

TRANSPORTATION IMPACT STUDY

Stafford Logistics Center

Aurora, Colorado

Prepared for:

Ware Malcomb
990 S. Broadway, Suite 230
Denver, CO 80209

Prepared by:

Felsburg Holt & Ullevig
6300 South Syracuse Way, Suite 600
Centennial, CO 80111
303.721.1440

Project Manager: Christopher J. Fasching, PE, PTOE
Project Manager: Philip Dunham, PE



FHU Reference No. 118444-01

January 2020

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION.....	1
II. EXISTING CONDITIONS.....	4
II.A. Land Use.....	4
II.B. Roadway System.....	4
II.C. Traffic Volumes and Operations.....	4
III. PROPOSED CONDITIONS	8
III.A. Site Trip Generation.....	8
III.B. Trip Distribution and Traffic Assignment.....	9
IV. FUTURE CONDITIONS.....	17
IV.A. Short Term Future Background	17
IV.B. Long-term Future Background.....	20
IV.C. Total Traffic Conditions	22
V. SUMMARY AND RECOMMENDATIONS.....	37

Appendices

- Appendix A. Traffic Counts
- Appendix B. Existing Conditions LOS
- Appendix C. NCHRP 684 (Internal Capture) Worksheets
- Appendix D. 2020-22 Background LOS
- Appendix E. 2040 Background LOS
- Appendix F. 2020-22 Total Traffic LOS
- Appendix G. 2040 Total Traffic LOS
- Appendix H. Signal Warrants
- Appendix I. Progression Analysis

List of Figures

	<u>Page</u>
Figure 1. Vicinity Map.....	2
Figure 2. Conceptual Site Plan	3
Figure 3. Existing Traffic Volumes.....	5
Figure 4. Existing Traffic Conditions	7
Figure 5. Short-Term Site Trip Distribution	10
Figure 6. Short-Term Site Generated Traffic.....	11
Figure 7. Long-Term Site Trip Distribution (Industrial)	13
Figure 8. Long-Term Site Trip Distribution (Retail).....	14
Figure 9. Long-Term Site Generated Traffic Assignment (Industrial)	15
Figure 10. Long-Term Site Generated Traffic Assignment (Retail).....	16
Figure 11. Short-Term Future Background Traffic Volumes	18
Figure 12. Short-Term Future Background Traffic Conditions.....	19
Figure 13. Long-Term Future (2040) Background Traffic Volumes.....	21
Figure 14. Long-Term Future (2040) Background Traffic Conditions.....	23
Figure 15. Short-Term Future Total Traffic Volumes	24
Figure 16. Short-Term Future Total Traffic Conditions.....	26
Figure 17. Long-Term Future (2040) Total Traffic Volumes	30
Figure 18. Long-Term Future (2040) Total Traffic Conditions.....	31

List of Tables

	<u>Page</u>
Table 1. Stafford Trip Generation Estimates.....	8
Table 2. Short-term Future (Year 3) 95 th Percentile Queueing – Stafford.....	28
Table 3. Long-term Future 95 th Percentile Queueing – Stafford.....	33
Table 4. Site Driveway Recommended Auxiliary Lane Length.....	35

I. INTRODUCTION

Ware Malcomb, on behalf of NorthPoint Development, is proposing to develop approximately 350 acres primarily in the southwest quadrant of the Picadilly Road and Colfax Avenue intersection in Aurora, Colorado. **Figure 1** illustrates the location of the site and the adjacent primary roadway network (existing and future planned roadways).

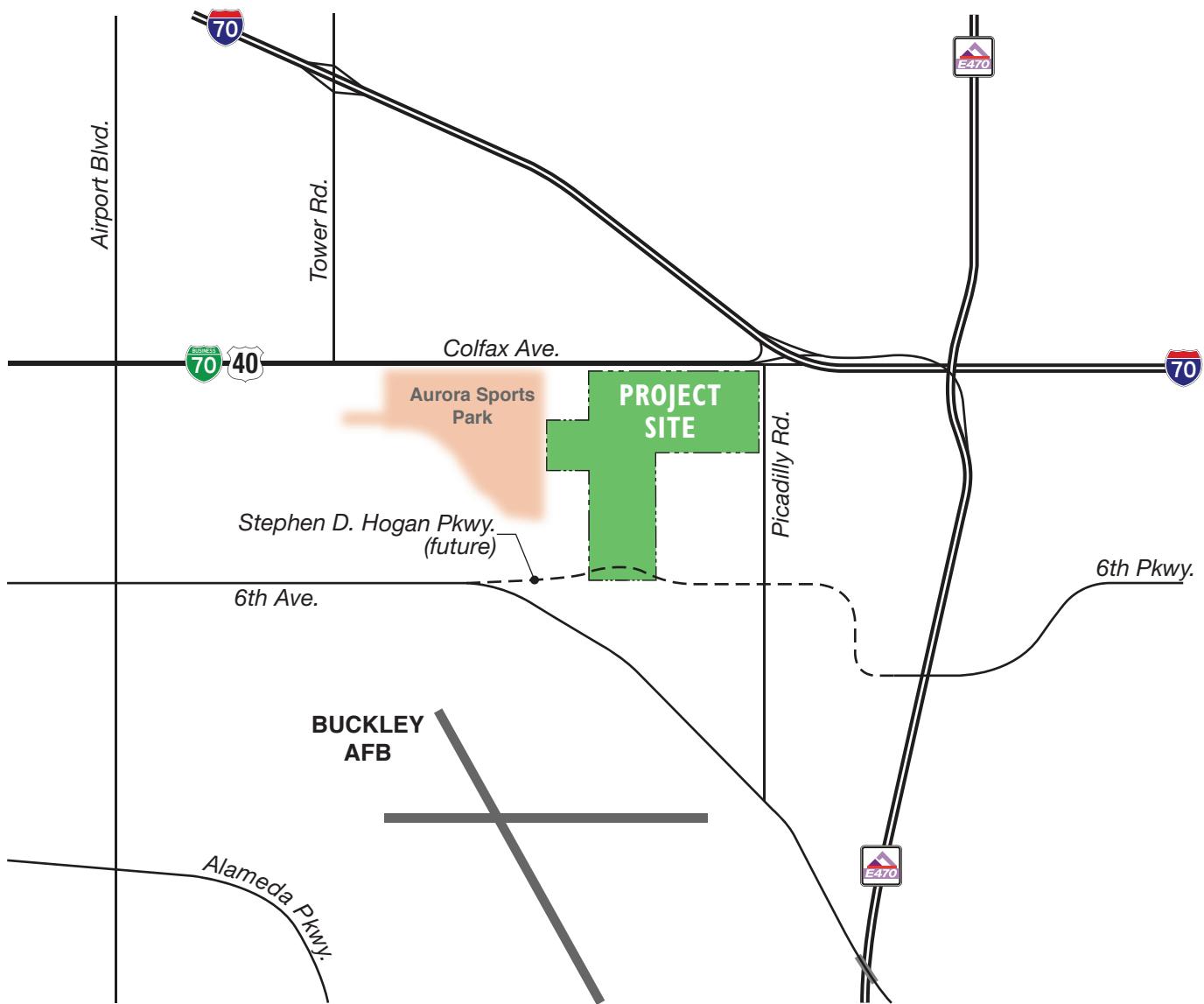
The proposed industrial development would consist of approximately 4.4 million square feet of industrial park, approximately 160,000 square feet of mixed retail including a bank and supermarket, a gas station, and two hotels with a total of 200 rooms. **Figure 2** depicts the current site plan concept.

The purpose of this Transportation Impact Study (TIS) is to estimate the potential impacts specific to the proposed development and to identify any resultant required roadway and/or intersection improvements and traffic control needs. Two future planning horizons were evaluated:

- **Short Term Future.** Three scenarios of traffic impacts were examined assuming completion of each of the first three buildings over the course of the first three years of development. These scenarios assume the realignment of Picadilly Road in conjunction with the completion of the third building in year three.
- **Long Term Future.** This scenario examines the traffic impacts within the context of the year 2040 horizon and full build out of the project site.

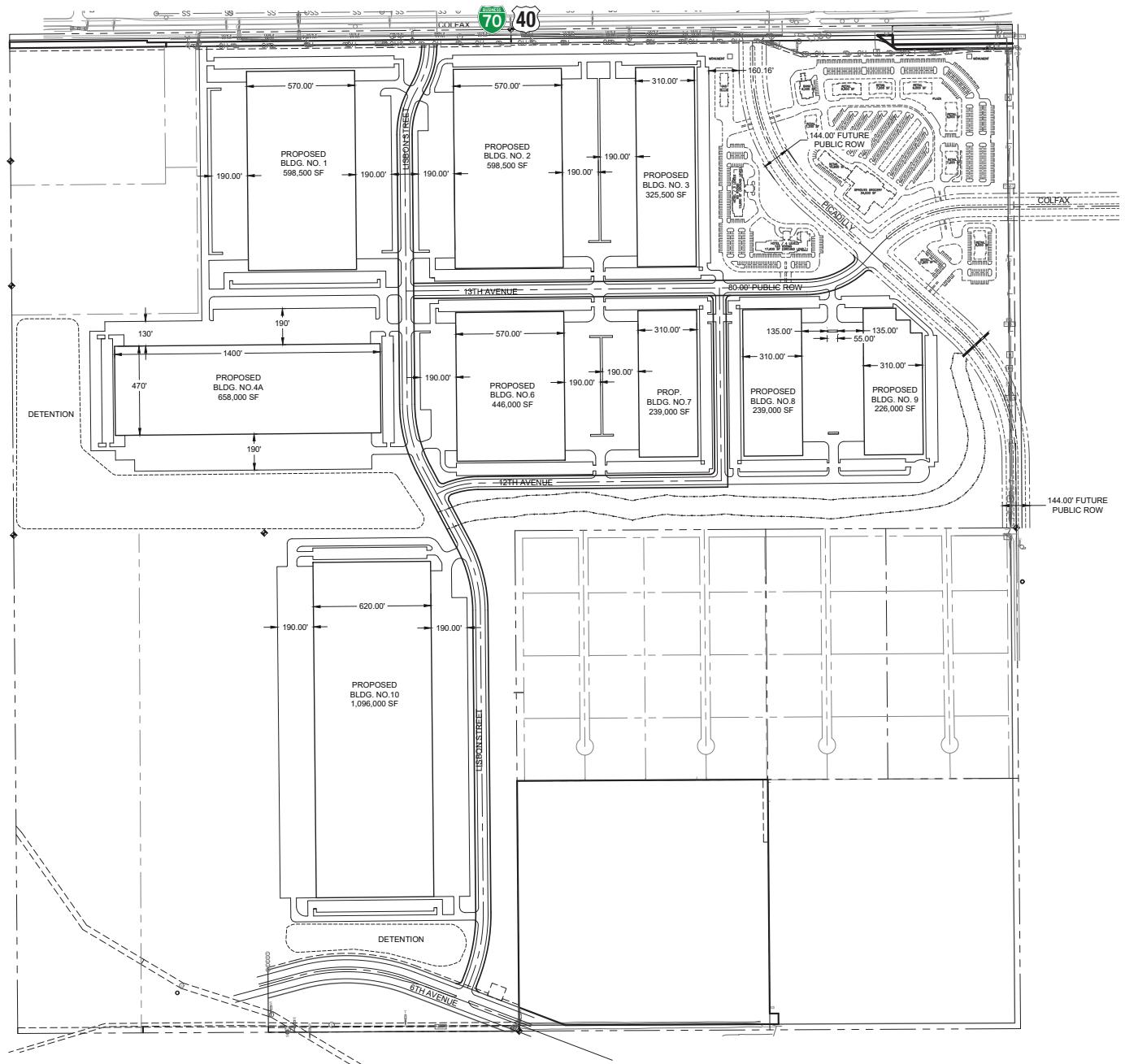
This study leverages the planning effort currently underway in support of the I-70/Picadilly Road interchange. Specifically, the City of Aurora is currently in the midst of reevaluating the Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) originally prepared in 2007, which includes updating the past effort with respect to traffic operations. As part of the City's interchange study, year 2040 traffic projections have been developed, and this TIS was conducted in conformance with the interchange effort. The interchange effort also includes the preparation of an Interchange Access Request, so while numerous processes will shortly be completed relative to the approval of this interchange, the funding to construct the interchange is not fully secured and the schedule of its construction remains unknown. For purposes of this study, it is assumed that the interchange is not in place and opened by the short-term future planning horizon, but it will be in place by 2040.

This report provides operational information including intersections levels of service and peak hour queue lengths, both of which inform recommendations in achieving short- and long-term functionality. Coordination with the Colorado Department of Transportation (CDOT) is ongoing regarding both the planned interchange and access to the site.



NORTH

FIGURE I
Vicinity
Map



NORTH

FIGURE 2
Conceptual Site Plan

II. EXISTING CONDITIONS

II.A. Land Use

The proposed site is undeveloped. Limited development around the site exists including the Aurora Sports Park and M & M Auto to its west, single-family housing to its north (which is set back from Colfax), and large-lot residential development southeast of the site. An approved mixed use development, referred to as Horizon Uptown, is planned east of the site across Picadilly Road.

II.B. Roadway System

Roadways near the site are further described as follows:

- **Colfax Avenue** is a four-lane divided east-west state highway (US 40 and Business I-70) along the sites' northern boundary. This roadway is currently a four-lane median-separated highway adjacent to the site and extends west through Aurora to downtown Denver and further to Golden. To the east, Colfax Avenue directly merges with I-70. Drivers also have the option of making use of the I-70 Frontage Road along the south side of Colfax Avenue, which connects through the I-70/E-470 interchange and parallels I-70 along its south side to the east. The posted speed limit adjacent to the site is 55 miles per hour (MPH).
- **Picadilly Road** is a two-lane north-south road that currently extends along the site's east side. Picadilly Road extends approximately 2 miles south from the I-70 Frontage Road to SH 30. Longer term, this roadway's alignment is planned to shift west near Colfax Avenue and extend north to a new interchange with I-70 and connect with the existing Picadilly Road north of Smith Road. Its ultimate cross-section is planned to be a six-lane major arterial facility. Adjacent to the site, the existing posted speed limit is 45 MPH.

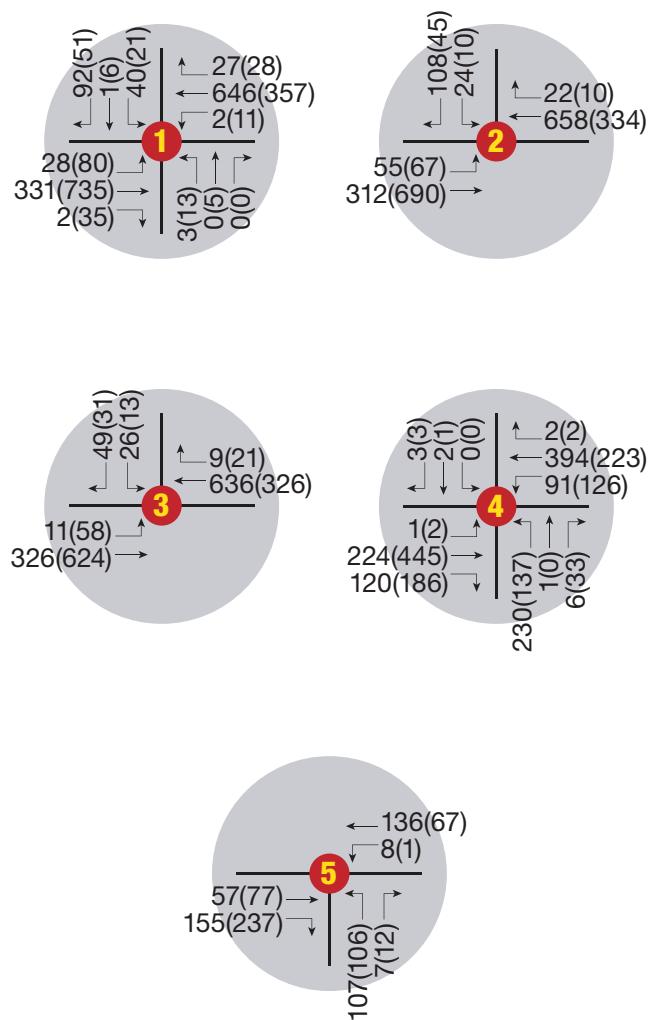
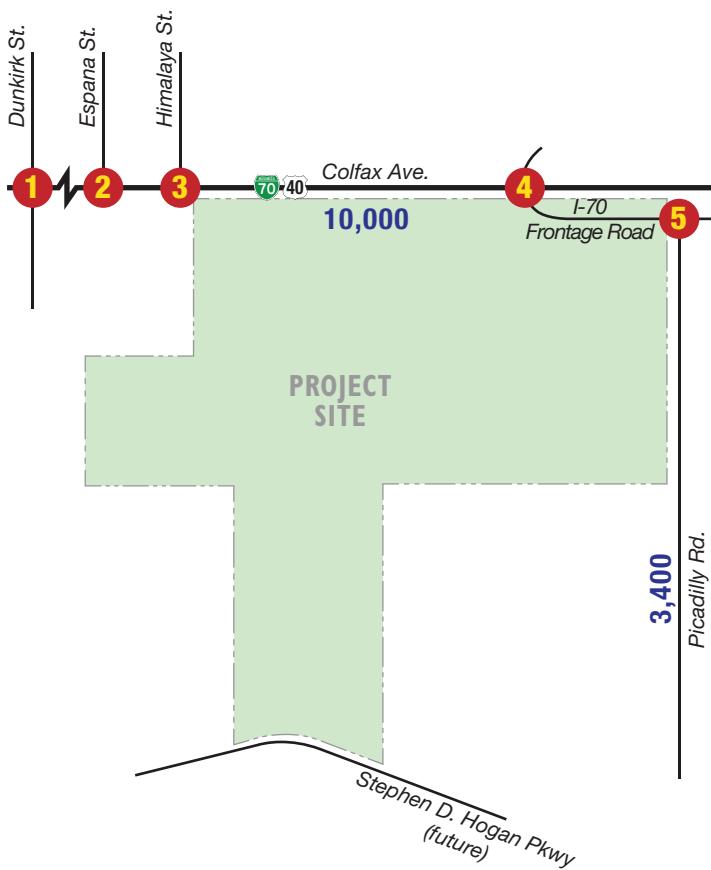
Another key future roadway in the area is Stephen D. Hogan Parkway. This roadway is currently under construction and will connect SH 30 (near the northeast corner of the Buckley Air Force Base) to the E-470/6th Parkway interchange. This roadway is initially being constructed as a two-lane facility, but long-term plans include eventual widening to a six-lane major arterial roadway.

II.C. Traffic Volumes and Operations

Weekday AM and PM peak hour turning movement counts were recently collected along Colfax Avenue. Traffic counts data along Picadilly were obtained from the 6th Avenue Extension study in support of the Stephen D. Hogan Parkway. **Figure 3** shows the data. These improvements have been developed based on the current understanding of the I-70/Picadilly Road interchange project. It is acknowledged that results of the interchange project study may provide additional recommendations at arterial intersections in the study area. **Appendix A** contains count data sheets.

As shown, Colfax Avenue serves 10,000 vehicles per day (VPD). Turning movements at the Colfax Avenue/Dunkirk Street and the Colfax Avenue/I-70 Frontage Road intersections show that Colfax Avenue serves 900 to 1,200 vehicles per hour during the peak hours. Picadilly Road serves a fraction of the traffic that Colfax Avenue serves at 3,400 VPD and approximately 300 vehicles per hour during the peak hours. Turning movements at the Picadilly Road/I-70 Frontage Road and the Colfax Avenue/I-70 Frontage Road intersections indicate a strong pattern between Colfax Avenue to the west and Picadilly Road to the south.

KEY MAP



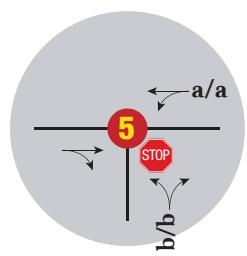
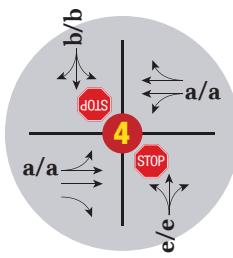
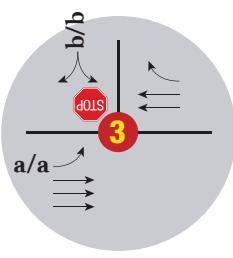
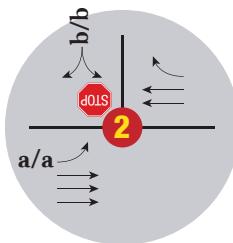
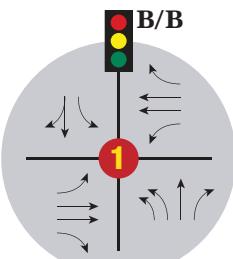
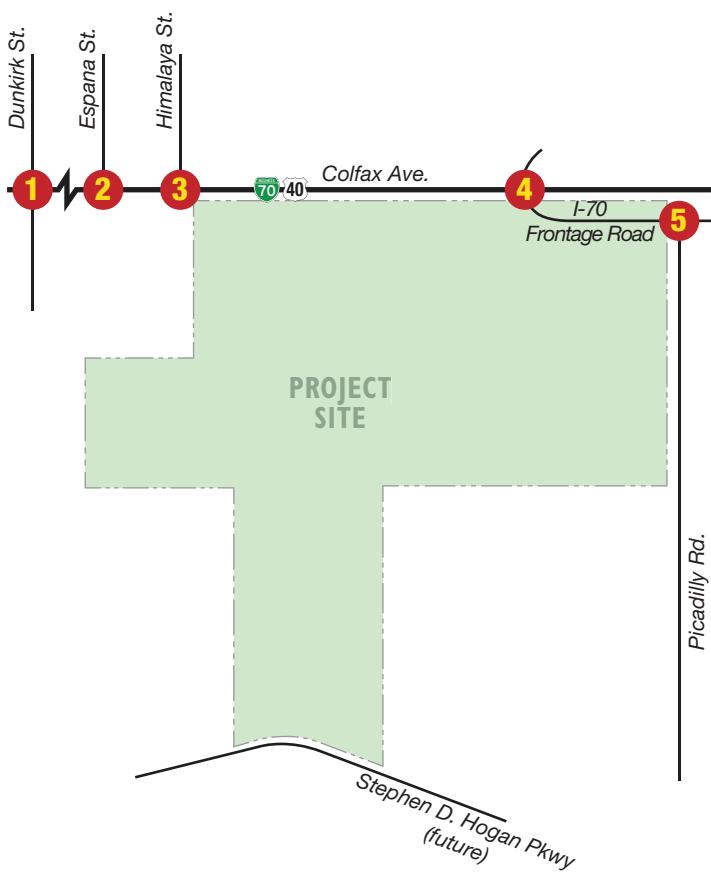
LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
XXXX = Daily Traffic Volumes

Traffic operations within the study area were evaluated according to techniques documented in the Highway Capacity Manual, 6th Edition (Transportation Research Board, 2016) using the existing traffic volumes, intersection geometry, and traffic control. Level of Service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. LOS is described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. For STOP controlled intersections, LOS is calculated for each movement that must yield the right-of-way. In urbanized areas, LOS D is typically considered to be acceptable for peak hour traffic operations and is the standard set in the City of Aurora TIS Guidelines.

Figure 4 also shows the existing traffic control, intersection geometry, and results of the LOS analyses. **Appendix B** includes the analysis worksheets. As indicated, all intersections currently operate within acceptable parameters, at LOS B or better, during peak times with the exception of the northbound approach at the Colfax Avenue/I-70 Frontage Road, which operates at LOS E during both the AM and PM Peak hours due to heavy northbound left turns. Peak hour and four-hour warrants provided in **Appendix H** indicate that signalization at the intersection of Colfax Avenue/I-70 Frontage Road is warranted under current conditions. However, CDOT does not support signalization of this location as this intersection will be eliminated upon realignment of Picadilly Road and the new intersection of Picadilly Road/Colfax Avenue should be signalized upon construction of the realignment.

KEY MAP



LEGEND

- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
- x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
- = Stop Sign
- = Traffic Signal

III. PROPOSED CONDITIONS

III.A. Site Trip Generation

The current development proposal consists of approximately 4.4 million square feet of industrial park uses and related retail/commercial/hotel uses once built out. Phase I of the development will include the industrial park portion of the site, and this phase was analyzed as the short-term development scenario of 5 years. The entirety of the mixed use will be included in Phase 2. NorthPoint Development does not intend to build the retail portions of the site until the Horizon Uptown development is well underway and/or funding is in place to construct the Picadilly/I-70 interchange as the retail uses will not be supported under current surrounding land use and regional access conditions. A trip generation analysis for the proposed site plan was conducted using average weekday data contained in Trip Generation, 10th Edition, Institute of Transportation Engineers (ITE), 2017. **Table I** shows the trip generation estimates.

Table I. Stafford Trip Generation Estimates

Land Use	ITE Code	Quantity	Units	Daily	AM Peak Hour			PM Peak Hour			
					In	Out	Total	In	Out	Total	
Industrial Park (Bldg. 1)	130	598.5	KSF	2,381	194	45	239	50	189	239	
Industrial Park (Bldg. 1 & 2)	130	1,197	KSF	3,414	388	91	479	101	378	479	
Industrial Park (Bldg. 1-3)	130	1,522.5	KSF	3,868	493	116	609	128	481	609	
Industrial Park (Total)	130	4,426.5	KSF	6,738	1,434	337	1,771	372	1,399	1,771	
Shopping Center	820	75.6	KSF	4,971	118	72	190	212	230	442	
Supermarket	850	34	KSF	3,623	78	52	130	178	171	349	
Drive-in Bank	912	6	KSF	614	33	24	57	61	62	123	
Hotel	310	200	Rooms	1,672	56	39	95	63	61	124	
Gas/Service Station	945	16	Pumps	2,752	82	82	164	112	112	224	
Total Trips					20,370	1,801	606	2,407	998	2,035	3,033
Internal Capture Reduction¹					380	5	5	10	19	19	38
Pass by Reduction²					1,376	41	41	82	56	56	112
Total New External Trips					18,614	1,755	560	2,315	923	1,960	2,883

Notes:

1 Daily internal capture is assumed to be 10 times the PM value as calculated using ITE methodology. See text relative to Peak Hour internal trip-making.

2 Pass by reduction of 50% for Gas/Service Station is assumed from traffic passing the site along Picadilly Road.

NCHRP 684 provides methodology for internal capture reductions based upon the interactions of different land uses within mixed-use developments including office, retail, restaurant, residential, cinema, and hotel. The methodology considers that mixed-use developments will keep a portion of the trips generated internal to the site, thus reducing impacts to the adjacent roadway network. Internal capture worksheets can be found in **Appendix C**.

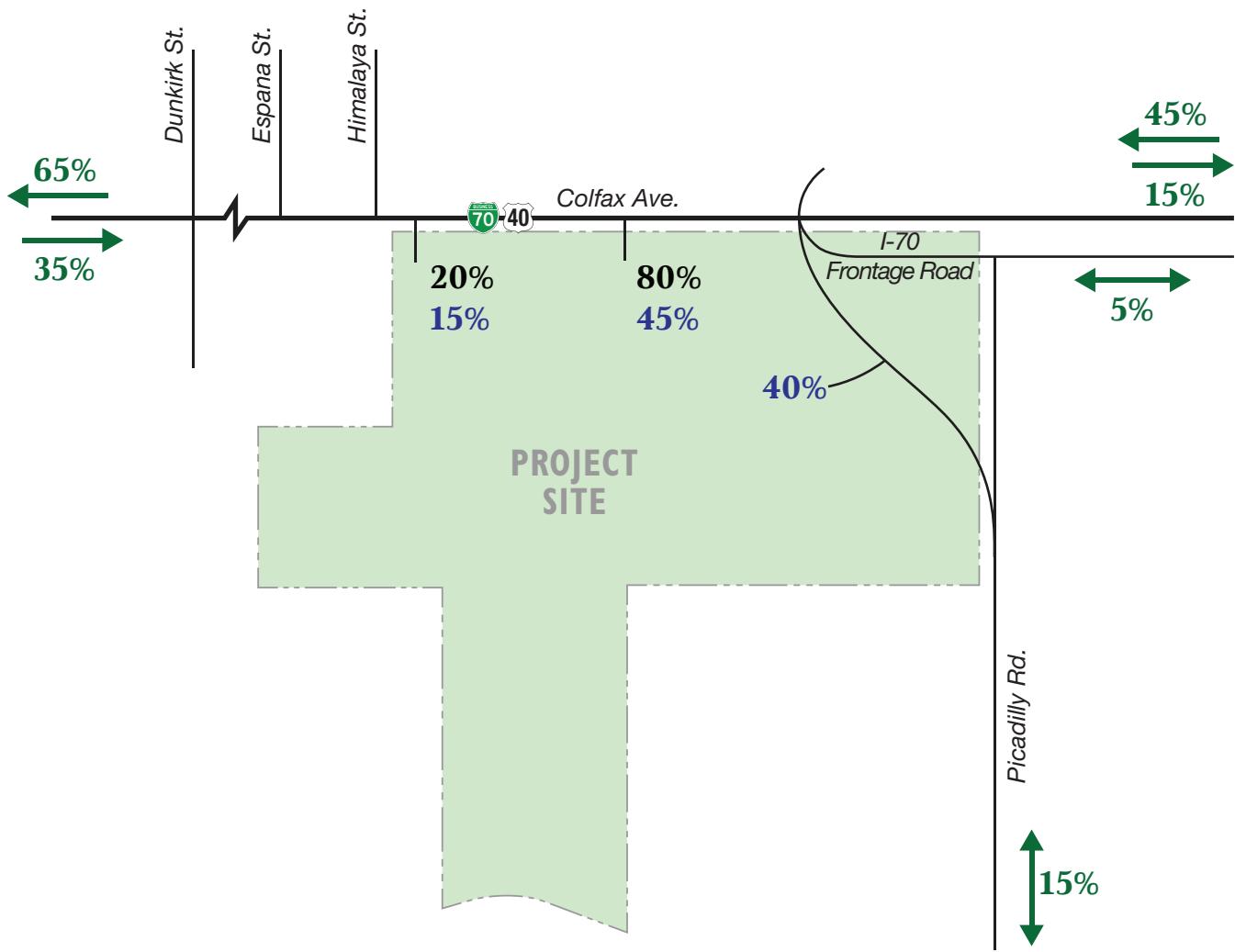
As can be seen, the proposed development would generate approximately 18,600 external trips per day, with about 2,300 AM peak hour trips and about 2,900 PM peak hour external trips. The first phase of development includes the entire 4.4 million square feet of industrial park, which generates about 6,700 trips per day. Approximately 10 percent of the trip generation associated with the industrial park uses will be larger trucks based on data for warehousing and industrial parks provided in the Trip Generation Handbook, 3rd Edition, ITE, 2014.

III.B. Trip Distribution and Traffic Assignment

Trip distribution percentages for this site were based, in part, on the turning movement counts and on the Northeast Aurora Transportation Study (NEATS) travel demand model, while not fully in the NEATS study area the site is immediately adjacent to the NEATS study area and City of Aurora has requested that land use model be used for this project. The geographic distribution is varied between the short- and long-term planning horizons realizing that the development will only be partially complete in the short-term and access will be limited to one right-in/right-out and two full movement accesses (one onto Colfax Avenue and one onto Picadilly Road). Over the short-term, site traffic will rely on Colfax Avenue and Picadilly Road for access. The short-term analysis further reflects a scenario in which the I-70/Picadilly Road interchange would not yet be built (nor the continuity of Picadilly Road across I-70). Access to Picadilly Road is provided only in the third year of the short-term scenario. Longer term, site traffic will have more options including Picadilly Road's full connection to I-70 as well as an access onto Stephen D. Hogan Parkway along the site's south side.

Figure 5 shows the short-term site-trip distribution percentages and **Figure 6** shows the short-term trip assignment resulting from applying the percentages. As indicated, the development's greatest impact in the short-term is expected to be onto Colfax Avenue, adding 1,900 VPD onto this roadway to the site's east and west upon completion of the first three buildings. Entering and exiting trips along Colfax Avenue differ due to the existing interchange not providing access onto westbound I-70, resulting in heavier exiting trips to the west to access I-70 via Tower Road.

Figure 7 and **Figure 8** show the long-term site-trip distribution percentages for the industrial and retail portions of the site, respectively. These vary as the industrial portion of the site will have more of a regional distribution while the retail will be focused more locally. **Figure 9** and **Figure 10** show the long-term trip assignments resulting from applying the percentages for the industrial and retail portions of the site, respectively. As indicated, from combining traffic volumes from **Figure 9** and **Figure 10** the development's greatest impact in the long-term is expected to be onto Picadilly Road to the north, adding 7,000 VPD. Picadilly Road to the south would serve 4,900 VPD, Colfax Avenue to the west would serve 5,600 VPD, Colfax Avenue to the east would serve 3,600 VPD, and Stephen D. Hogan Parkway would serve 2,100 VPD.



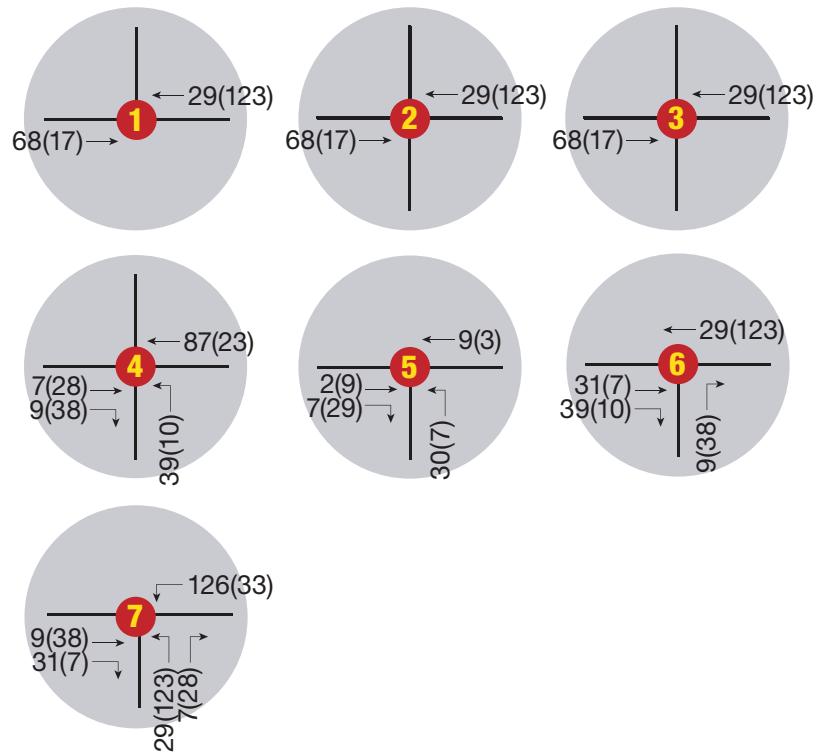
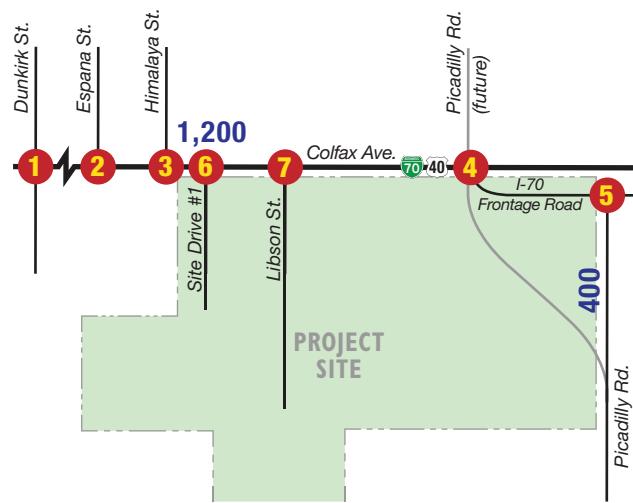
LEGEND

- XX%** = Site Trip Distribution
- XX%** = Access Distribution 1 & 2
- XX%** = Access Distribution 3

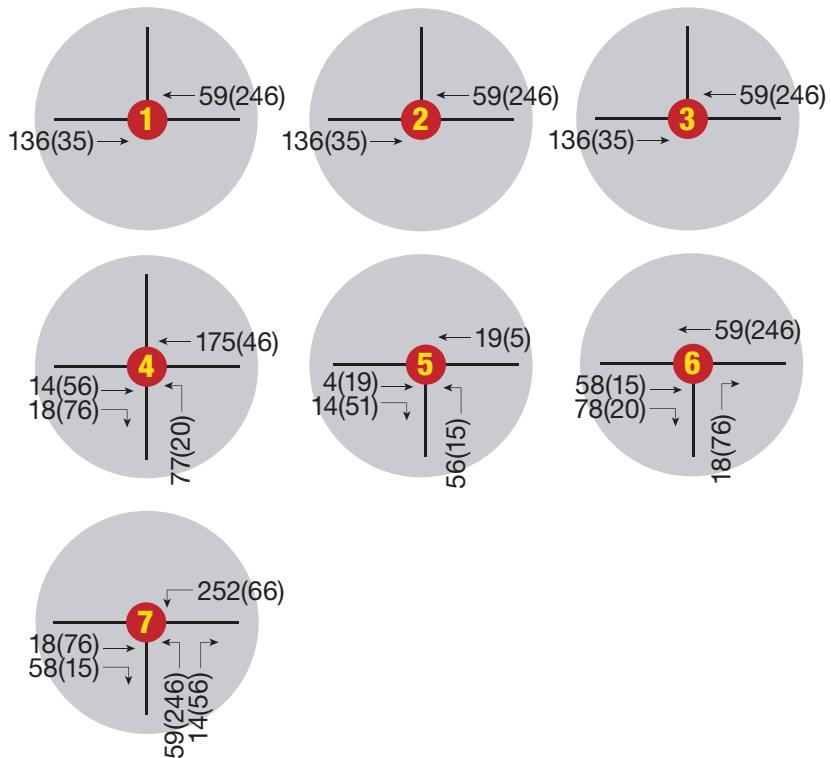
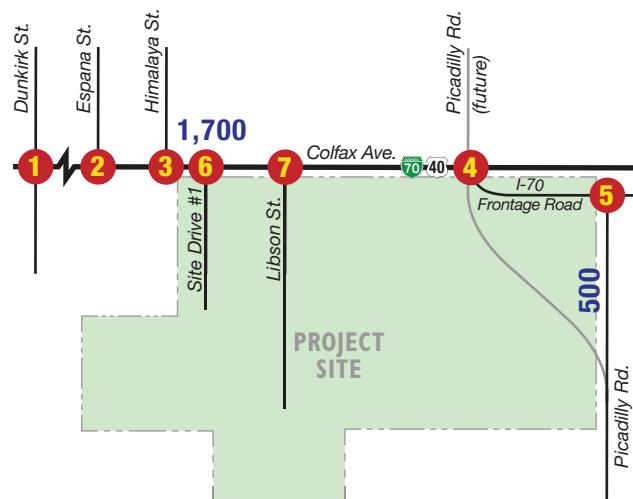
NORTH

FIGURE 5
Short-Term
Site Trip Distribution

Building 1



Building 1 & 2



LEGEND

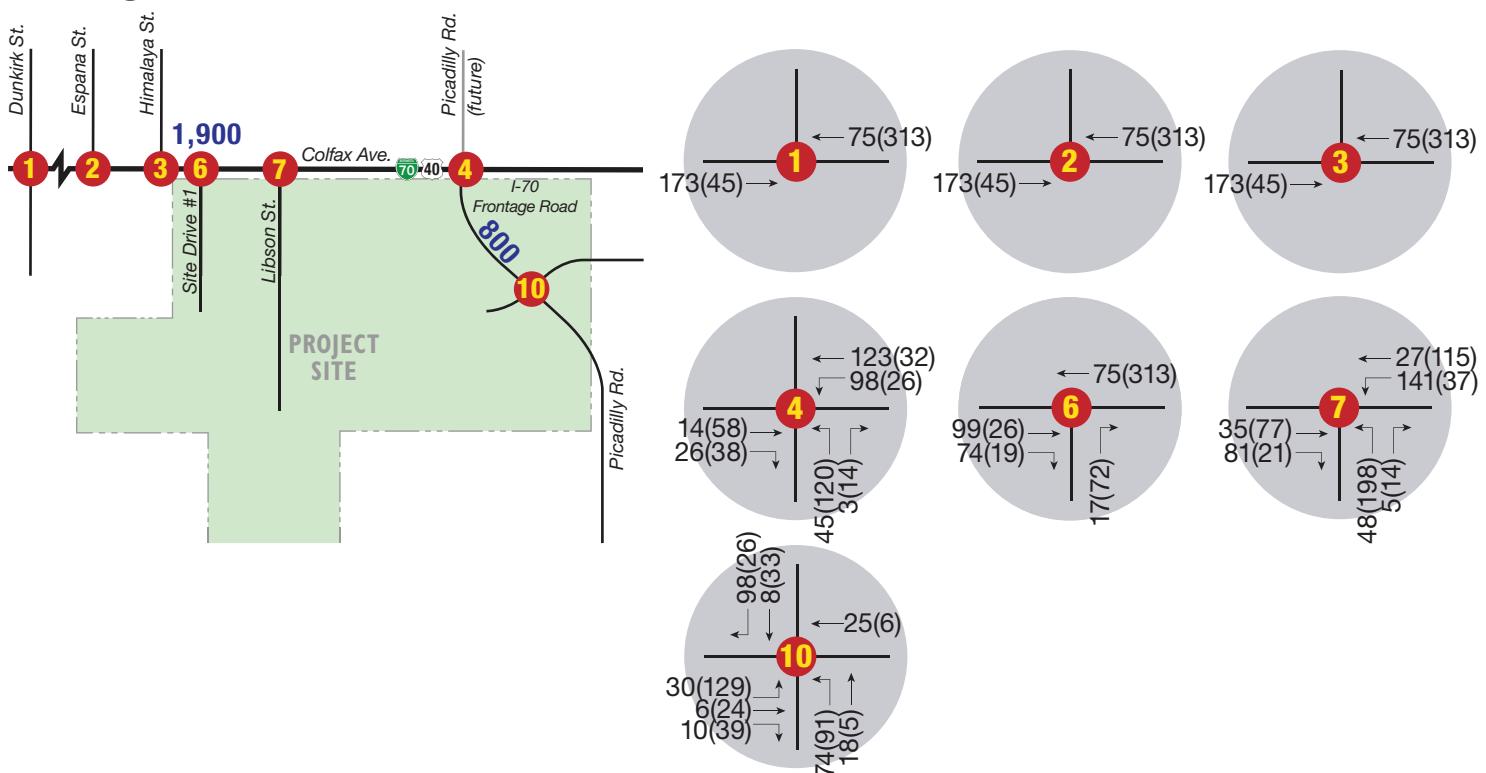
XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

NOTE: ADT volumes may double count some trips due to trip routing

Short-Term Site Generated Traffic

Building 1 - 3

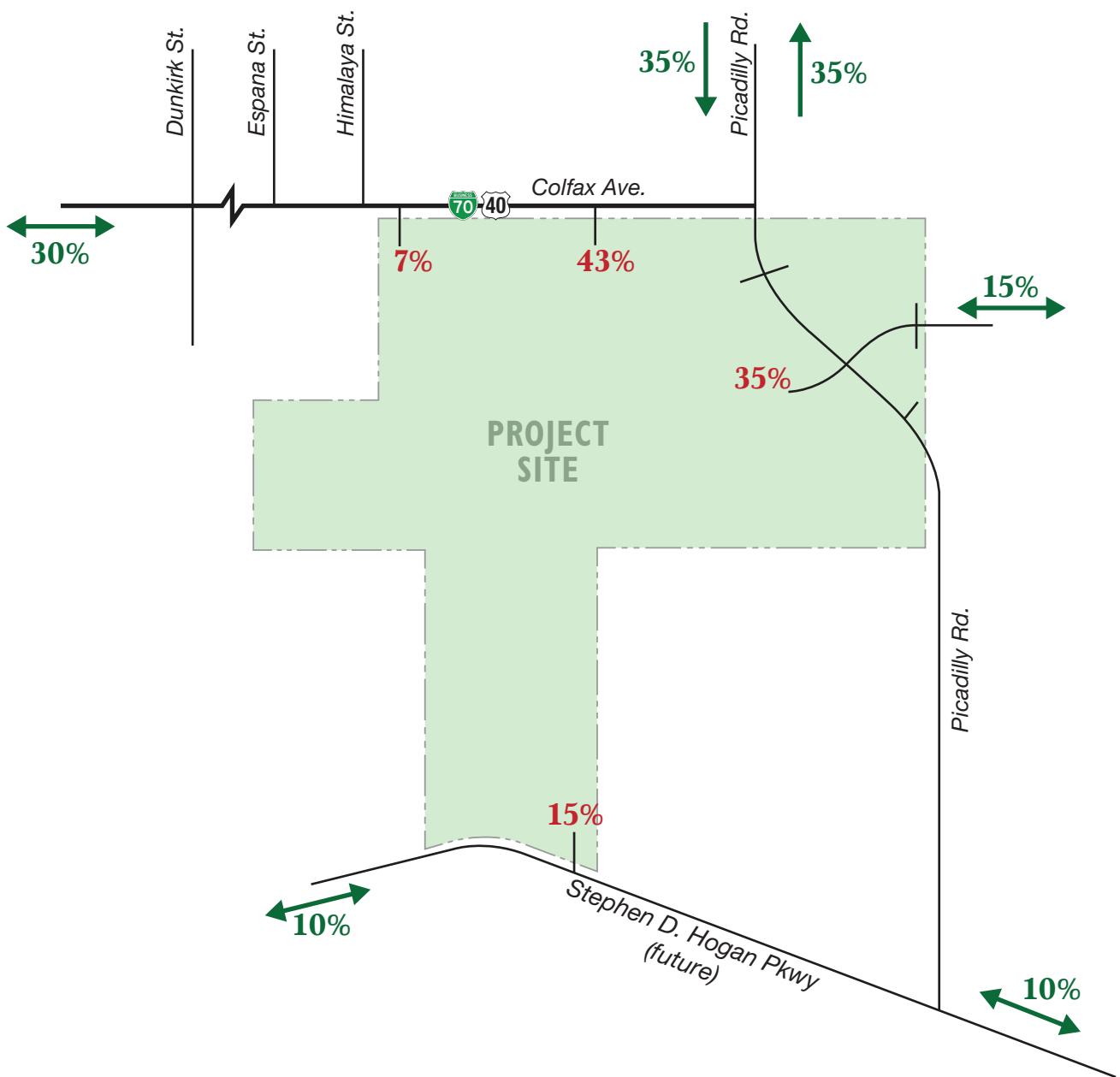


LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

NOTE: ADT volumes may double
count some trips due to trip routing

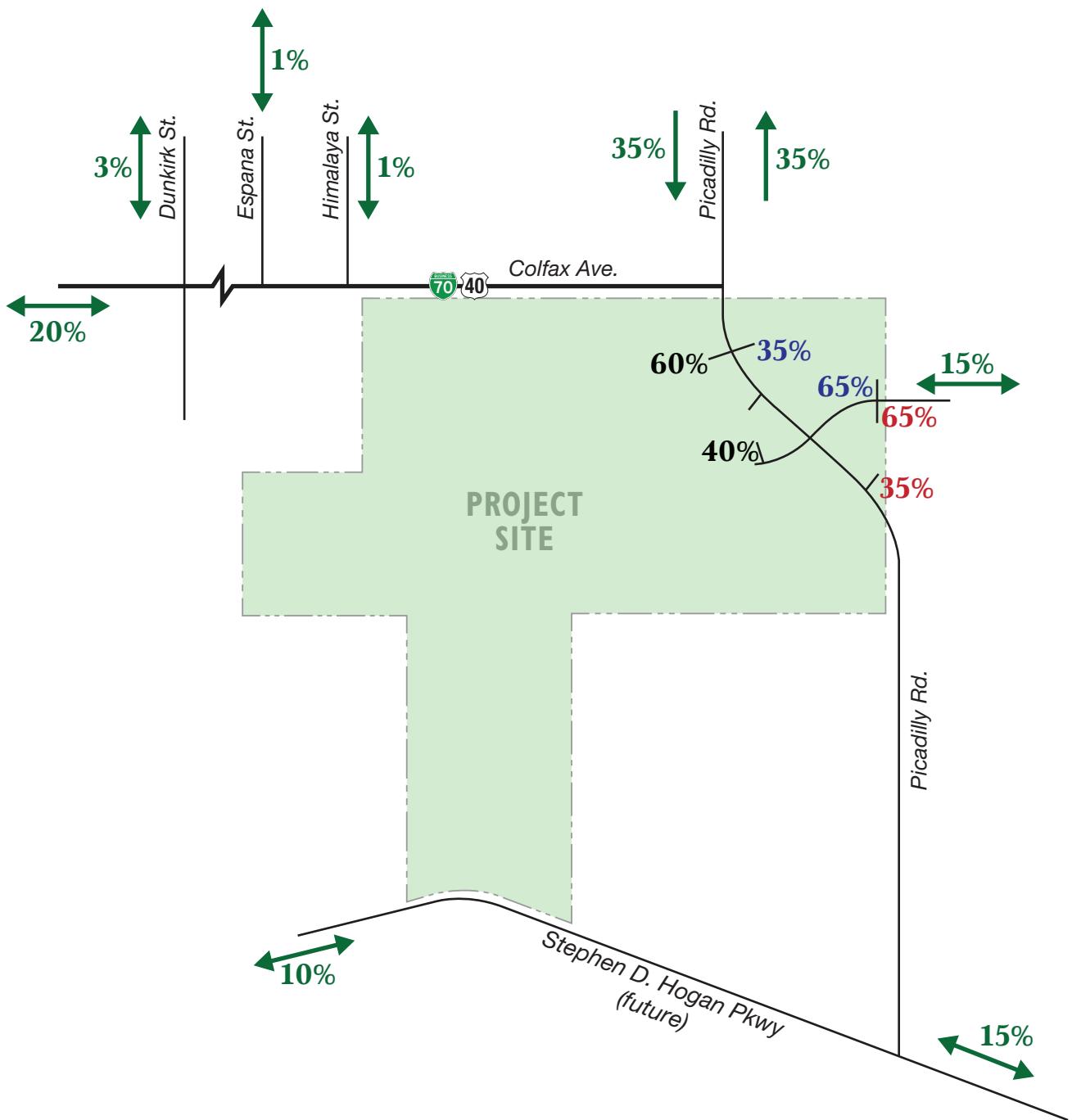


LEGEND

- ↔ XX% = Site Trip Distribution
- ↔ XX% = Access Distribution

NORTH

FIGURE 7
Long-Term
Site Trip Distribution (Industrial)



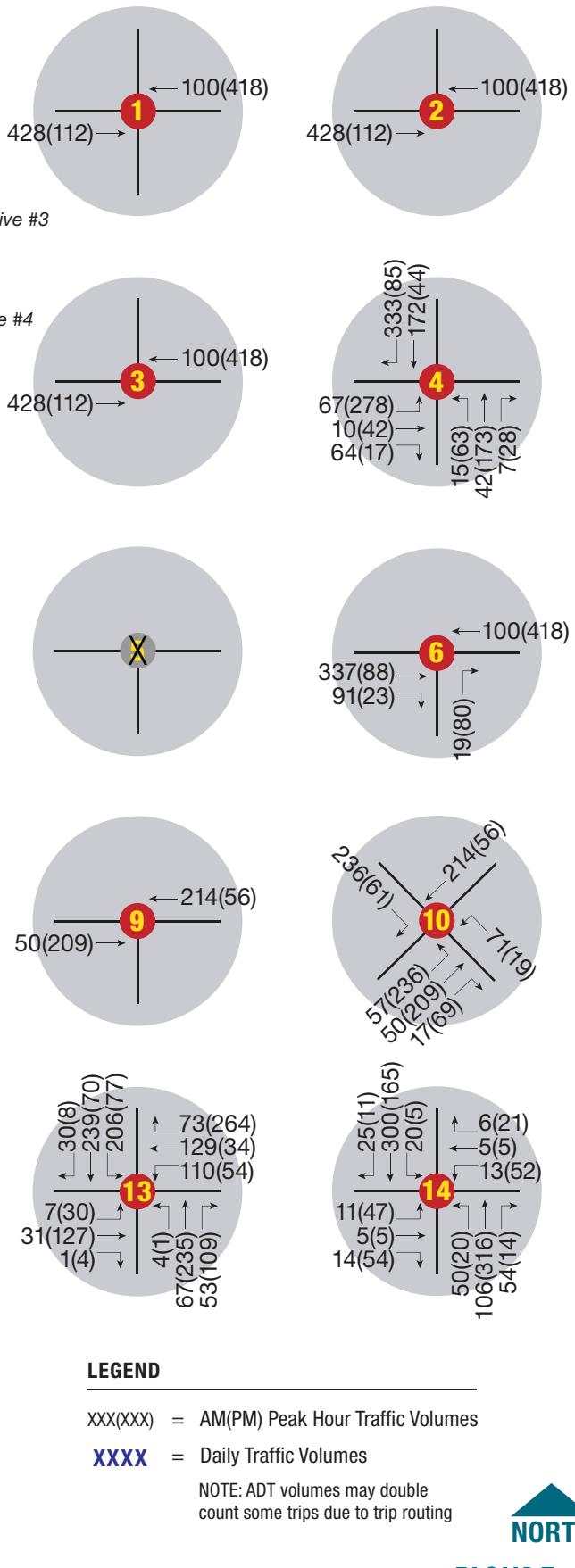
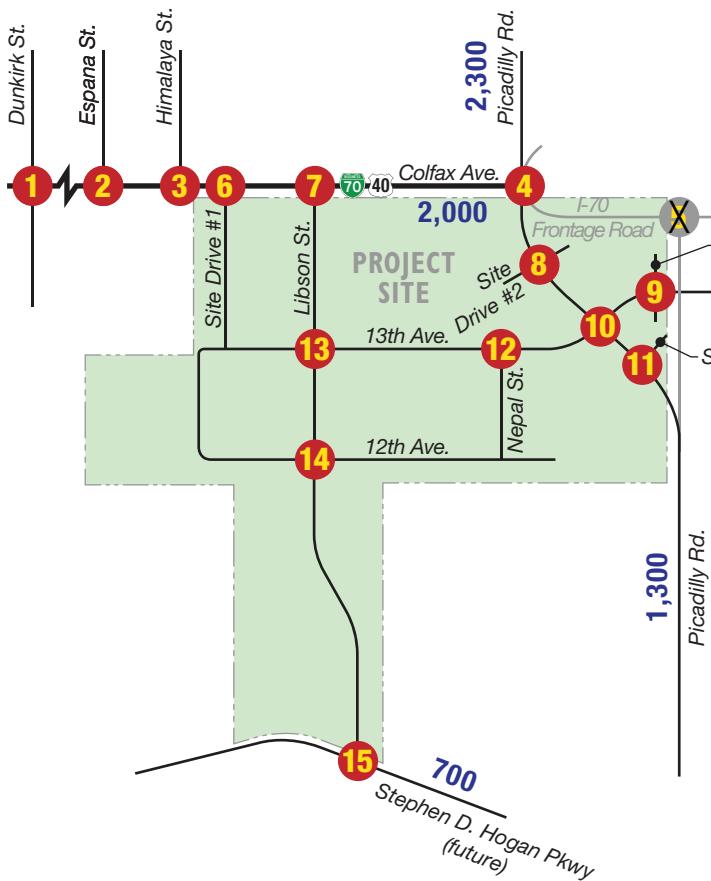
LEGEND

- XX%** = Site Trip Distribution
- XX%** = Gas Station & Hotels Access Distribution
- XX%** = Grocery, Restaurants & Retail Access Distribution
- XX%** = Retail Access Distribution

NORTH

FIGURE 8
Long-Term
Site Trip Distribution (Retail)

KEY MAP



LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

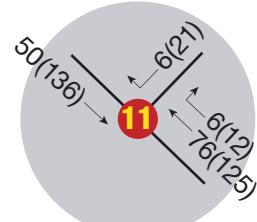
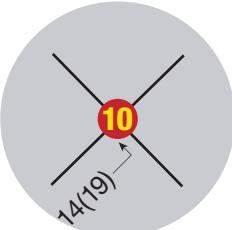
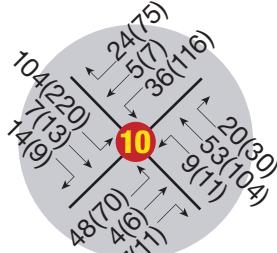
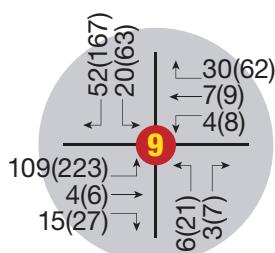
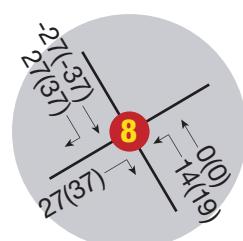
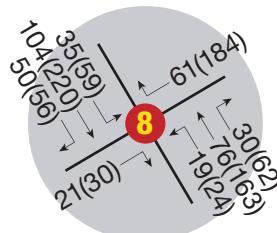
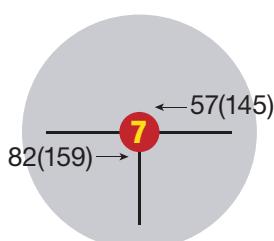
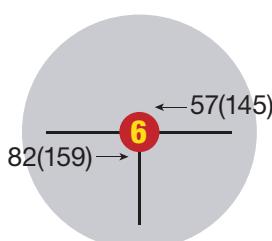
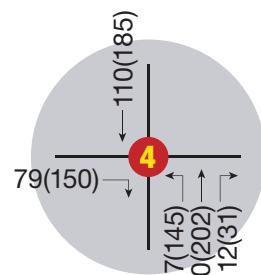
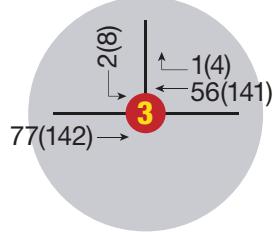
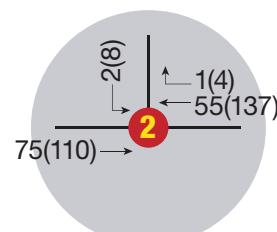
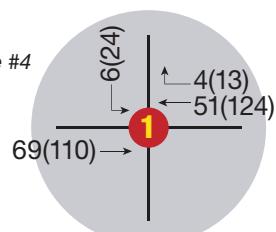
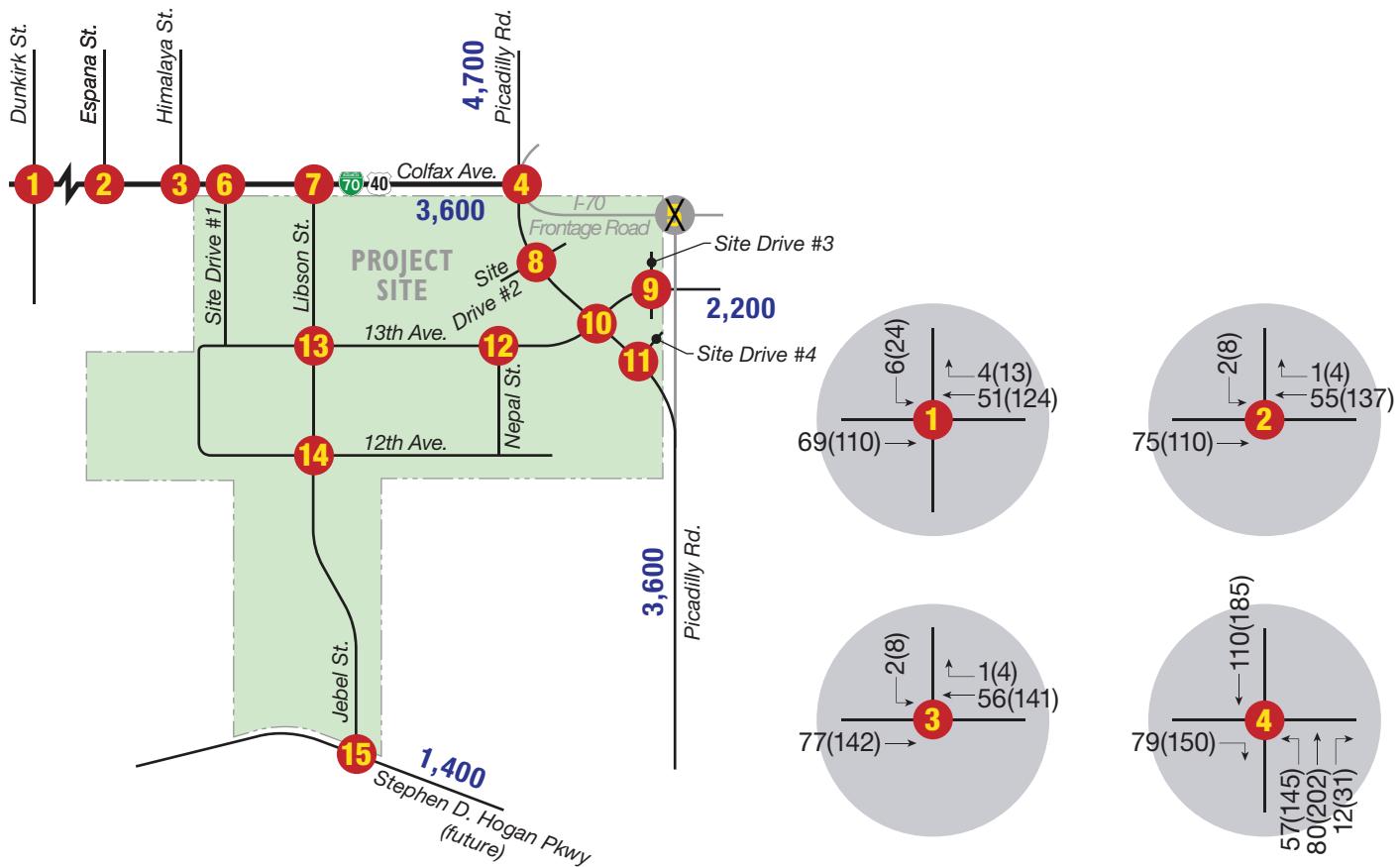
NOTE: ADT volumes may double count some trips due to trip routing



FIGURE 9

Long-Term Site Generated Traffic Assignment (Industrial)

KEY MAP



LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

NOTE: ADT volumes may double count some trips due to trip routing



FIGURE 10

Long-Term Site Generated Traffic Assignment (Retail)

IV. FUTURE CONDITIONS

IV.A. Short Term Future Background

Roadway System

The short-term scenario evaluates the first three years of the Stafford Logistics Center. Improvements associated with the I-70/Picadilly interchange are not anticipated in this timeline, however the realignment of Picadilly Road is anticipated during year three. The construction of Stephen D. Hogan Parkway as four-lanes of the ultimate six-lane arterial cross section will be complete to the south of the Stafford site.

Traffic Volumes

Phase 1 of the development will consist of the first three buildings of the industrial park portion of the site. Access will be provided onto Colfax Avenue via one right-in-right-out and one full movement access, and upon completion of the Picadilly Road realignment one full movement access onto Picadilly Road via realigned Colfax Avenue. The right-in-right-out access onto Colfax Avenue is intended to provide shared access with the adjacent property to the west. The key intersections of analysis include Colfax Avenue/Dunkirk Street, Colfax Avenue/Espana Street, Colfax Avenue/Himalaya Street, Colfax Avenue/I-70 Frontage Road (replaced by Picadilly Road/Colfax Avenue in year three), and Picadilly Road/I-70 Frontage Road (replaced by Picadilly Road/realigned Colfax Avenue in year three). The I-70/Picadilly Road interchange and is not assumed to be constructed within the short-term timeframe. The signalization of Colfax Avenue/I-70 Frontage Road is warranted but has not been considered given a lack of support by CDOT staff and it is recommended Picadilly Road/Colfax Avenue be signalized upon realignment of Picadilly Road.

Background traffic is the component of roadway volumes that would use the adjacent roadway system regardless of site development. Along Colfax Avenue adjacent to the site, moderate to heavy growth is expected over the next few years based on data from the NEATS model and other developments near the site. For this analysis, a 6 percent annual growth was assumed for the entire study area.

Figure 11 illustrates short-term background traffic volumes in each of the three years for the short term scenario.

Traffic Control

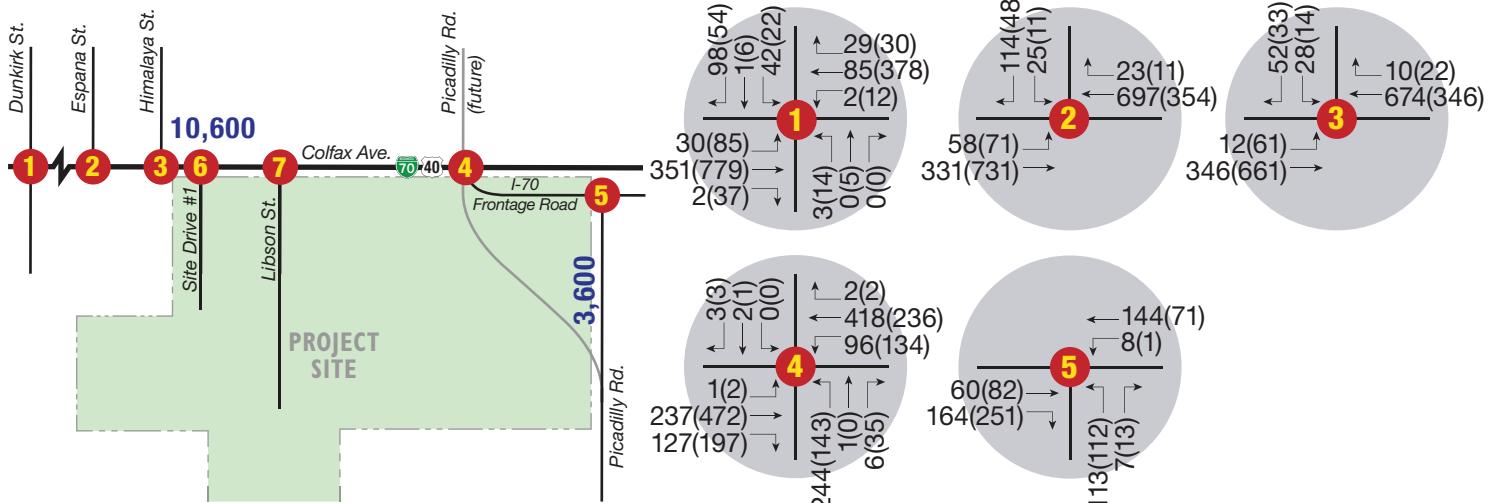
The short-term background traffic is not anticipated to trigger any additional signalization warrants. All intersections are assumed to be side-street-stop controlled except for Colfax Avenue/Dunkirk Street, which is signalized under existing conditions. The northbound approach of Colfax Avenue/I-70 Frontage Road is anticipated to experience LOS F during peak hours in years 1 and 2 which will be improved upon signalization of Picadilly Road/Colfax Avenue.

Traffic Operations

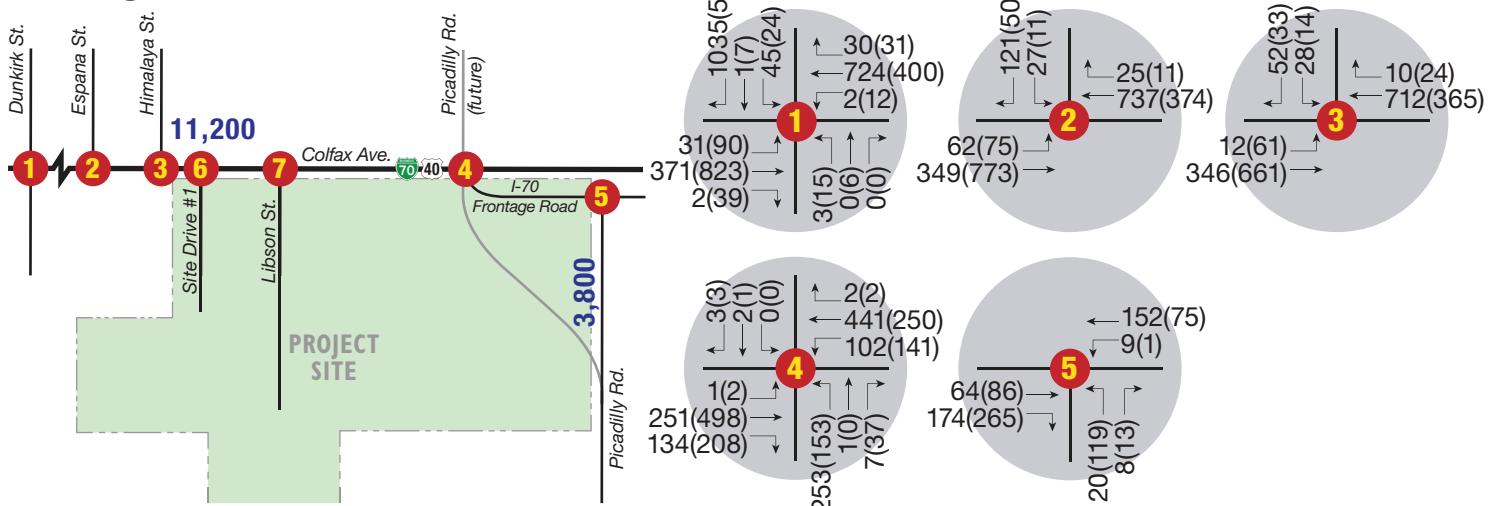
The short-term background traffic volume magnitudes are only marginally greater than existing conditions. As such, short-term traffic operations are very similar to existing conditions. As indicated, all intersections currently operate within acceptable parameters, at LOS D or better with the exception of the previously mentioned northbound approach of Colfax Avenue/I-70 Frontage Road.

The Short-term Future background traffic volumes were used as the basis for intersection capacity analyses, the results of which are shown on **Figure 12**, and LOS worksheets can be found in **Appendix G**.

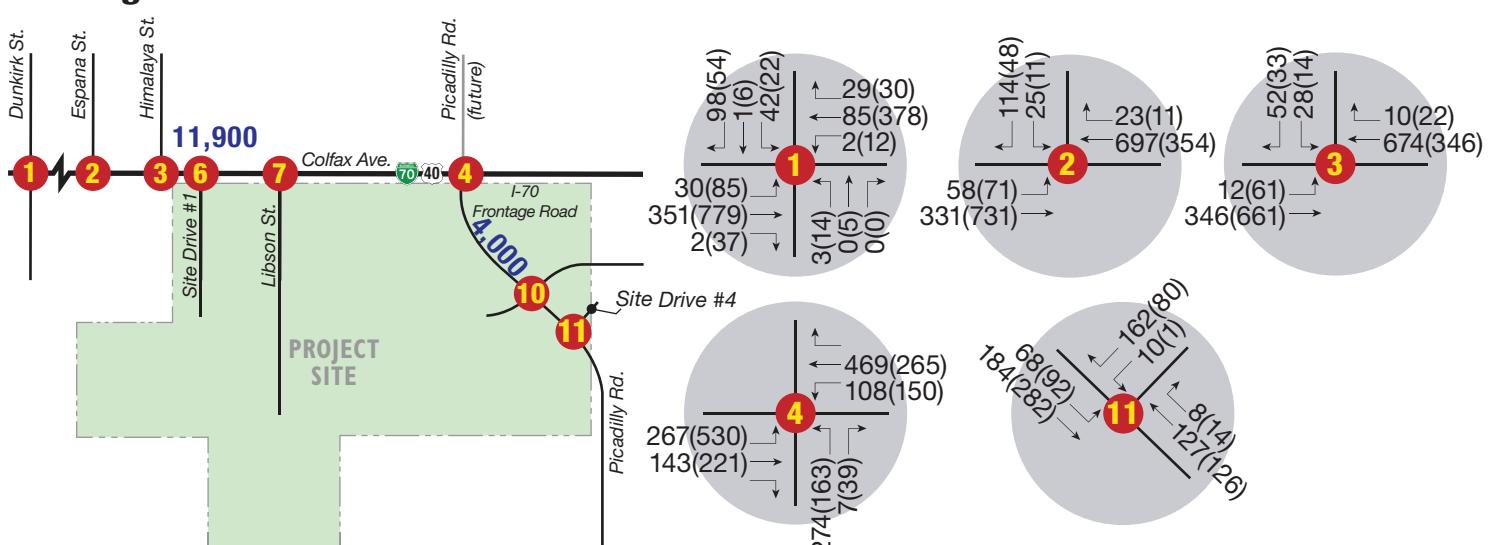
Building 1



Building 1 & 2



Building 1 - 3



LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

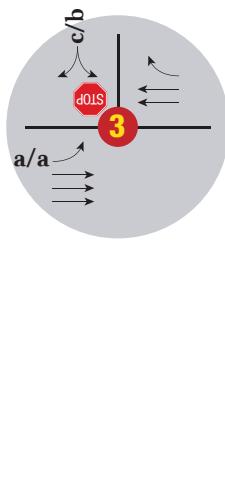
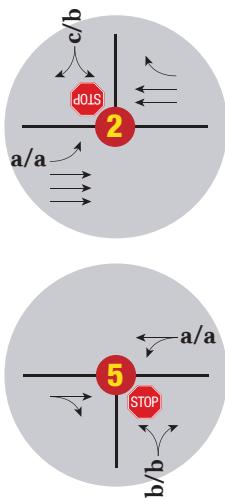
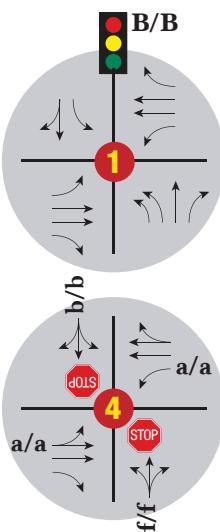
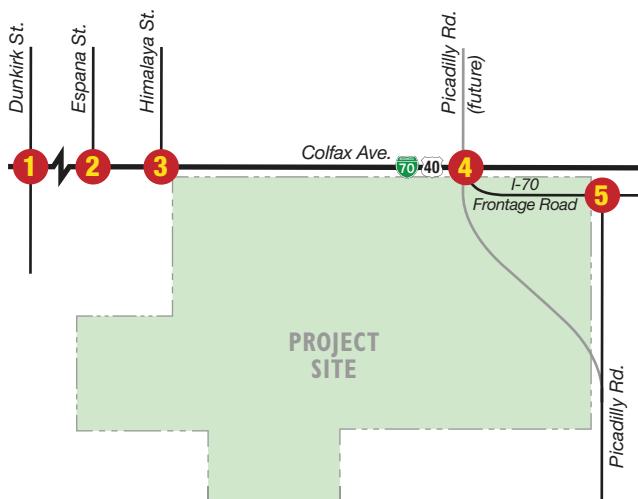
XXXX = Daily Traffic Volumes

NORTH
FIGURE II

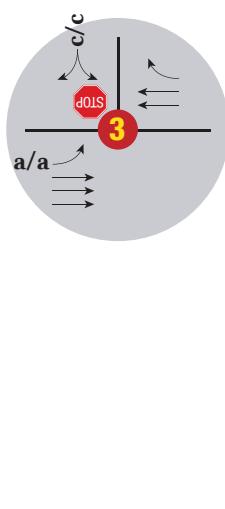
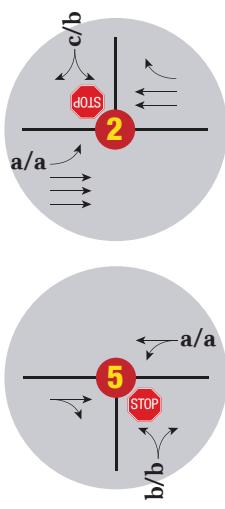
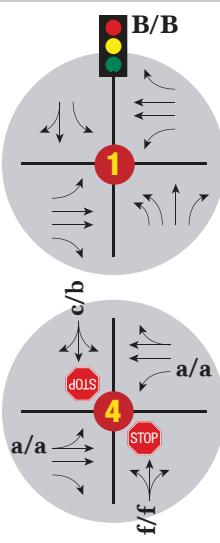
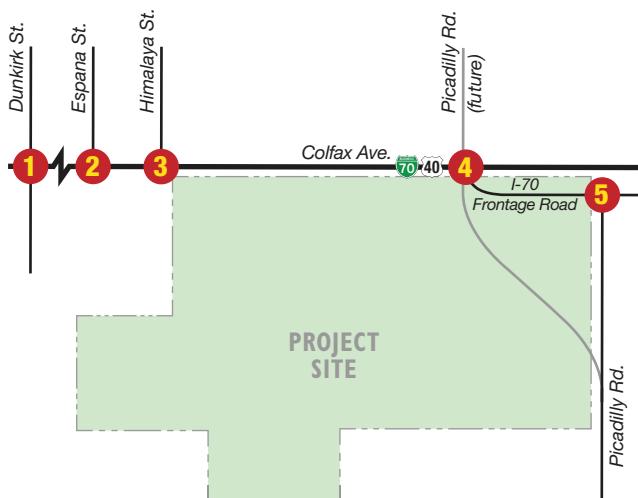
Short-Term Future Background Traffic Volumes

Stafford Industrial 18-444 7/9/19

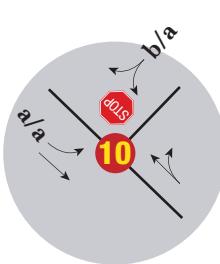
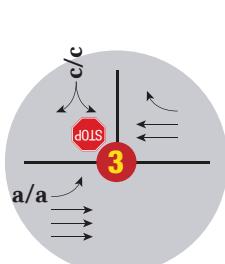
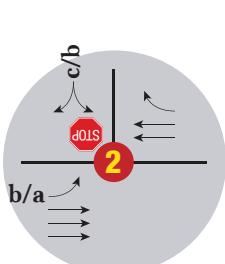
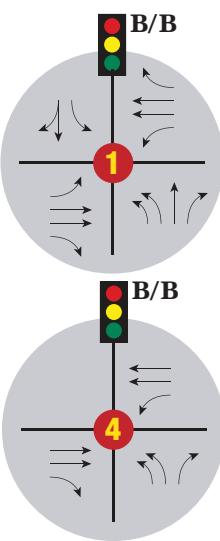
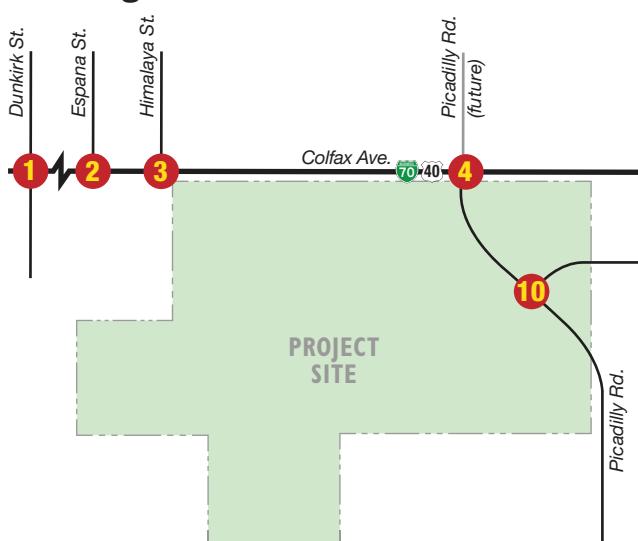
Building 1



Building 1 & 2



Building 1 - 3



LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

IV.B. Long-term Future Background

Roadway System

By the year 2040, Stafford is assumed to be built out. This includes the existing roadways as well as:

- Realignment of Picadilly Road to the west at Colfax Avenue.
- Extension of Picadilly Road north of Colfax Avenue crossing over I-70 and connecting with Picadilly Road at Smith Road.
- A reconfigured interchange between I-70 and Picadilly Road providing all movements to/from I-70 (not all are provided today), and removal of the east leg of the Colfax Avenue/Picadilly Road intersection that currently serves the existing ramps.
- The completion of the Stephen D. Hogan Parkway along the site's south side. This will be completed as a four-lane cross section in the short-term scenario and a six-lane cross section in the long-term scenario.

Traffic Volumes

The long-term background traffic has been estimated from traffic projections developed in support of the I-70/Picadilly Road projections prepared by HDR, Inc. for the ongoing study of the I-70/Picadilly Road interchange. These projections were based on the current Denver Regional Council of Governments (DRCOG) travel demand model. In developing background traffic for the Stafford TIS, adjustments were made to the interchange projection to remove trips associated with the 350 acres associated with the Stafford development. Volumes were also added entering and exiting the southbound legs of intersections along Colfax Avenue to account for the undeveloped strip of land between Colfax Avenue and the residential development to the north and the 65-acre parcel between Lisbon Street and Picadilly Road, which are all zoned for commercial use. ITE land use 820 (Shopping Center) with an FAR of 0.2 was assumed for these properties.

Results of the above adjustments provided background traffic forecasts illustrated on **Figure 13**. Picadilly Road is estimated to serve the greatest amount of background traffic reaching up to 41,500 VPD immediately north of the site. Stephen D. Hogan Parkway will also serve a significant amount of traffic reaching as much as 38,400 VPD. Picadilly Road to the south is projected to serve 22,500 VPD, Colfax Avenue to the west is projected to serve 28,000 VPD, and Colfax Avenue to the east is projected to serve 20,400 VPD.

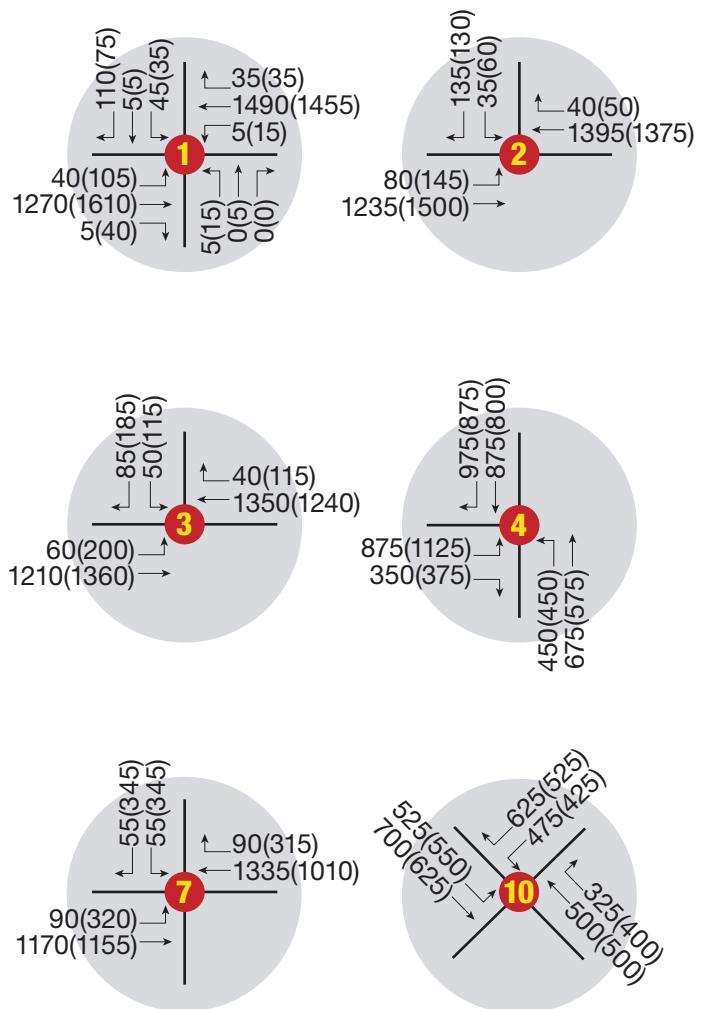
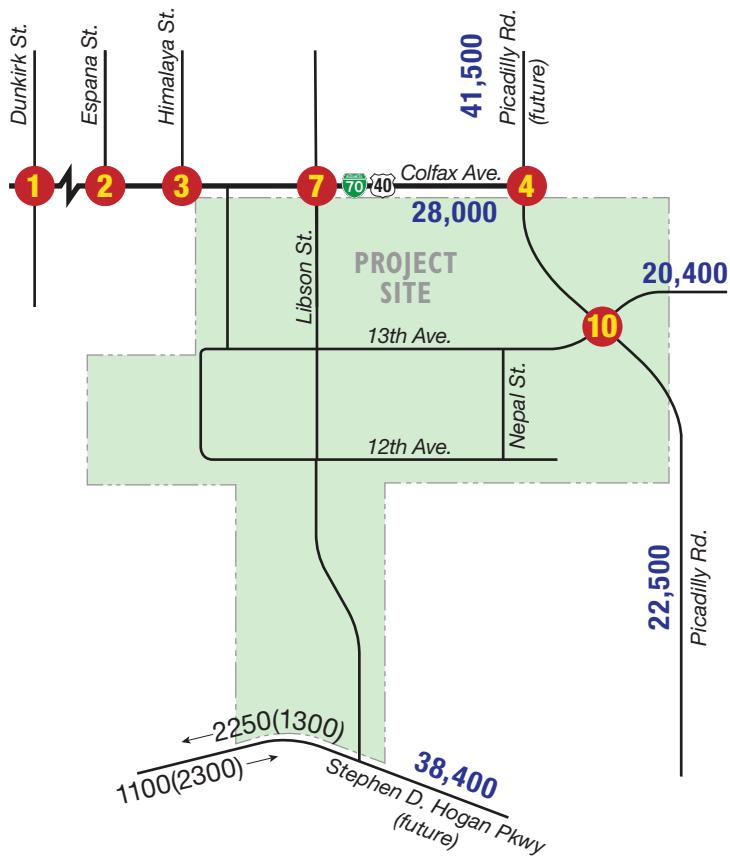
Traffic Control

Signalization of several intersections along Colfax Avenue is assumed in the long term. Future background traffic levels are projected to warrant signalization at the following intersections within the study area:

- Colfax Avenue/Picadilly Road
- Colfax Avenue/Himalaya Street
- Colfax Avenue/Lisbon Street
- Picadilly Road/relocated Colfax Avenue (south of Colfax Avenue section line)

Colfax Avenue/Picadilly Road and Picadilly Road/relocated Colfax Avenue are assumed to be signalized based on the I-70/Picadilly Road project. Peak hour and four-hour signal warrants are met at Colfax Avenue/Himalaya Street, and Colfax Avenue/Lisbon Street and are provided in **Appendix H**. Colfax Avenue/Espana Street was not evaluated as CDOT does not support signalization due to the proximity to Colfax Avenue/Dunkirk Street to the west.

KEY MAP



LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
 XXXX = Daily Traffic Volumes

Traffic Operations

The Long-term Future background traffic volumes were used as the basis for intersection capacity analyses, the results of which are shown on **Figure 14** (**Appendix GE** includes LOS worksheets).

As indicated, all intersections are projected to operate within acceptable parameters, at LOS D or better, during peak times with the exception of the southbound approach at Colfax Avenue/Espana Street, which is projected to operate at LOS F during both peak hours. This includes significant widening of the intersections to include numerous auxiliary lanes as well as signalization. Key laneage needs include four-laning of Picadilly Road, and four-laning of the off-alignment Colfax Avenue east of Picadilly Road. The major intersections, such as Colfax Avenue/Picadilly Road and Picadilly Road/relocated Colfax Avenue, will also need dual left turn lanes and separate right turn lanes along select approaches due to background traffic demands alone.

IV.C. Total Traffic Conditions

Short-term Future

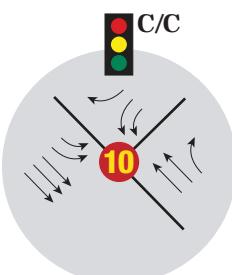
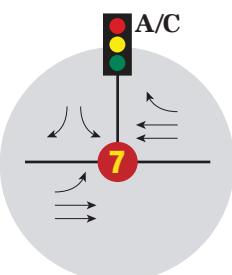
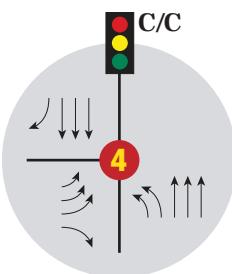
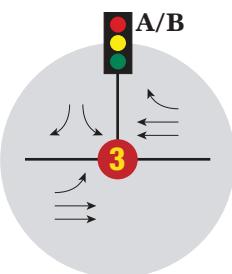
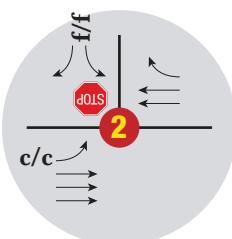
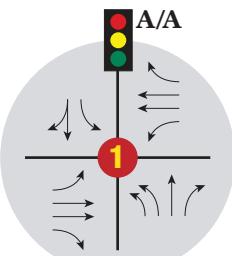
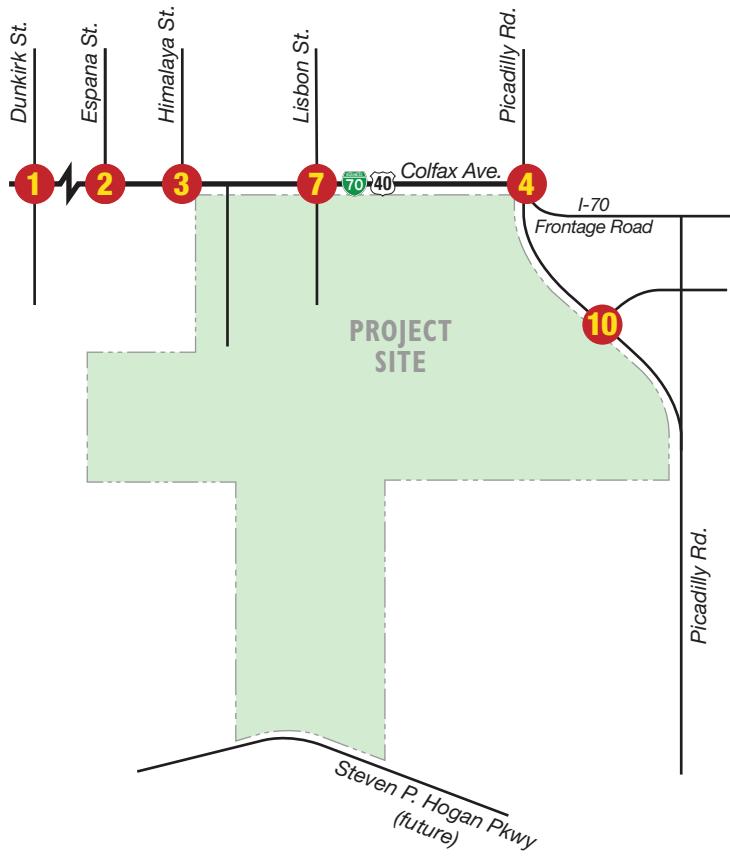
The short-term site generated traffic volumes (**Figure 5**) were added to the corresponding background volumes (**Figure 11**) to produce the short-term future total traffic volumes shown on **Figure 15**. As shown, traffic volumes along Colfax Avenue would reach as much as 13,800 VPD upon completion of the first three buildings, of which the first phase of Stafford would make up 14 percent of the total traffic. Traffic volumes along Picadilly Road would reach as much as 4,800 VPD, of which the first phase of Stafford would make up 17 percent of the total traffic. Access to the site will be provided by one right-in-right-out and one full movement access onto Colfax Avenue and one full movement access onto Picadilly Road.

Intersection capacity analyses were conducted using the short-term total peak hour volumes and intersection geometrics as illustrated on **Figure 16**. A 10 percent heavy vehicle was used throughout the study area with an increase to 25 percent for all movements entering and exiting the site.

Appendix F includes analysis worksheets. As indicated, traffic operations would remain acceptable at LOS D or better with the following exception, the northbound approach of Colfax Avenue/I-70 Frontage Road is projected to operate at LOS F during the AM and PM peak hours for scenarios evaluating the first two buildings, prior to realignment of Picadilly Road and ultimate signalization of Colfax Avenue/Picadilly Road anticipated with building three. This approach currently experiences LOS issues and will continue to do so in the short-term background conditions for buildings one and two. This issue will be addressed with the signalization of Colfax Avenue/Picadilly Road to occur in conjunction with the Picadilly Road realignment. Picadilly Road daily volumes would indicate that the segment south of Colfax Avenue will continue to maintain an LOS of C or better based upon volume thresholds presented in the NEATS study.

Short-term total traffic volumes will warrant signalization at Colfax Avenue/Lisbon Street (Full Access Site Driveway) for all three scenarios presented, warrants are met for peak hours and partially meet the four-hour warrant for building one and fully meet after building two. While the four-hour warrant may not fully be met for building one alone signalization is recommended to alleviate LOS issues and in anticipation of subsequent development within Stafford. Dual left turns for the westbound and northbound approaches of the Colfax Avenue/Lisbon Street intersection are recommended at the completion of building two along with a northbound channelized right turn with acceleration lane. The intersection of Picadilly Road/Realigned Colfax Avenue is not anticipated to meet warrants in year three when the connection is initially made, but should continue to be monitored both as Stafford continues to develop as well as Horizon Uptown to the east. The peak hour and four-hour warrants are provided in **Appendix H**, and 70 percent warrants were used as the current posted speed on Colfax Avenue is 55 MPH and on Picadilly Road is 45 MPH.

KEY MAP



LEGEND

X/X = AM/PM Peak Hour Signalized
Intersection Level of Service

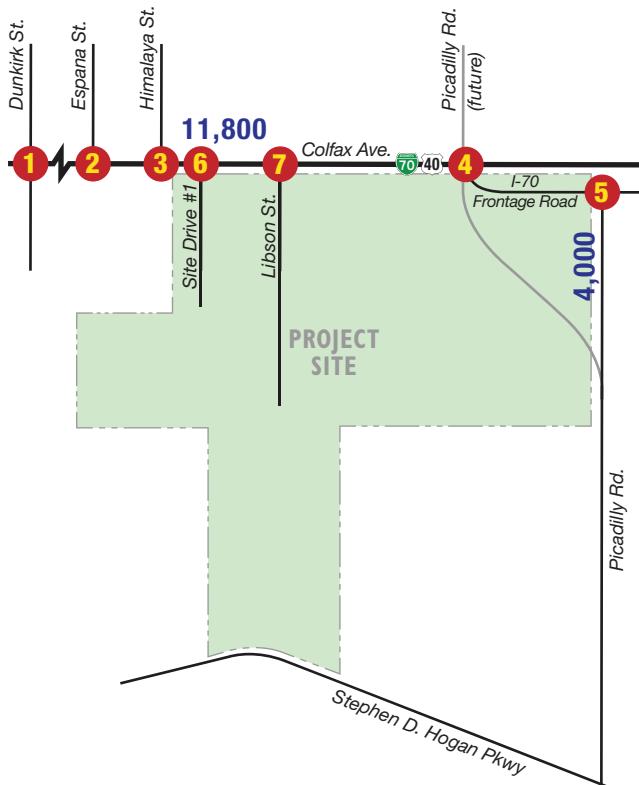
x/x = AM/PM Peak Hour Unsignalized
Intersection Level of Service

= Stop Sign

= Traffic Signal

KEY MAP

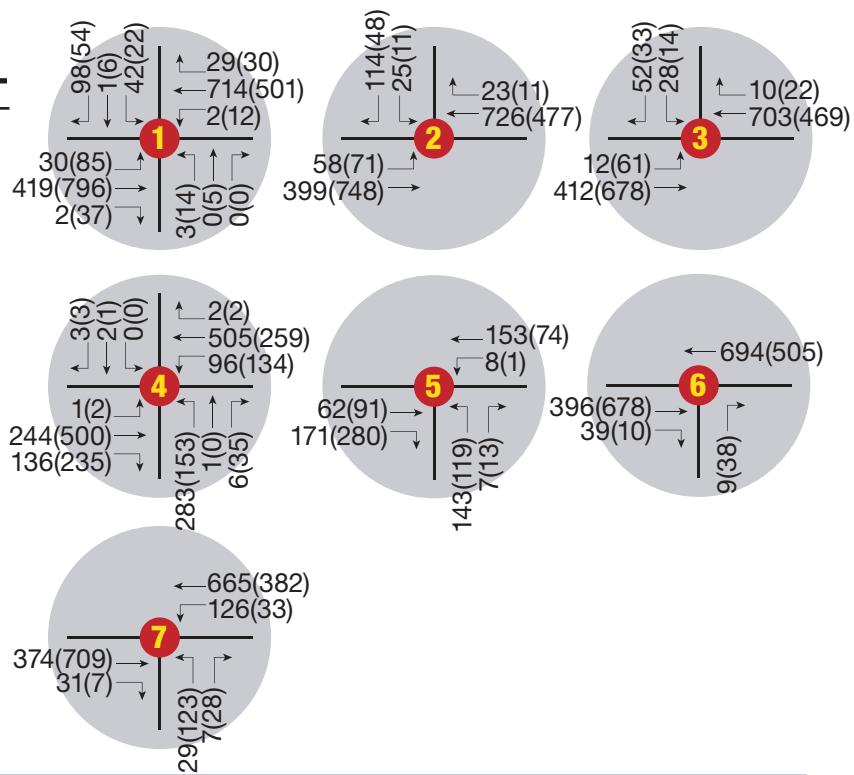
Building 1



LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes



Building 1 & 2

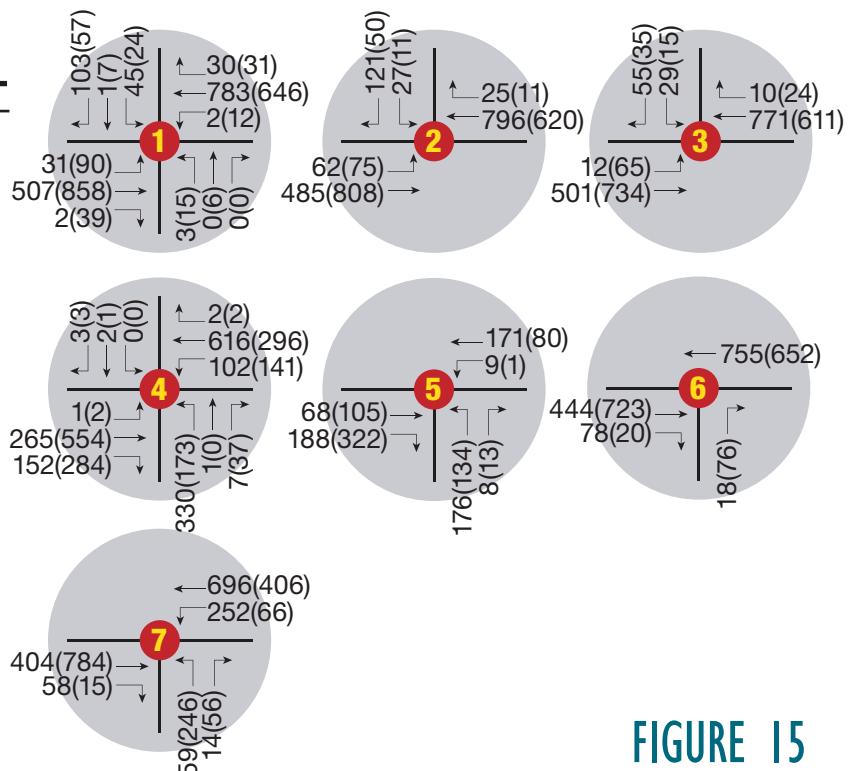
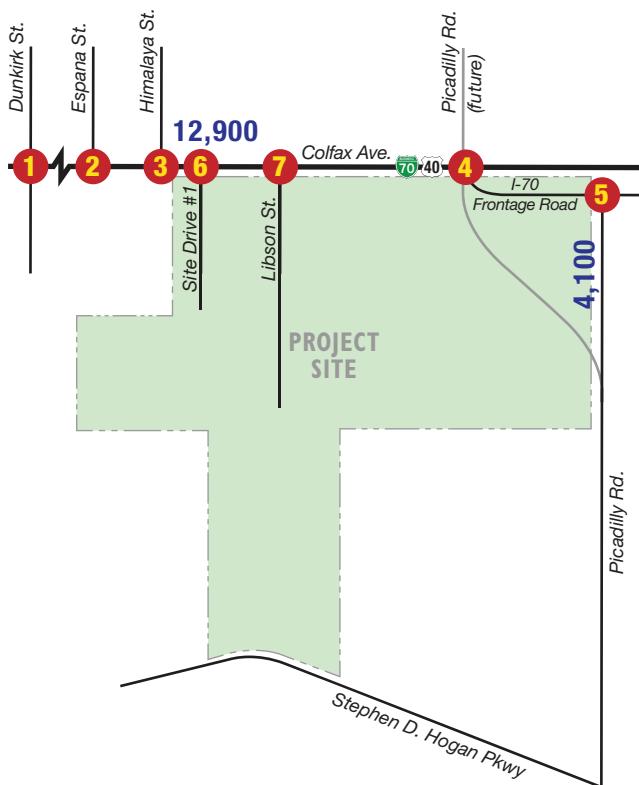
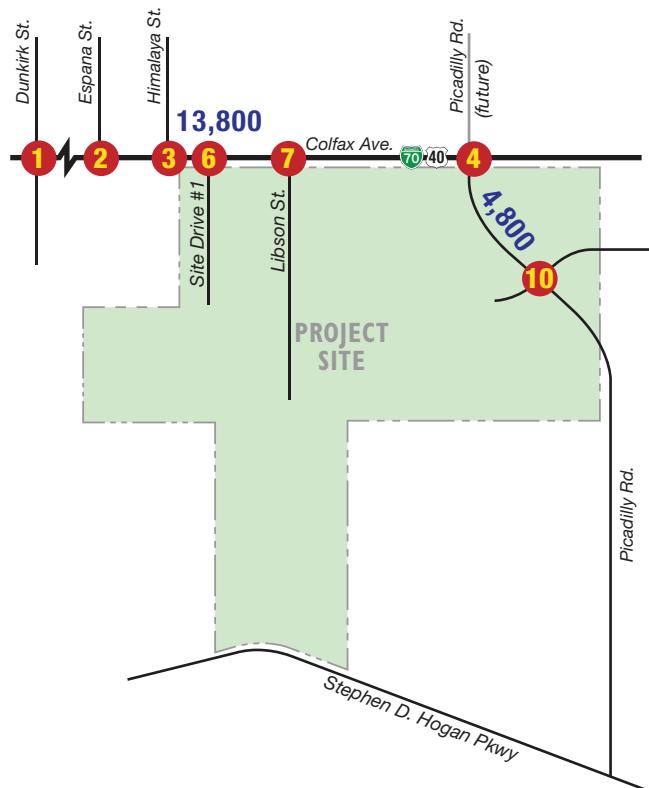


FIGURE 15

Short-Term Future
Total Traffic Volumes

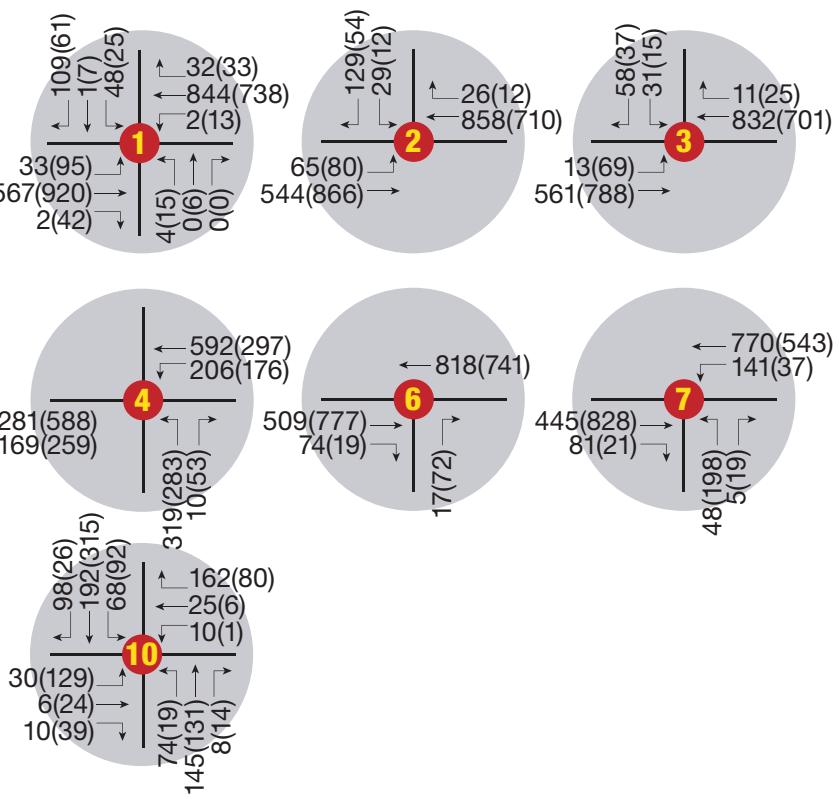
KEY MAP Building 1-3



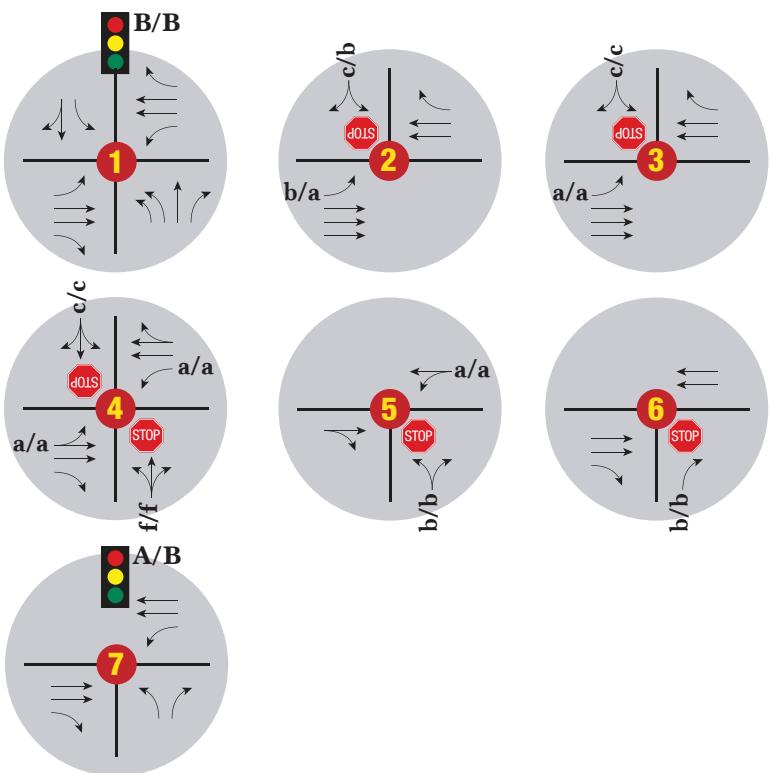
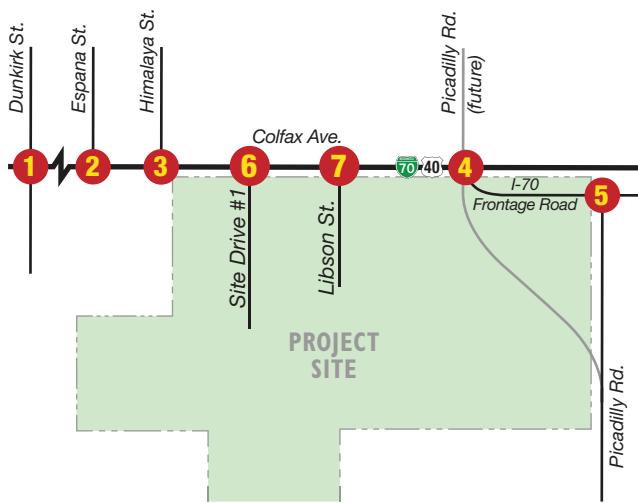
LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

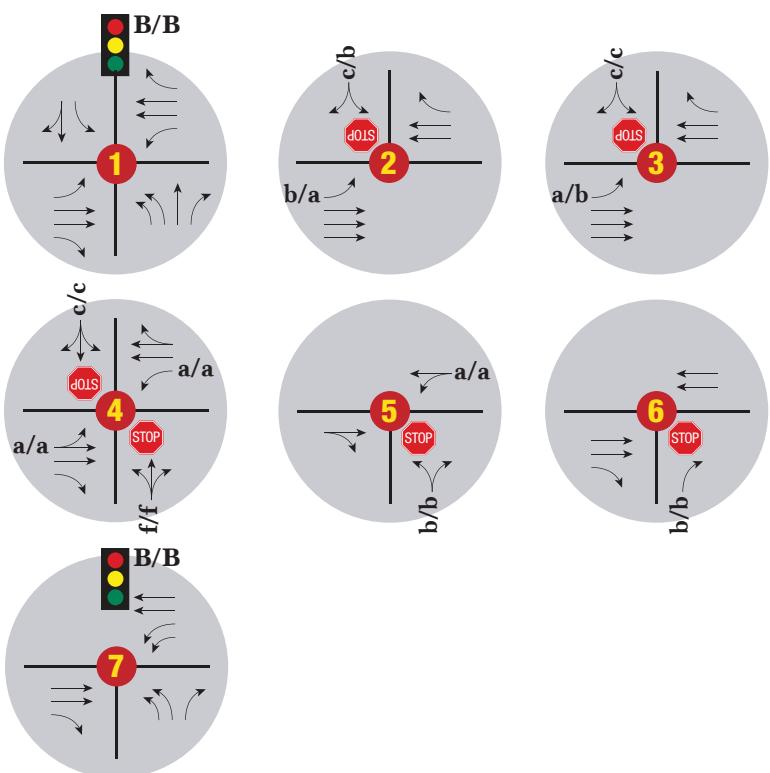
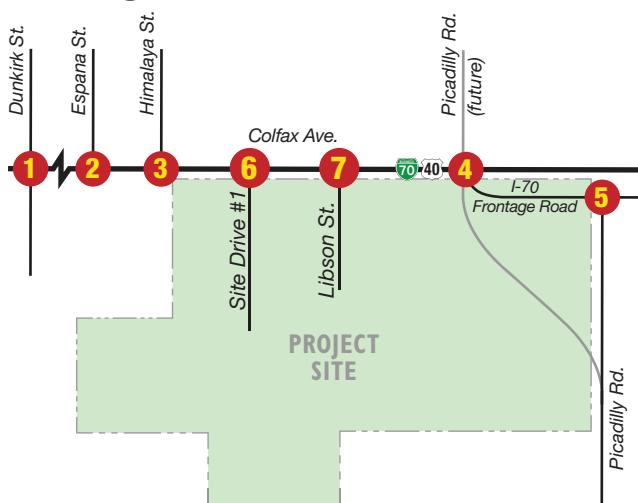
XXXX = Daily Traffic Volumes



Building 1



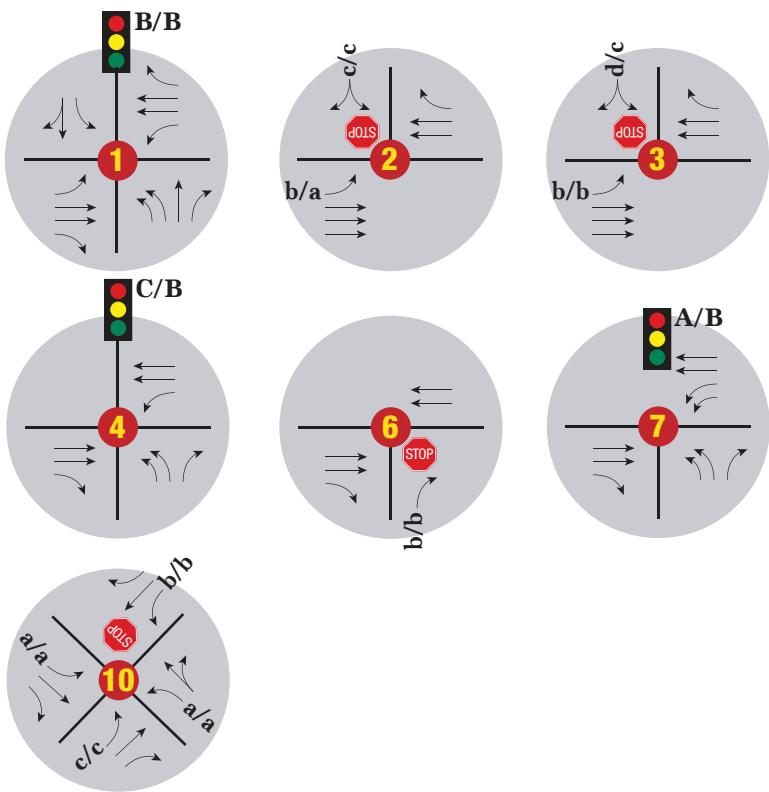
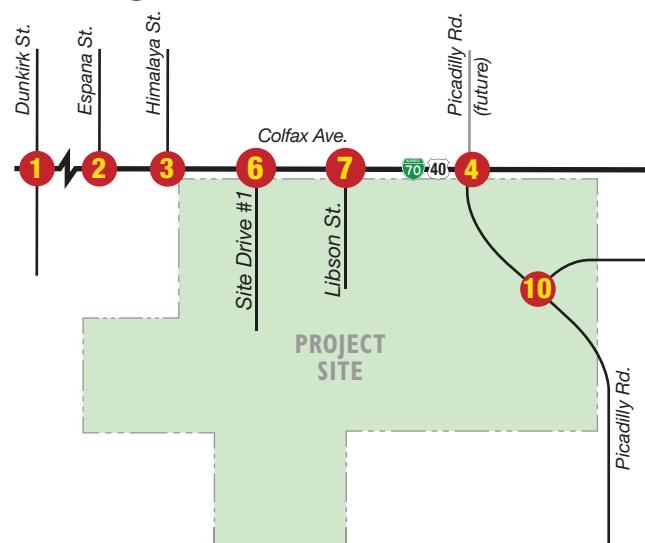
Building 1 & 2



LEGEND

- | | |
|-----|--|
| X/X | = AM/PM Peak Hour Signalized Intersection Level of Service |
| x/x | = AM/PM Peak Hour Unsignalized Intersection Level of Service |

Building 1 - 3



LEGEND

- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
 x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

Additional traffic growth is needed on side street approaches before signal warrants are satisfied at the Colfax Avenue/Himalaya Street intersection, and CDOT has stated that they do not support signalization of Colfax Avenue/Espana Street. The ultimate signalization of Colfax Avenue/Picadilly Road will replace the intersection of the Colfax Avenue/I-70 Frontage road as part of the I-70/Picadilly Road interchange project. However, warrant analysis indicates signalization of the existing intersection is currently warranted under existing conditions. Temporary signalization at Colfax Avenue/Picadilly Road is not supported by CDOT staff and it is recommended that signalization occur at the time the Picadilly Road realignment is completed.

Intersection movement queuing has also been assessed given the short-term traffic projections for year three. **Table 2** presents the results.

Table 2. Short-term Future (Year 3) 95th Percentile Queueing – Stafford

Intersection	Direction	95% Queue (ft)		
		Left	Thru	Right
Colfax Avenue/Dunkirk Street (Intersection #1)	Eastbound	25	175	0
	Westbound	25	200	25
	Northbound	25	25	0
	Southbound	75	175	
Colfax Avenue/Espana Street (Intersection #2)	Eastbound	25	--	
	Southbound		50	
Colfax Avenue/Himalaya Street (Intersection #3)	Eastbound	25	--	
	Southbound		50	
Colfax Avenue/Picadilly Road (Intersection #4)	Eastbound	--	175	200
	Westbound	300	75	--
	Northbound	225	--	75
Colfax Avenue/Stafford Site Driveway #1 (Intersection #6)	Northbound		25	
Colfax Avenue/Lisbon Street (Intersection #7)	Eastbound	--	125	25
	Westbound	125	50	--
	Northbound	150	--	0
Picadilly Road /Southern Colfax Avenue Alignment (Intersection #10)	Eastbound	75	25	25
	Westbound	25	25	25
	Northbound	25	--	
	Southbound	25	--	

Long-Term Future

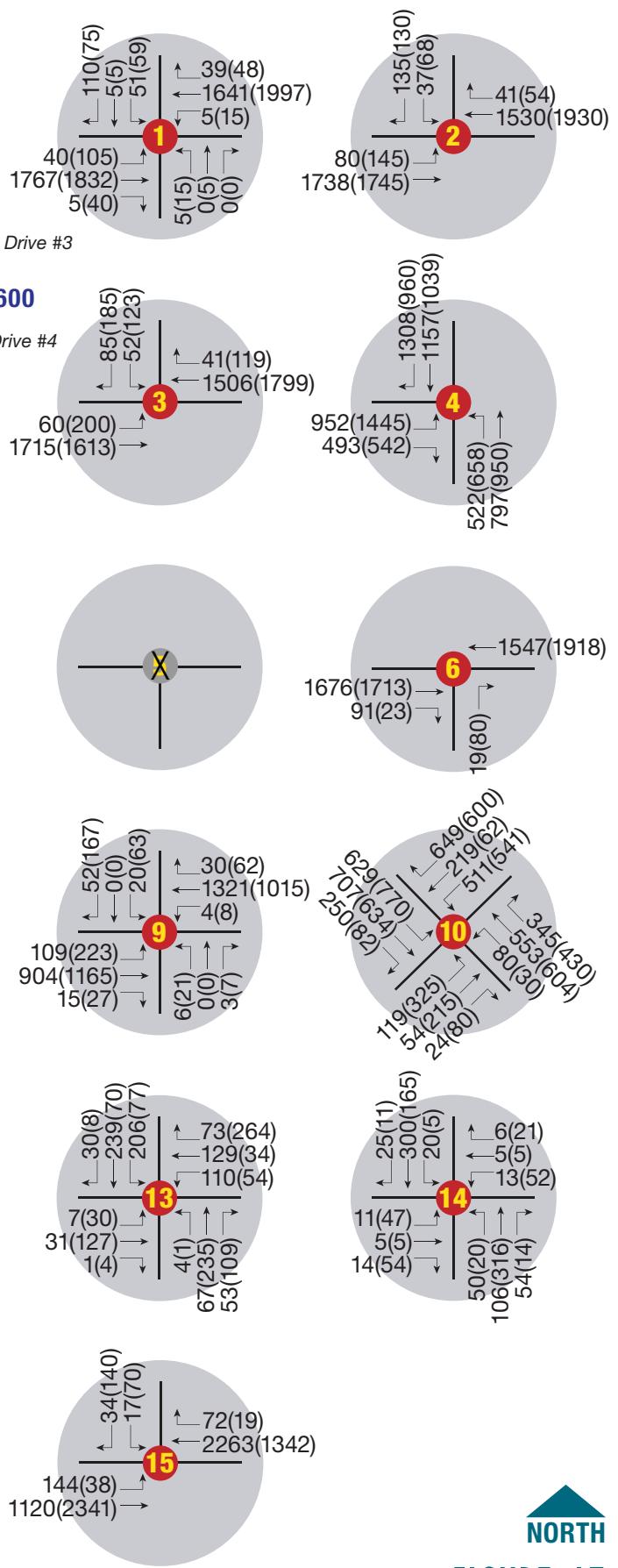
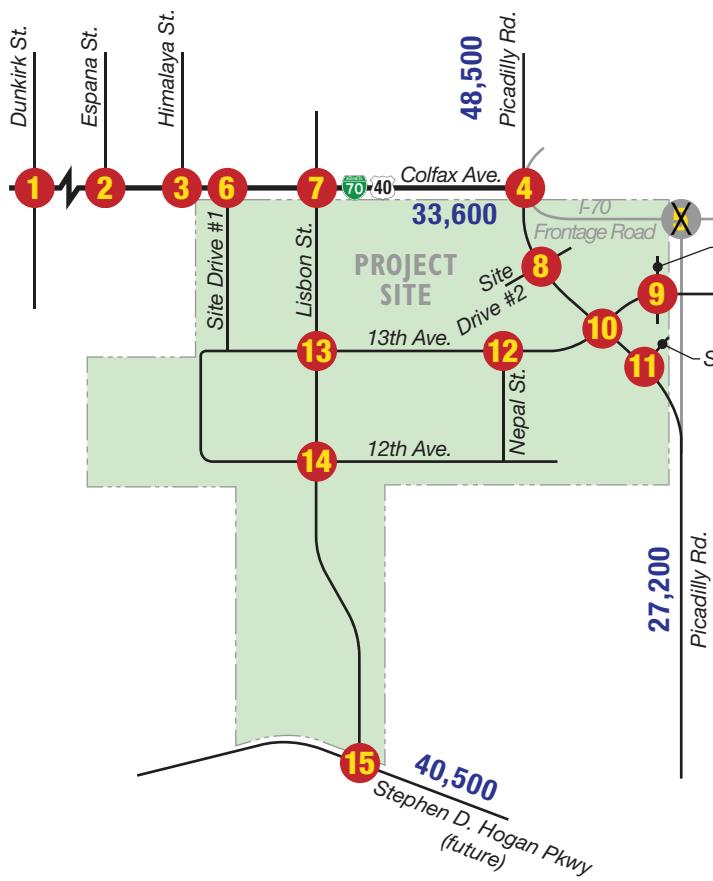
The 2040 site generated traffic volumes (**Figure 9** and **Figure 10**) were added to the long-term future background traffic volumes (**Figure 13**) to produce the year 2040 total traffic volumes illustrated on **Figure 17**. As shown, traffic volumes along Colfax Avenue will increase to up to 34,400 VPD by 2040 once the area is built out. Picadilly Road could serve 27,700 VPD south of Colfax Avenue and 49,200 VPD north of Colfax Avenue.

Intersection capacity analyses were conducted using the long-term total peak hour volumes and intersection geometrics, also shown on **Figure 18**. **Appendix G** includes the analysis worksheets. A 10 percent heavy vehicle was used throughout the study area with an increase to 25 percent for all movements entering and exiting or within the industrial portion of the site.

These improvements have been developed based on the current understanding of the I-70/Picadilly Road interchange project. It is acknowledged that the interchange project may provide additional recommendations at arterial intersections in the study area. Results for each intersection are summarized below:

- Colfax Avenue/Dunkirk Street (Intersection #1) – signal (exists today), Colfax Avenue is a major arterial roadway. The intersection does not need any modification from the existing geometry.
- Colfax Avenue/Espana Street (Intersection #2) – tee intersection, Colfax Avenue is a major arterial roadway. The intersection should be modified to include separate southbound left and right turn lanes. CDOT has indicated that this intersection is to remain unsignalized.
- Colfax Avenue/Himalaya Street (Intersection #3) – signal tee intersection, Colfax Avenue is a major arterial roadway. The intersection should be modified to include separate southbound left and right turn lanes.
- Colfax Avenue/Stafford Access Drive #1 (Intersection #6) – stop controlled right-in/right-out, Colfax Avenue is a four-lane major arterial. The intersection will need an eastbound right turn lane.
- Colfax Avenue/Lisbon Street (Stafford full movement access) (Intersection #7) – signal, Colfax Avenue is a four-lane major arterial at the intersection. Lisbon Street will be a two-lane collector providing access to future retail and existing residential properties to the north and to the Stafford Logistics Center to the south. The intersection will need dual left turn lanes and separate right turn lanes along all four approaches. The northbound and southbound right turns should be channelized with acceleration lanes onto Colfax Avenue.
- Colfax Avenue/Picadilly Road (Intersection #4) – signal, Colfax Avenue is a major arterial, Picadilly Road is planned to be a major arterial and interchange with I-70. The east leg of this intersection will be one-way eastbound as a component of the I-70/Picadilly Road interchange (eastbound on-ramp). The intersection should include two through-lanes eastbound, three through-lanes north-south, northbound and eastbound dual left turn lanes, and separate right turn lanes with overlap signal phasing along the southbound and eastbound approaches.
- Picadilly Road/Stafford Access Drive #2 (Intersection #8) – stop controlled $\frac{3}{4}$ access, Picadilly Road is a planned six-lane major arterial. The northbound and southbound approaches should have separate left and right turn lanes.
- Picadilly Road /Southern Colfax Avenue Alignment (Intersection #10) – signal, Picadilly Road is a planned six-lane major arterial. The west leg of the intersection will serve as a site access roadway which will be 13th Avenue through the site. The east leg serves as the Southern Colfax Avenue alignment through the planned Horizon Uptown development. Separate right turn lanes should be included at all approaches with signal phasing overlaps included on the northbound approaches, channelization of the westbound approach right turn, and left turn lanes at all approaches with dual left for the southbound and westbound approaches.

KEY MAP

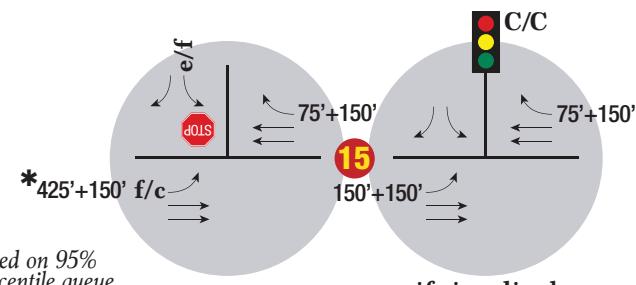
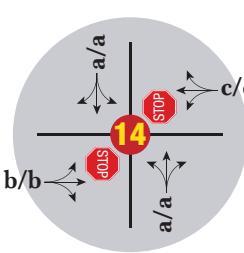
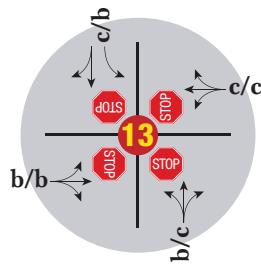
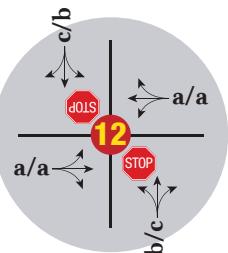
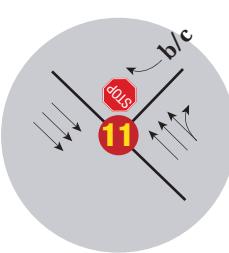
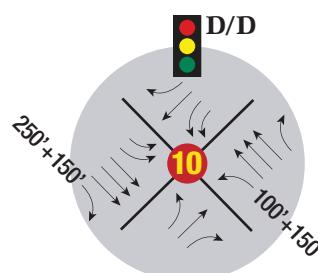
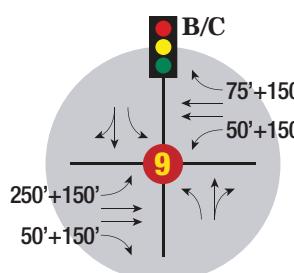
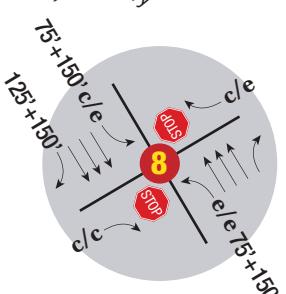
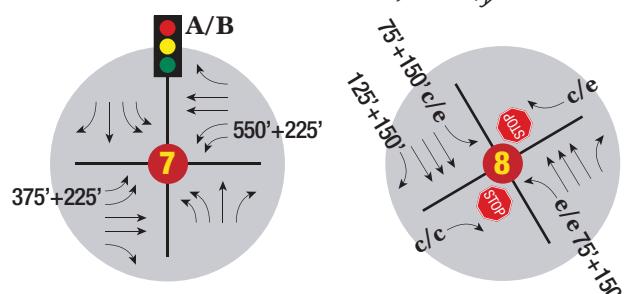
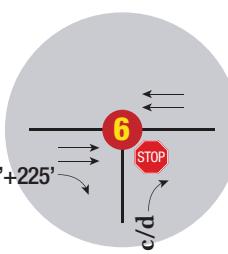
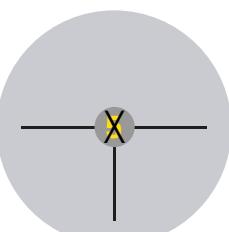
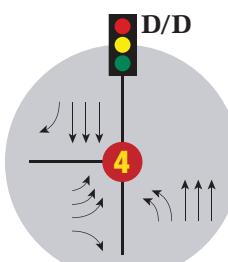
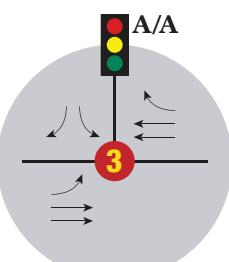
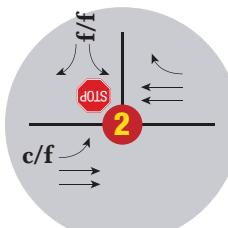
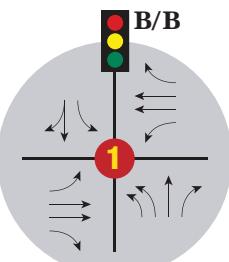
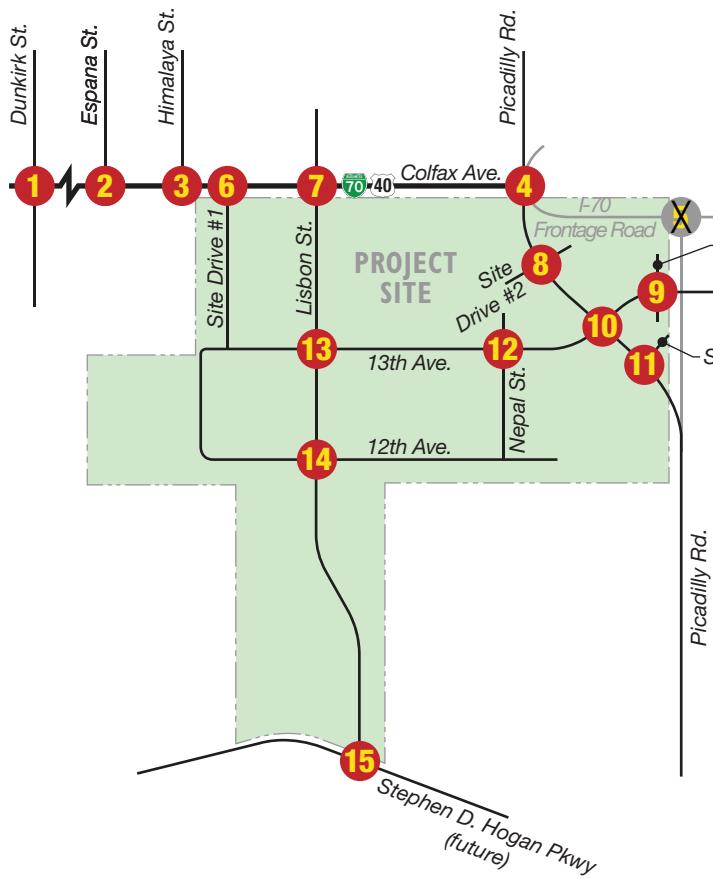


LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
 XXXX = Daily Traffic Volumes



KEY MAP



if signalized

*based on 95% percentile queue

LEGEND

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsigned Intersection Level of Service

= Stop Sign

= Traffic Signal

x/x = Storage/Decel + Taper



FIGURE 18

Long Term Future (2040) Total SHAC Auxiliary Lane Length Traffic Conditions

- Southern Colfax Avenue Alignment/Stafford Access Drive #3 (Intersection #9) – signal, the Southern Colfax Avenue alignment is a planned major arterial extending through the planned Horizon Uptown development and the I-70/E-470 interchange, becoming the I-70 South Frontage Road. Peak hour and 4-hour signal warrants were analyzed for the intersection and are provided in **Appendix H**. The PM peak hour narrowly falls below thresholds and a 4-hour warrant with the 2nd-4th highest hour being 90, 85, and 75 percent of the PM peak hour meets for 3 of 4 hours and narrowly misses meeting thresholds for the final hour. Signalization is recommended as even a slight increase in any of the site uses would likely cause warrants to be met. Without signalization LOS F conditions are expected for the driveway, and this is the only access for the majority of the retail portion of Stafford Logistics Center allowing for movements to the east and south. Additionally, despite not meeting SHAC thresholds a westbound left turn lane is recommended to access the retail uses south of Colfax Avenue to eliminate queuing within a through travel lane. Queuing between this intersection and Picadilly Road/Southern Colfax Avenue Alignment should be considered. The 95th percentile queues between the two intersections require a minimum spacing of 375 feet or 550 feet if left turn lanes cannot be stacked side by side. City of Aurora standard is 660 feet between signalized intersections, which would indicate 95th percentile queuing would be adequately accommodated.
- Picadilly Road/Stafford Access Drive #4 (Intersection #11) – stop controlled right-in/right-out tee intersection, Picadilly Road is a planned six-lane major arterial.
- Stephen D. Hogan Parkway/Ibel Street (Stafford southern access) (Intersection #15) – stop controlled tee intersection, Stephen D. Hogan Parkway is a planned six-lane major arterial. The eastbound approach should have a separate left turn lane, the westbound approach should have a separate right turn lane, and the southbound approach should have separate left and right turn lanes. Peak hour and four-hour warrants were analyzed for the intersection and are provided in **Appendix H**. While side street volumes are low and do not approach meeting signal warrants, poor LOS is anticipated. Given the internal roadway network of the site and other signalized driveways, it is anticipated that some drivers will use capacity of other access points to enter and exit the site from Stephen D. Hogan Parkway via Picadilly Road. Due to the need for fire access to the southern portion of the site, it is recommended this be a full access movement despite the higher delay. Additionally median space provided for the eastbound left turn should provide the ability for southbound left turns to make the turn in two stages if necessary. While warrants are not met, the intersection analysis assuming signalization has also been provided at the request of City of Aurora staff.
- Lisbon Street/12th Avenue (Intersection #14) – side street stop-controlled, this intersection is internal to the site and does not need auxiliary lanes.
- Lisbon Street/13th Avenue (Intersection #13) – all-way stop controlled, this intersection is internal to the site and a southbound left turn auxiliary lane is recommended. For an all-way stop warrant, the major street volume needs to average at least 300 vehicles per hour and the minor street volume needs to average at least 200 vehicles per hour for any 8 hours of an average day for this warrant to be satisfied. The AM and PM peak hours would experience 600 and 500 along the major (northbound) street and 350 and 500 vehicles per hour along the minor (east-west) street respectively. Data provided in the December 2015 Journal of Transportation of the Institute of Transportation Engineers indicates that roughly 50 percent industrial uses is expected to have a daily distribution in which 10.5 and 10.8 percent of daily traffic is expected during the AM and PM peak hours, respectively, and have a 6.3 percent daily share for the 11 AM hour, which is expected to be the 8th highest hour. Applying these percentages and interpolating the other hours, the 8th highest hour would have a volume of approximately 325 per hour along the major street and 250 per hour along the minor street. These volumes would satisfy the all-way stop warrant. A roundabout is not recommended at

this intersection based on the high concentration of trucks internal to the site. However, roundabout LOS has been presented in **Appendix G** per City of Aurora guidelines.

- Nepal Street/13th Avenue (Intersection #12) – two-way stop controlled, this intersection is internal to the site and does not need auxiliary lanes.

As indicated, traffic operations would remain acceptable at LOS D or better, with the following exceptions:

- Picadilly Road/Site Drive #2 is projected to operate at LOS E for northbound left turns in both the AM and PM peak hours, LOS E for southbound left turns during the PM peak hour, and LOS E for the stop-controlled westbound approach during the PM peak hour.
- Colfax Avenue/España Drive is projected to operate at LOS F for the stop-controlled southbound approach in both the AM and PM peak hours, and LOS F for the eastbound left during the PM peak hour. CDOT does not support signalization due to the proximity to Colfax Avenue/Dunkirk Street to the west.
- Stephen D. Hogan Parkway/Lisbon Street is projected to operate at LOS E and LOS F for the stop-controlled southbound approach respectively in both the AM and PM peak hours, and LOS F for eastbound left turns at in the AM peak hour.

An intersection movement queuing analysis was also completed for the perimeter roadway intersections, and the results are shown in **Table 3**.

Table 3. Long-term Future 95th Percentile Queueing – Stafford

Intersection	Direction	95% Queue (ft)		
		Left	Thru	Right
Colfax Avenue/Dunkirk Street (Intersection #1), signal	Eastbound	125	625	0
	Westbound	25	300	25
	Northbound	25	25	25
	Southbound	100	200	
Colfax Avenue/España Street (Intersection #2)	Eastbound	150	--	
	Southbound	300	--	125
Colfax Avenue/Himalaya Street (Intersection #3), signal	Eastbound	100	225	--
	Westbound	--	100	25
	Southbound	175	--	525
Picadilly Road/Colfax Avenue (Intersection #4), signal	Eastbound	375	--	800
	Northbound	475	375	--
	Southbound	--	425	0
Picadilly Road /Southern Colfax Avenue Alignment (Intersection #10), signal	Eastbound	200	425	125
	Westbound	375	300	0
	Northbound	75	250	450
	Southbound	475	300	325
Colfax Avenue/Stafford Site Drive #1 (Intersection #6)	Northbound	--		50
Colfax Avenue/Lisbon Street (Site Drive) (Intersection #7), signal	Eastbound	75	25	25
	Westbound	25	275	125
	Northbound	250	0	0
	Southbound	275	0	0

Intersection	Direction	95% Queue (ft)		
		Left	Thru	Right
Picadilly Road/Stafford Site Drive #2 (Intersection #8)	Eastbound	--	--	50
	Westbound	--	--	150
	Northbound	50	--	--
	Southbound	50	--	--
Southern Colfax Avenue Alignment/ Stafford Site Drive #3 (Intersection #9), signal	Eastbound	175	50	25
	Westbound	25	550	75
	Northbound	25	25	--
	Southbound	75	200	--
Picadilly Road/Stafford Site Drive #4 (Intersection #11)	Westbound	--	--	25
Stephen D. Hogan/Lisbon Street (Site Drive) (Intersection #15) As TWSC	Eastbound	425	--	--
	Southbound	275	--	75
Stephen D. Hogan/Lisbon Street (Site Drive) (Intersection #15) As Signal	Eastbound	125	775	--
	Westbound	--	575	50
	Southbound	75	--	75
Lisbon Street/13 th Avenue (Internal Site Intersection) (Intersection #13)	Eastbound	50	--	--
	Westbound	125	--	--
	Northbound	150	--	--
	Southbound	75	75	--
13 th Avenue/Nepal Street (Internal Site Intersection) (Intersection #12)	Eastbound	25	--	--
	Westbound	25	--	--
	Northbound	25	--	--
	Southbound	25	--	--
Lisbon Street/12 th Avenue(Internal Site Intersection) (Intersection #14)	Eastbound	25	--	--
	Westbound	25	--	--
	Northbound	25	--	--
	Southbound	0	--	--

Queue lengths are based upon lane geometries depicted on **Figure 16**.

The City of Aurora bases the need for auxiliary turn lanes on the CDOT SHAC. Colfax Avenue is classified as an access category NR-A facility by CDOT. Based on a speed limit of 55 MPH and the projected volumes presented on **Figure 14**, right turn lanes shall be provided at both site entrance locations along Colfax Avenue and a left turn at the Colfax Avenue/Lisbon Street intersection. These auxiliary lanes shall be sized based on deceleration length plus storage for left turn lanes and deceleration length for right turns. Taper lengths are included in the recommended deceleration length from the SHAC and shall be constructed with a 18.5:1 taper for 55 MPH.

Picadilly Road, realigned southern Colfax Avenue, and Stephen D. Hogan Parkway are planned arterials that would be classified as access category NR-B with 40 MPH posted speed limits. Left and right turn auxiliary lanes are required at all site access points based on the projected volumes presented on **Figure 14** and summarized in **Table 4**. These auxiliary lanes shall be sized based on storage plus taper length using a 12:1 taper according to the SHAC. Storage lengths are recommended at 1 foot per vehicle during the maximum volume in the peak hours rounded up to the nearest 25 feet.

Table 4. Site Driveway Recommended Auxiliary Lane Length

Intersection	Direction	SHAC recommended auxiliary lane length
Picadilly Road /Southern Colfax Avenue Alignment (Intersection #10)	Northbound Left	100-foot storage plus 150-foot taper
	Southbound Right	250-foot storage plus 150-foot taper
Colfax Avenue/Stafford Site Drive #1 (Intersection #6)	Eastbound Right	600-foot deceleration (includes 225-foot taper)
Colfax Avenue/Lisbon Street (Site Drive) (Intersection #7)	Eastbound Right	600-foot deceleration (includes 225-foot taper)
	Westbound Left	350-foot storage plus 600-foot deceleration (includes 225-foot taper)
Picadilly Road/Stafford Site Drive #2 (Intersection #8)	Northbound Right	75-foot storage plus 150-foot taper
	Northbound Left	75-foot storage plus 150-foot taper
	Southbound Right	125-foot storage plus 150-foot taper
	Southbound Left	75-foot storage plus 150-foot taper
Southern Colfax Avenue Alignment/Stafford Site Drive #3 (Intersection #9)	Eastbound Right	50-foot storage plus 150-foot taper
	Eastbound Left	250-foot storage plus 150-foot taper
	Westbound Right	75-foot storage plus 150-foot taper
	Westbound Left	Volume does not meet threshold
Picadilly Road/Stafford Site Drive #4 (Intersection #11)	Northbound Left	Volume does not meet threshold
Stephen D. Hogan/Lisbon Street (Site Drive) (Intersection #15)	Eastbound Left	150-foot storage plus 150-foot taper
	Westbound Right	75-foot storage plus 150-foot taper

While the Southern Colfax Avenue Alignment/Stafford Site Drive #3 intersection westbound approach does not meet SHAC criteria for warranting a left turn lane, one is recommended to keep turning vehicles from queuing in a through lane. Additionally, the Stephen D. Hogan Parkway/Lisbon Street intersection does not provide adequate storage based on 95th percentile queuing for the eastbound left turn and it is recommended that storage length be increased to accommodate the projected 425-foot queue length.

Colfax Progression Analysis

CDOT requested a progression analysis of Colfax Avenue to determine if signal progression is satisfactory given the reduction of signal spacing from 1/2 mile spacing to as low as 1/3 mile spacing near the main site entrance on Lisbon Street. Progression was analyzed for the four signals between Dunkirk Street and Picadilly Road. The analysis used a projected cycle length of 120 seconds and the existing 55 MPH speed limit.

Eastbound

Eastbound progression was analyzed from Dunkirk Street through movements to the Picadilly Road eastbound left turn movement for traffic heading towards the new I-70 interchange. AM eastbound progression achieves a bandwidth of 39 seconds, representing the entire eastbound green time at the Picadilly Road/Colfax Avenue intersection for an efficiency of 32.5 percent. PM peak hour progression in the dominant eastbound direction achieves a bandwidth of 38 seconds for an efficiency of 31.7 percent.

Westbound

Westbound progression considered both the northbound lefts from Picadilly Road as well as through movements beginning at Lisbon Street. This consideration is to account for the fact that the northbound left volumes do not warrant progressing a bandwidth from the tee intersection at Picadilly Road west that would satisfy SHAC recommendations due to heavy north-south volumes that are also of concern given that Picadilly Road is a planned major arterial roadway. Progression percentages presented are from Lisbon Street west. AM peak hour progression in the dominant westbound direction finds that the entire 25 seconds of northbound left green time at Picadilly Road/Colfax Avenue intersection can progress through the remaining three study area signals. Progression from Lisbon Street west indicated that a bandwidth of 44 seconds could be progressed through the remaining two signals, which provides an efficiency of 36.7 percent. PM peak hour progression in the westbound direction finds that the entire 27 seconds of northbound left green time at Picadilly Road/Colfax Avenue intersection can progress through the remaining three study area signals. Progression from Lisbon Street west was determined to be a bandwidth of 33 seconds of green time could be progressed through the remaining two signals, which provides an efficiency of 27.5 percent.

The average progression for both directions (eastbound for the entire corridor and westbound from Lisbon Street) is 34.6 percent in the AM peak hour and 29.6 percent in the PM peak hour. While these progression efficiencies fall slightly below the 35 percent guideline from the SHAC, it should be considered that this is anticipated to be an urban environment and Picadilly Road will be a six-lane arterial that will require substantial split time to operate efficiently. The entire northbound left from Picadilly Road progresses through the entire corridor in both peak hours and the entire eastbound left progresses through the intersection at Picadilly Road for the AM peak hour. Traffic conditions along Picadilly Road are the limiting factor in not achieving the preferred 35 percent outlined in the SHAC. The proposed 1/3 mile signal spacing allows optimal progression as constrained by the Colfax Avenue/Picadilly Road intersection, and lane geometry can be implemented to accommodate projected queues without hindering traffic flow at adjacent signals. Progression diagrams are presented in **Appendix I**.

V. SUMMARY AND RECOMMENDATIONS

NorthPoint Development is proposing a 350-acre development comprised of approximately 4.4 million square feet of industrial uses, approximately 160,000 square feet of mixed retail including a bank and supermarket, a gas station, and two hotels with a total of 200 rooms. The development will be phased as the market allows, and the initial development phase includes the northern 100 acres of the site along Colfax Avenue yielding approximately 1.5 million square feet of industrial development. Primary access to the site will be via Colfax Avenue, particularly as part of the initial development. As the property develops, an internal road system will evolve providing circulation around the site as well as providing access onto Colfax Avenue, Picadilly Road (which will ultimately interchange with I-70), and Stephen D. Hogan Parkway.

The proposed Stafford development is estimated to generate approximately 18,600 external trips per day when built out, with about 2,300 occurring during the AM peak hour and 2,900 occurring during the PM peak hour. Phase I of the development will generate approximately 6,700 trips per day, and it would increase Colfax Avenue traffic by 30 percent.

The potential traffic impacts of the development were evaluated under both Short-term Future (2024) and Long-term Future (2040) conditions. The 2024 conditions include the development's first phase, of all industrial park buildings, with relatively little other development in the area. The long-term analysis reflects build out of Stafford and the surrounding area per travel demand modeling represented in the I-70/Picadilly Road interchange study, which accounts for a full interchange at I-70/Picadilly Road as well as the continuity of Picadilly Road north of Colfax Avenue, across I-70, and connecting with Picadilly Road at Smith Road.

NorthPoint does not intend to develop any of the retail portions of the Stafford Logistics Center prior to the realignment of Picadilly Road. The retail uses will develop once more residential development in the area occurs, which is not expected to mature to the point that Picadilly Road requires widening in short term scenarios. Analysis indicates that the entire industrial portion of the site can develop in the short term without access to Picadilly Road and maintain acceptable operations within the study area.

Short-term future needs in the area to accommodate Phase I of the Stafford development include the following:

- Providing auxiliary left and right turn lanes and signalization of the Colfax Avenue/Lisbon Street (Stafford full access drive)
- Providing an auxiliary right turn lane at the Colfax Avenue/Stafford Access Drive #1
- Realignment of Picadilly Road simultaneous with construction of Building 3 and the signalization of Colfax Avenue/Picadilly Road at that time.

Long-term future (2040) traffic reflects build out of the area, and traffic volumes are anticipated to increase noticeably. The following roadway sections are needed to accommodate future traffic.

- Colfax Avenue will be realigned to the southeast of Picadilly Road and is projected to need a four-lane cross section.
- Picadilly Road will be continued to the north providing an interchange with I-70 and is projected to need a six-lane cross section.
- The intersections of Colfax Avenue/Himalaya Street, Colfax Avenue/Lisbon Street, Colfax Avenue/Picadilly Road, Picadilly Road/Realigned Southern Colfax Avenue alignment, and Realigned Southern Colfax Avenue alignment/Stafford Access Drive #3 are all projected to be signalized. CDOT will not allow the signalization of Colfax Avenue/Espana Street.

- Internal site intersections are all to be side street stop controlled except for the intersection of Lisbon Street/13th Avenue, which will be all-way stop controlled.
- The average progression for both directions is 34.6 percent in the AM peak hour and 29.6 percent in the PM peak hour. Traffic conditions along Picadilly Road are the limiting factor in not achieving the desired progression levels outlined in the SHAC and not the placement of signals at intervals below 1/2 mile along Colfax Avenue.

The City of Aurora bases the need for auxiliary turn lanes on the CDOT SHAC (and Colfax Avenue being a state highway already requires the SHAC's application). Ultimate turn lane storage lengths are shown in **Table 3** for auxiliary lanes at site access points.

These improvements have been developed based on the current understanding of the I-70/Picadilly Road interchange project. It is acknowledged that results of the interchange project study may provide additional recommendations at arterial intersections in the study area.

APPENDIX A. TRAFFIC COUNTS

All Traffic Data Services
Wheat Ridge, CO 80033

Page 1

Site Code: 6
Station ID: 6
COLFAX AVE W.O. I70 FRONTAGE RD

Start Time	11-Dec-18 Tue	EB	WB	Total
12:00 AM		38	22	60
01:00		19	46	65
02:00		9	18	27
03:00		11	23	34
04:00		59	62	121
05:00		108	180	288
06:00		268	398	666
07:00		357	573	930
08:00		250	391	641
09:00		190	262	452
10:00		187	260	447
11:00		182	267	449
12:00 PM		247	242	489
01:00		191	217	408
02:00		323	269	592
03:00		454	382	836
04:00		536	322	858
05:00		608	343	951
06:00		330	241	571
07:00		176	112	288
08:00		127	91	218
09:00		75	70	145
10:00		58	53	111
11:00		37	43	80
Total		4840	4887	9727
Percent		49.8%	50.2%	
AM Peak Vol.	-	07:00	07:00	07:00
PM Peak Vol.	-	17:00	15:00	17:00
	-	608	382	951

All Traffic Data Services
Wheat Ridge, CO 80033

Page 2

Site Code: 6
Station ID: 6
COLFAX AVE W.O. I70 FRONTAGE RD

Start Time	12-Dec-18 Wed	EB	WB	Total
12:00 AM		37	40	77
01:00		12	54	66
02:00		12	24	36
03:00		14	30	44
04:00		42	57	99
05:00		114	200	314
06:00		282	443	725
07:00		369	658	1027
08:00		221	415	636
09:00		194	309	503
10:00		180	247	427
11:00		195	228	423
12:00 PM		235	231	466
01:00		240	247	487
02:00		354	279	633
03:00		489	389	878
04:00		581	326	907
05:00		612	376	988
06:00		295	217	512
07:00		174	119	293
08:00		168	92	260
09:00		90	80	170
10:00		55	34	89
11:00		40	34	74
Total		5005	5129	10134
Percent		49.4%	50.6%	
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	17:00	15:00	-
	-	612	389	988

All Traffic Data Services
Wheat Ridge, CO 80033

Page 3

Site Code: 6
Station ID: 6
COLFAX AVE W.O. I70 FRONTAGE RD

Start Time	13-Dec-18	EB	WB	Total
	Thu			
12:00 AM		36	41	77
01:00		15	36	51
02:00		15	28	43
03:00		13	22	35
04:00		55	65	120
05:00		112	186	298
06:00		246	407	653
07:00		397	644	1041
08:00		223	422	645
09:00		147	261	408
10:00		166	217	383
11:00		178	228	406
12:00 PM		212	227	439
01:00		226	230	456
02:00		367	257	624
03:00		504	341	845
04:00		602	383	985
05:00		646	374	1020
06:00		354	243	597
07:00		187	132	319
08:00		134	106	240
09:00		124	70	194
10:00		71	46	117
11:00		47	49	96
Total		5077	5015	10092
Percent		50.3%	49.7%	
AM Peak Vol.	-	07:00	07:00	07:00
PM Peak Vol.	-	17:00	16:00	17:00
Grand Total		14922	15031	29953
Percent		49.8%	50.2%	

ADT

ADT 9,984

AADT 9,984

All Traffic Data Services
Wheat Ridge, CO 80033

Page 1

Site Code: 7
Station ID: 7
PICADILLY RD S.O. I70 FRONTAGE RD

Start Time	11-Dec-18 Tue	NB	SB	Total
12:00 AM		4	14	18
01:00		6	8	14
02:00		10	4	14
03:00		5	7	12
04:00		21	20	41
05:00		50	43	93
06:00		88	149	237
07:00		102	166	268
08:00		94	111	205
09:00		66	78	144
10:00		53	75	128
11:00		69	95	164
12:00 PM		55	88	143
01:00		63	101	164
02:00		84	136	220
03:00		110	207	317
04:00		113	243	356
05:00		115	228	343
06:00		49	155	204
07:00		31	86	117
08:00		22	66	88
09:00		23	37	60
10:00		10	45	55
11:00		10	29	39
Total		1253	2191	3444
Percent		36.4%	63.6%	
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	17:00	16:00	-
	-	115	243	356

All Traffic Data Services
Wheat Ridge, CO 80033

Page 2

Site Code: 7
Station ID: 7
PICADILLY RD S.O. I70 FRONTAGE RD

Start Time	12-Dec-18 Wed	NB	SB	Total
12:00 AM		3	14	17
01:00		4	9	13
02:00		8	7	15
03:00		11	5	16
04:00		19	17	36
05:00		61	50	111
06:00		92	145	237
07:00		112	166	278
08:00		75	107	182
09:00		59	78	137
10:00		47	88	135
11:00		52	74	126
12:00 PM		49	90	139
01:00		72	100	172
02:00		86	167	253
03:00		99	194	293
04:00		118	242	360
05:00		100	231	331
06:00		47	133	180
07:00		41	83	124
08:00		30	85	115
09:00		17	45	62
10:00		14	33	47
11:00		12	34	46
Total		1228	2197	3425
Percent		35.9%	64.1%	
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	16:00	16:00	-

All Traffic Data Services
Wheat Ridge, CO 80033

Page 3

Site Code: 7
Station ID: 7
PICADILLY RD S.O. I70 FRONTAGE RD

Start Time	13-Dec-18	NB	SB	Total
	Thu			
12:00 AM		6	13	19
01:00		4	10	14
02:00		11	4	15
03:00		6	5	11
04:00		18	20	38
05:00		59	51	110
06:00		82	136	218
07:00		109	167	276
08:00		86	114	200
09:00		57	83	140
10:00		56	73	129
11:00		49	76	125
12:00 PM		47	103	150
01:00		57	100	157
02:00		65	120	185
03:00		118	221	339
04:00		114	244	358
05:00		105	242	347
06:00		57	155	212
07:00		31	74	105
08:00		23	65	88
09:00		15	50	65
10:00		8	43	51
11:00		15	28	43
Total		1198	2197	3395
Percent		35.3%	64.7%	
AM Peak Vol.	-	07:00	07:00	07:00
PM Peak Vol.	-	15:00	16:00	16:00
	-	118	244	358

All Traffic Data Services
Wheat Ridge, CO 80033

Page 4

Site Code: 7
Station ID: 7
PICADILLY RD S.O. I70 FRONTAGE RD

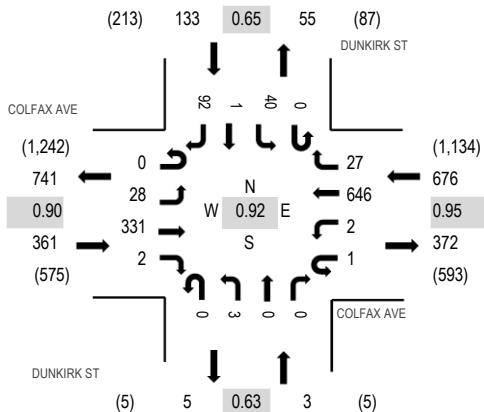
Start Time	14-Dec-18 Fri	NB	SB	Total
12:00 AM		4	14	18
01:00		6	8	14
02:00		10	4	14
03:00		5	7	12
04:00		21	20	41
05:00		50	43	93
06:00		88	149	237
07:00		102	166	268
08:00		94	111	205
09:00		66	78	144
10:00		53	75	128
11:00		69	95	164
12:00 PM		*	*	*
01:00		*	*	*
02:00		*	*	*
03:00		*	*	*
04:00		*	*	*
05:00		*	*	*
06:00		*	*	*
07:00		*	*	*
08:00		*	*	*
09:00		*	*	*
10:00		*	*	*
11:00		*	*	*
Total		568	770	1338
Percent		42.5%	57.5%	
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	-	-	-
Grand Total		4247	7355	11602
Percent		36.6%	63.4%	
ADT		ADT 3,429	AADT 3,429	



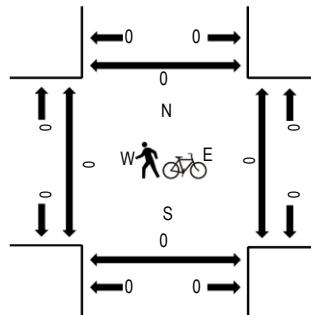
(303) 216-2439
www.alltrafficdata.net

Location: 1 DUNKIRK ST & COLFAX AVE AM
Date and Start Time: Wednesday, December 12, 2018
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:00 AM - 07:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

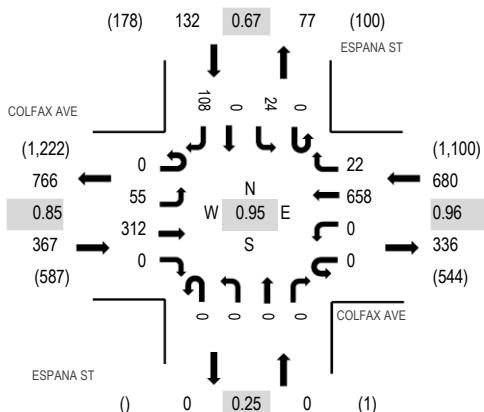
Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				DUNKIRK ST Northbound				DUNKIRK ST Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
7:00 AM	0	8	91	1	0	1	163	5	0	0	0	0	0	21	0	30	320	1,173	0	0	0	0
7:15 AM	0	8	90	0	0	0	167	10	0	1	0	0	0	3	0	23	302	1,086	0	0	0	0
7:30 AM	0	5	74	1	1	1	165	11	0	0	0	0	0	10	0	25	293	989	0	0	0	0
7:45 AM	0	7	76	0	0	0	151	1	0	2	0	0	0	6	1	14	258	872	0	0	0	0
8:00 AM	0	6	53	0	0	0	140	4	0	1	1	0	0	8	0	20	233	754	0	0	1	0
8:15 AM	0	4	56	0	0	0	122	7	0	0	0	0	0	4	0	12	205	0	0	0	0	
8:30 AM	0	3	44	0	0	0	107	2	0	0	0	0	0	4	0	16	176	0	0	0	0	
8:45 AM	1	1	46	0	0	0	72	4	0	0	0	0	0	6	0	10	140	0	0	0	0	
Count Total	1	42	530	2	1	2	1,087	44	0	4	1	0	0	62	1	150	1,927	0	0	1	0	
Peak Hour	0	28	331	2	1	2	646	27	0	3	0	0	0	40	1	92	1,173	0	0	0	0	



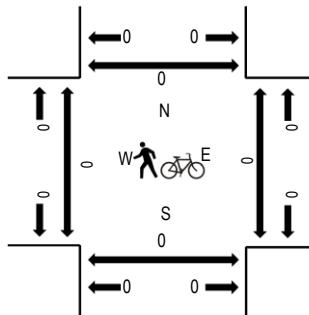
(303) 216-2439
www.alltrafficdata.net

Location: 2 ESPANA ST & COLFAX AVE AM
Date and Start Time: Wednesday, December 12, 2018
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				ESPAÑA ST Northbound				ESPAÑA ST Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
7:00 AM	0	12	96	0	0	0	159	7	0	0	0	0	0	9	0	24	307	1,179	0	0	0	0
7:15 AM	0	19	76	0	0	0	162	9	0	0	0	0	0	6	0	19	291	1,084	0	0	0	0
7:30 AM	0	13	70	0	0	0	171	6	0	0	0	0	0	8	0	41	309	983	0	0	0	0
7:45 AM	0	11	70	0	0	0	166	0	0	0	0	0	0	1	0	24	272	831	0	0	0	0
8:00 AM	1	7	55	0	0	0	128	0	0	0	0	0	0	7	0	14	212	687	0	0	0	0
8:15 AM	0	5	54	0	0	0	121	3	0	0	0	0	0	1	0	6	190	0	0	0	0	
8:30 AM	0	4	40	0	0	0	99	1	0	1	0	0	0	0	0	12	157	0	0	0	0	
8:45 AM	0	3	51	0	0	0	68	0	0	0	0	0	0	0	0	6	128	0	0	0	1	
Count Total	1	74	512	0	0	0	1,074	26	0	1	0	0	0	32	0	146	1,866	0	0	0	1	
Peak Hour	0	55	312	0	0	0	658	22	0	0	0	0	0	24	0	108	1,179	0	0	0	0	



(303) 216-2439
www.alltrafficdata.net

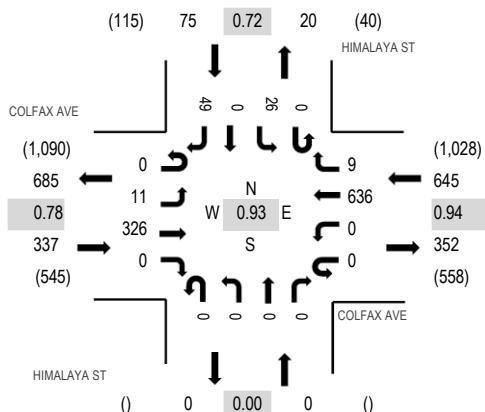
Location: 3 HIMALAYA ST & COLFAX AVE AM

Date and Start Time: Wednesday, December 12, 2018

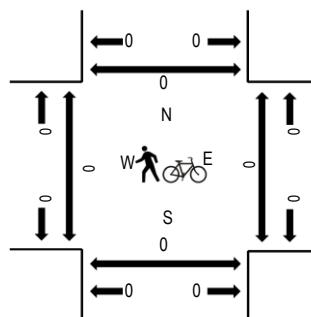
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:00 AM - 07:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE				COLFAX AVE				HIMALAYA ST				HIMALAYA ST				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South		North	West		East	South	North		
U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North		
7:00 AM	0	6	102	0	0	0	146	5	0	0	0	0	0	13	0	13	285	1,057	0	0	0	0
7:15 AM	0	1	79	0	0	0	162	0	0	0	0	0	0	6	0	19	267	965	0	0	0	0
7:30 AM	0	2	79	0	0	0	168	3	0	0	0	0	0	2	0	8	262	878	0	0	0	0
7:45 AM	0	2	66	0	0	0	160	1	0	0	0	0	0	5	0	9	243	752	0	0	0	0
8:00 AM	0	5	58	0	0	0	114	3	0	0	0	0	0	6	0	7	193	631	0	0	0	0
8:15 AM	0	3	47	0	0	0	114	3	0	0	0	0	0	4	0	9	180	0	0	0	0	0
8:30 AM	0	2	41	0	0	0	85	0	0	0	0	0	0	0	0	8	136	0	0	0	0	0
8:45 AM	0	3	49	0	0	0	63	1	0	0	0	0	0	1	0	5	122	0	0	0	0	0
Count Total	0	24	521	0	0	0	1,012	16	0	0	0	0	0	37	0	78	1,688	0	0	0	0	0
Peak Hour	0	11	326	0	0	0	636	9	0	0	0	0	0	26	0	49	1,057	0	0	0	0	0



(303) 216-2439
www.alltrafficdata.net

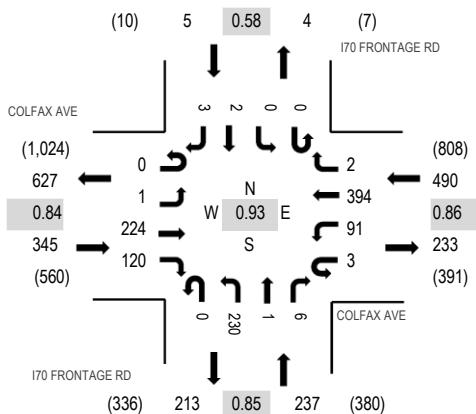
Location: 4 I70 FRONTAGE RD & COLFAX AVE AM

Date and Start Time: Wednesday, December 12, 2018

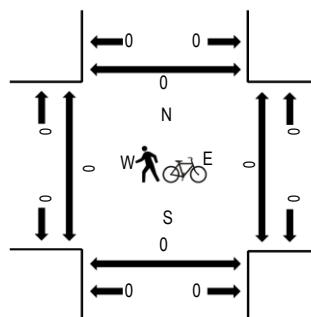
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE				COLFAX AVE				I70 FRONTAGE RD				I70 FRONTAGE RD				Rolling Hour	Pedestrian Crossings					
	Eastbound		Westbound		Northbound		Southbound		U-Turn		Left		Thru		Right			Total	West	East	South	North	
7:00 AM	0	1	71	31	1	25	99	0	0	0	46	0	3	0	0	0	1	278	1,077	0	0	0	0
7:15 AM	0	0	60	32	1	33	107	1	0	53	1	0	0	0	0	0	1	289	1,017	0	0	0	0
7:30 AM	0	0	47	30	1	17	104	0	0	67	0	3	0	0	2	0	0	271	914	0	0	0	0
7:45 AM	0	0	46	27	0	16	84	1	0	64	0	0	0	0	0	0	1	239	790	0	0	0	0
8:00 AM	0	1	47	24	1	12	82	2	0	46	0	2	0	0	0	0	1	218	681	0	0	0	0
8:15 AM	0	0	32	16	3	15	72	0	0	43	0	2	0	1	0	2	1	186	0	0	0	0	0
8:30 AM	0	0	28	16	0	14	58	0	0	30	0	1	0	0	0	0	1	147	0	0	0	0	0
8:45 AM	0	0	36	15	5	11	43	0	0	19	0	0	0	0	0	0	1	130	0	0	0	0	0
Count Total	0	2	367	191	12	143	649	4	0	368	1	11	0	1	2	7	1,758	0	0	0	0	0	
Peak Hour	0	1	224	120	3	91	394	2	0	230	1	6	0	0	2	3	1,077	0	0	0	0	0	



(303) 216-2439
www.alltrafficdata.net

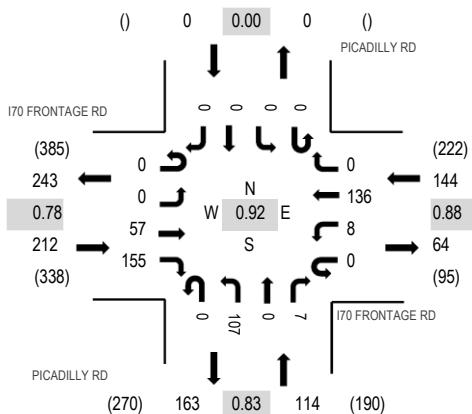
Location: 5 PICADILLY RD & I70 FRONTAGE RD AM

Date and Start Time: Wednesday, December 12, 2018

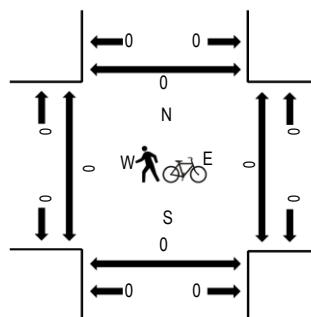
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

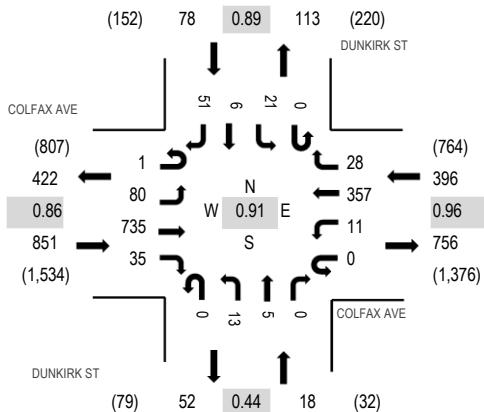
Interval Start Time	I70 FRONTAGE RD				I70 FRONTAGE RD				PICADILLY RD				PICADILLY RD				Rolling Hour	Pedestrian Crossings			
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South		North			West	East	South	North
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North
7:00 AM	0	0	16	38	0	1	31	0	0	22	0	1	0	0	0	0	109	470	0	0	0
7:15 AM	0	0	17	51	0	4	35	0	0	19	0	2	0	0	0	0	128	448	0	0	0
7:30 AM	0	0	13	35	0	1	40	0	0	30	0	4	0	0	0	0	123	400	0	0	0
7:45 AM	0	0	11	31	0	2	30	0	0	36	0	0	0	0	0	0	110	338	0	0	0
8:00 AM	0	0	12	26	0	3	22	0	0	23	0	1	0	0	0	0	87	280	0	0	0
8:15 AM	0	0	5	26	0	2	21	0	0	25	0	1	0	0	0	0	80	0	0	0	0
8:30 AM	0	0	3	27	0	1	15	0	0	14	0	1	0	0	0	0	61	0	0	0	0
8:45 AM	0	0	7	20	0	2	12	0	0	10	0	1	0	0	0	0	52	0	0	0	0
Count Total	0	0	84	254	0	16	206	0	0	179	0	11	0	0	0	0	750	0	0	0	0
Peak Hour	0	0	57	155	0	8	136	0	0	107	0	7	0	0	0	0	470	0	0	0	0



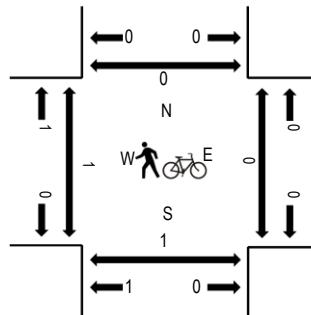
(303) 216-2439
www.alltrafficdata.net

Location: 1 DUNKIRK ST & COLFAX AVE PM
Date and Start Time: Wednesday, December 12, 2018
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

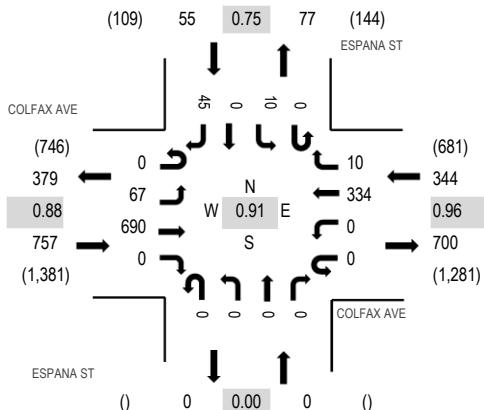
Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				DUNKIRK ST Northbound				DUNKIRK ST Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
4:00 PM	1	16	143	0	0	0	84	13	0	0	0	0	0	6	1	11	275	1,183	0	0	0	0
4:15 PM	0	16	167	4	0	0	72	9	0	3	2	0	0	9	4	10	296	1,278	0	0	0	0
4:30 PM	0	17	188	0	0	1	87	6	0	2	1	0	0	5	1	10	318	1,343	0	0	0	0
4:45 PM	0	24	149	2	0	0	84	9	0	0	3	0	0	5	3	15	294	1,333	0	0	0	0
5:00 PM	0	22	213	11	0	1	97	7	0	0	0	0	0	4	0	15	370	1,299	0	0	0	0
5:15 PM	1	17	185	22	0	9	89	6	0	11	1	0	0	7	2	11	361	1	0	1	0	
5:30 PM	1	19	150	9	0	3	89	11	0	5	1	0	0	3	1	16	308	0	0	0	0	
5:45 PM	0	16	136	5	0	0	85	2	0	0	2	1	0	5	0	8	260	0	0	0	0	
Count Total	3	147	1,331	53	0	14	687	63	0	21	10	1	0	44	12	96	2,482	1	0	1	0	
Peak Hour	1	80	735	35	0	11	357	28	0	13	5	0	0	21	6	51	1,343	1	0	1	0	



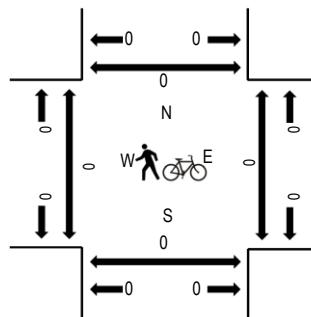
(303) 216-2439
www.alltrafficdata.net

Location: 2 ESPANA ST & COLFAX AVE PM
Date and Start Time: Wednesday, December 12, 2018
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				ESPAÑA ST Northbound				ESPAÑA ST Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
4:00 PM	0	15	133	0	0	0	80	6	0	0	0	0	0	7	0	15	256	1,057	0	0	0	0
4:15 PM	1	15	160	0	0	0	70	0	0	0	0	0	0	3	0	11	260	1,118	0	0	0	0
4:30 PM	0	23	171	0	0	0	76	3	0	0	0	0	0	4	0	15	292	1,156	0	0	0	0
4:45 PM	0	12	141	0	0	0	84	1	0	0	0	0	0	2	0	9	249	1,125	0	0	0	0
5:00 PM	0	15	199	0	0	0	88	3	0	0	0	0	0	1	0	11	317	1,114	0	0	0	0
5:15 PM	0	17	179	0	0	0	86	3	0	0	0	0	0	3	0	10	298	0	0	0	0	
5:30 PM	0	11	144	0	0	0	92	2	0	0	0	0	0	1	0	11	261	0	0	0	0	
5:45 PM	0	13	132	0	0	0	82	5	0	0	0	0	0	1	0	5	238	0	0	0	0	
Count Total	1	121	1,259	0	0	0	658	23	0	0	0	0	0	22	0	87	2,171	0	0	0	0	
Peak Hour	0	67	690	0	0	0	334	10	0	0	0	0	0	10	0	45	1,156	0	0	0	0	



(303) 216-2439
www.alltrafficdata.net

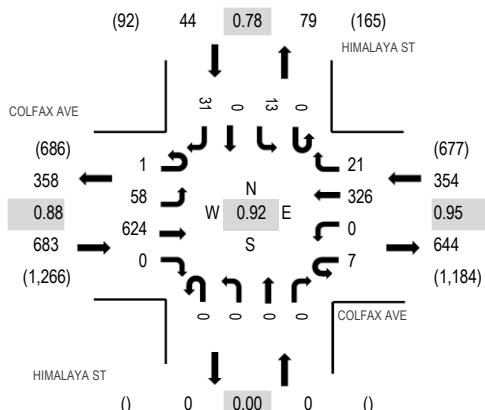
Location: 3 HIMALAYA ST & COLFAX AVE PM

Date and Start Time: Wednesday, December 12, 2018

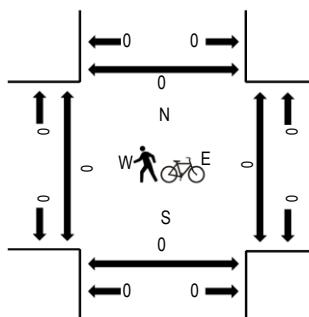
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				HIMALAYA ST Northbound				HIMALAYA ST Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
4:00 PM	2	13	124	0	1	0	72	5	0	0	0	0	0	2	0	12	231	986	0	0	0	0
4:15 PM	0	15	151	0	0	0	61	7	0	0	0	0	0	1	0	7	242	1,050	0	0	0	0
4:30 PM	0	16	154	0	0	0	80	4	0	0	0	0	0	3	0	7	264	1,081	0	0	0	0
4:45 PM	0	10	138	0	1	0	82	5	0	0	0	0	0	4	0	9	249	1,074	0	0	0	0
5:00 PM	1	16	177	0	5	0	82	6	0	0	0	0	0	2	0	6	295	1,049	0	0	0	0
5:15 PM	0	16	155	0	1	0	82	6	0	0	0	0	0	4	0	9	273	0	0	0	0	0
5:30 PM	0	14	135	0	0	0	88	9	0	0	0	0	0	5	0	6	257	0	0	0	0	0
5:45 PM	0	17	112	0	2	0	72	6	0	0	0	0	0	7	0	8	224	0	0	0	0	0
Count Total	3	117	1,146	0	10	0	619	48	0	0	0	0	0	28	0	64	2,035	0	0	0	0	0
Peak Hour	1	58	624	0	7	0	326	21	0	0	0	0	0	13	0	31	1,081	0	0	0	0	0



(303) 216-2439
www.alltrafficdata.net

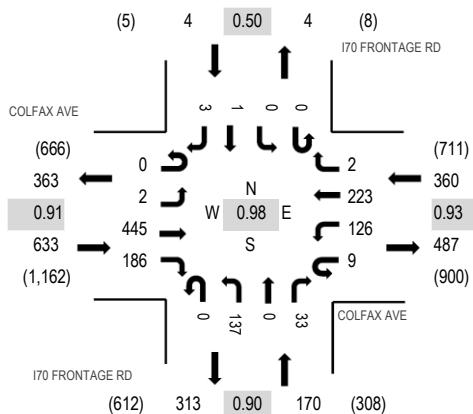
Location: 4 I70 FRONTAGE RD & COLFAX AVE PM

Date and Start Time: Wednesday, December 12, 2018

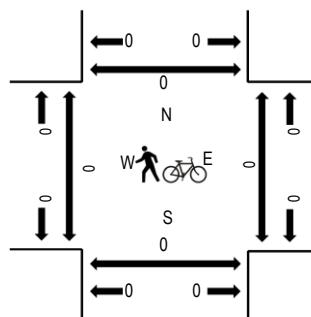
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	COLFAX AVE Eastbound				COLFAX AVE Westbound				I70 FRONTAGE RD Northbound				I70 FRONTAGE RD Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
4:00 PM	0	0	93	35	2	36	45	0	0	0	30	0	6	0	1	0	0	248	1,088	0	0	0
4:15 PM	0	1	106	38	1	41	39	1	0	0	27	0	13	0	0	0	0	267	1,137	0	0	0
4:30 PM	0	1	112	43	1	39	55	1	0	0	31	0	9	0	0	0	1	293	1,167	0	0	0
4:45 PM	0	0	100	46	2	32	61	0	0	0	31	0	8	0	0	0	0	280	1,156	0	0	0
5:00 PM	0	1	126	47	2	22	52	1	0	0	37	0	7	0	0	0	2	297	1,098	0	0	0
5:15 PM	0	0	107	50	4	33	55	0	0	0	38	0	9	0	0	1	0	297	0	0	0	0
5:30 PM	0	0	107	40	1	40	54	2	0	0	33	0	5	0	0	0	0	282	0	0	0	0
5:45 PM	0	0	71	38	2	31	56	0	0	0	19	0	5	0	0	0	0	222	0	0	0	0
Count Total	0	3	822	337	15	274	417	5	0	246	0	62	0	1	1	3	2,186	0	0	0	0	
Peak Hour	0	2	445	186	9	126	223	2	0	137	0	33	0	0	1	3	1,167	0	0	0	0	



(303) 216-2439
www.alltrafficdata.net

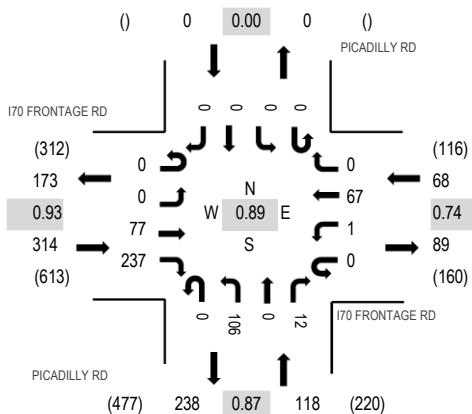
Location: 5 PICADILLY RD & I70 FRONTAGE RD PM

Date and Start Time: Wednesday, December 12, 2018

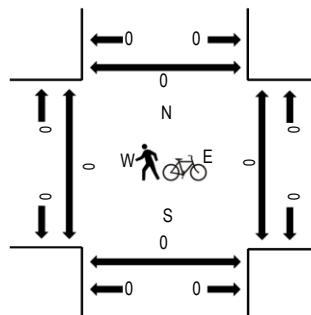
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

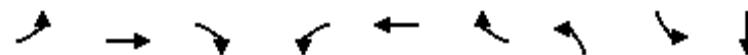
Traffic Counts

Interval Start Time	I70 FRONTAGE RD Eastbound				I70 FRONTAGE RD Westbound				PICADILLY RD Northbound				PICADILLY RD Southbound				Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North
4:00 PM	0	0	10	60	0	0	10	0	0	24	0	3	0	0	0	0	107	474	0	0	0
4:15 PM	0	0	17	62	0	0	10	0	0	32	0	2	0	0	0	0	123	482	0	0	0
4:30 PM	0	0	22	57	0	0	16	0	0	24	0	1	0	0	0	0	120	500	0	0	0
4:45 PM	0	0	16	64	0	1	13	0	0	26	0	4	0	0	0	0	124	497	0	0	0
5:00 PM	0	0	15	56	0	0	15	0	0	27	0	2	0	0	0	0	115	475	0	0	0
5:15 PM	0	0	24	60	0	0	23	0	0	29	0	5	0	0	0	0	141	0	0	0	0
5:30 PM	0	0	20	58	0	2	12	0	0	24	0	1	0	0	0	0	117	0	0	0	0
5:45 PM	0	0	17	55	0	2	12	0	0	15	0	1	0	0	0	0	102	0	0	0	0
Count Total	0	0	141	472	0	5	111	0	0	201	0	19	0	0	0	0	949	0	0	0	0
Peak Hour	0	0	77	237	0	1	67	0	0	106	0	12	0	0	0	0	500	0	0	0	0

APPENDIX B. EXISTING CONDITIONS LOS

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
01/08/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	28	331	2	2	646	27	3	40	1	
Future Volume (vph)	28	331	2	2	646	27	3	40	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	30.0	25.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	15.0	30.0	35.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	12.0%	24.0%	28%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	32.0	32.1	32.1	32.7	28.9	28.9	5.4	8.1	6.6	
Actuated g/C Ratio	0.62	0.62	0.62	0.63	0.56	0.56	0.10	0.16	0.13	
v/c Ratio	0.06	0.16	0.00	0.00	0.36	0.03	0.01	0.16	0.35	
Control Delay	5.6	7.5	0.0	5.0	11.6	0.1	29.3	22.6	11.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.6	7.5	0.0	5.0	11.6	0.1	29.3	22.6	11.4	
LOS	A	A	A	A	B	A	C	C	B	
Approach Delay		7.3			11.1				14.7	
Approach LOS		A			B				B	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 52

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 10.4

Intersection LOS: B

Intersection Capacity Utilization 43.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
01/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	28	331	2	2	646	27	3	0	0	40	1	92
Future Volume (veh/h)	28	331	2	2	646	27	3	0	0	40	1	92
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	30	360	0	2	702	29	3	0	0	43	1	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	1629		518	1324	590	319	30		301	1	148
Arrive On Green	0.03	0.46	0.00	0.00	0.37	0.37	0.00	0.00	0.00	0.08	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	16	1572
Grp Volume(v), veh/h	30	360	0	2	702	29	3	0	0	43	0	101
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1587
Q Serve(g_s), s	0.6	3.3	0.0	0.0	8.4	0.6	0.0	0.0	0.0	1.2	0.0	3.4
Cycle Q Clear(g_c), s	0.6	3.3	0.0	0.0	8.4	0.6	0.0	0.0	0.0	1.2	0.0	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	350	1629		518	1324	590	319	30		301	0	149
V/C Ratio(X)	0.09	0.22		0.00	0.53	0.05	0.01	0.00		0.14	0.00	0.68
Avail Cap(c_a), veh/h	519	3329		840	3329	1485	1257	1031		482	0	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.4	8.9	0.0	10.6	13.4	10.9	26.2	0.0	0.0	21.6	0.0	23.9
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.2	0.0	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.3	1.6	0.0	0.0	4.5	0.4	0.0	0.0	0.0	0.9	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.5	9.0	0.0	10.6	14.1	11.0	26.2	0.0	0.0	21.7	0.0	27.8
LnGrp LOS	B	A		B	B	C	A		C	A	C	
Approach Vol, veh/h	390		A		733			3	A		144	
Approach Delay, s/veh	9.1				13.9			26.2			26.0	
Approach LOS		A			B			C		C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.1	34.0	5.2	10.1	9.8	29.3	9.5	5.9				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.0	5.3	2.0	5.4	2.6	10.4	3.2	0.0				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.4	0.0	9.9	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection

Int Delay, s/veh 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	55	312	658	22	24	108
Future Vol, veh/h	55	312	658	22	24	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	328	693	23	25	114

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	716	0	-	0	940	347
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	247	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	880	-	-	-	295	649
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	880	-	-	-	276	649
Mov Cap-2 Maneuver	-	-	-	-	276	-
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	733	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.4
HCM LOS		B	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	880	-	-	-	521
HCM Lane V/C Ratio	0.066	-	-	-	0.267
HCM Control Delay (s)	9.4	-	-	-	14.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	11	326	636	9	26	49
Future Vol, veh/h	11	326	636	9	26	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	351	684	10	28	53
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	694	0	-	0	884	342
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	897	-	-	-	285	654
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	897	-	-	-	281	654
Mov Cap-2 Maneuver	-	-	-	-	281	-
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	814	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.3	0	14.8			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	897	-	-	-	448	
HCM Lane V/C Ratio	0.013	-	-	-	0.18	
HCM Control Delay (s)	9.1	-	-	-	14.8	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.6	

Intersection

Int Delay, s/veh 11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	224	120	91	394	2	230	1	6	0	2	3
Future Vol, veh/h	1	224	120	91	394	2	230	1	6	0	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	241	129	98	424	2	247	1	6	0	2	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	426	0	0	370	0	0	652	865	121	744	993	213
Stage 1	-	-	-	-	-	-	243	243	-	621	621	-
Stage 2	-	-	-	-	-	-	409	622	-	123	372	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1130	-	-	1185	-	-	353	290	908	303	244	792
Stage 1	-	-	-	-	-	-	739	703	-	442	477	-
Stage 2	-	-	-	-	-	-	590	477	-	868	617	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1130	-	-	1185	-	-	320	258	908	275	217	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	320	258	-	275	217	-
Stage 1	-	-	-	-	-	-	738	702	-	442	425	-
Stage 2	-	-	-	-	-	-	521	425	-	860	616	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	0	1.8		46.7		14.5		
HCM LOS				E		B		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	325	1130	-	-	1185	-	-	384
HCM Lane V/C Ratio	0.784	0.001	-	-	0.083	-	-	0.014
HCM Control Delay (s)	46.7	8.2	0	-	8.3	0.3	-	14.5
HCM Lane LOS	E	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	6.3	0	-	-	0.3	-	-	0

Intersection

Int Delay, s/veh 2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	57	155	8	136	107	7
Future Vol, veh/h	57	155	8	136	107	7
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	168	9	148	116	8

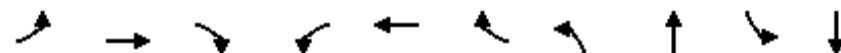
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	230	0	312 146
Stage 1	-	-	-	-	146 -
Stage 2	-	-	-	-	166 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1338	-	681 901
Stage 1	-	-	-	-	881 -
Stage 2	-	-	-	-	863 -
Platoon blocked, %	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1338	-	676 901
Mov Cap-2 Maneuver	-	-	-	-	676 -
Stage 1	-	-	-	-	881 -
Stage 2	-	-	-	-	857 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	687	-	-	1338	-
HCM Lane V/C Ratio	0.18	-	-	0.006	-
HCM Control Delay (s)	11.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
01/08/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	80	735	35	11	357	28	13	5	21	6
Future Volume (vph)	80	735	35	11	357	28	13	5	21	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases			2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	25.0	10.0	30.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	35.0	15.0	30.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	28.0%	12.0%	24.0%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	38.3	40.8	40.8	34.4	28.3	28.3	6.6	5.8	7.2	6.0
Actuated g/C Ratio	0.70	0.74	0.74	0.63	0.52	0.52	0.12	0.11	0.13	0.11
v/c Ratio	0.13	0.31	0.03	0.02	0.21	0.04	0.03	0.03	0.10	0.28
Control Delay	5.2	7.1	0.1	4.8	12.4	0.1	22.5	28.2	23.4	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	7.1	0.1	4.8	12.4	0.1	22.5	28.2	23.4	14.2
LOS	A	A	A	A	B	A	C	C	C	B
Approach Delay		6.6			11.3			24.0		16.7
Approach LOS		A			B			C		B

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 54.9

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.31

Intersection Signal Delay: 8.8

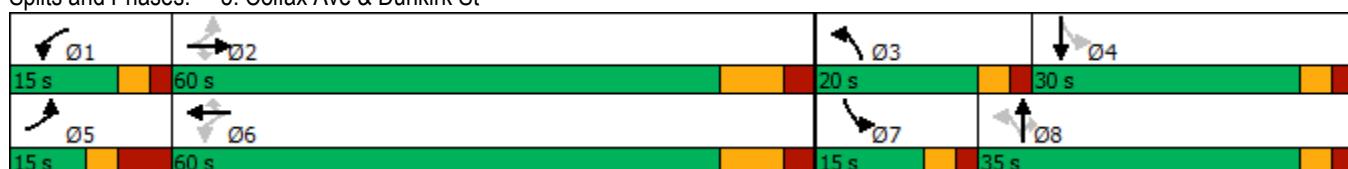
Intersection LOS: A

Intersection Capacity Utilization 48.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
01/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	80	735	35	11	357	28	13	5	0	21	6	51
Future Volume (veh/h)	80	735	35	11	357	28	13	5	0	21	6	51
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	808	0	12	392	31	14	5	0	23	7	56
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	490	1574		338	1215	542	470	118		331	20	164
Arrive On Green	0.07	0.44	0.00	0.02	0.34	0.34	0.02	0.06	0.00	0.07	0.11	0.11
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	179	1433
Grp Volume(v), veh/h	88	808	0	12	392	31	14	5	0	23	0	63
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1612
Q Serve(g_s), s	1.8	9.6	0.0	0.3	4.8	0.8	0.2	0.1	0.0	0.7	0.0	2.1
Cycle Q Clear(g_c), s	1.8	9.6	0.0	0.3	4.8	0.8	0.2	0.1	0.0	0.7	0.0	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	490	1574		338	1215	542	470	118		331	0	184
V/C Ratio(X)	0.18	0.51		0.04	0.32	0.06	0.03	0.04		0.07	0.00	0.34
Avail Cap(c_a), veh/h	587	3098		616	3098	1382	1296	959		513	0	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.0	11.7	0.0	12.3	14.2	12.9	24.8	25.8	0.0	22.3	0.0	23.9
Incr Delay (d2), s/veh	0.1	0.6	0.0	0.0	0.3	0.1	0.0	0.1	0.0	0.1	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	5.0	0.0	0.1	2.7	0.5	0.2	0.1	0.0	0.5	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.2	12.3	0.0	12.3	14.6	13.0	24.9	25.9	0.0	22.4	0.0	24.7
LnGrp LOS	B	B		B	B	B	C	C		C	A	C
Approach Vol, veh/h		896	A		435			19	A		86	
Approach Delay, s/veh		12.2			14.4			25.1			24.1	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	34.9	6.0	11.7	11.8	29.0	9.0	8.7				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.3	11.6	2.2	4.1	3.8	6.8	2.7	2.1				
Green Ext Time (p_c), s	0.0	11.4	0.0	0.2	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			13.7									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	67	690	334	10	10	45
Future Vol, veh/h	67	690	334	10	10	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	758	367	11	11	49
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	378	0	-	0	818	184
Stage 1	-	-	-	-	367	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	1177	-	-	-	346	827
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1177	-	-	-	324	827
Mov Cap-2 Maneuver	-	-	-	-	324	-
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	574	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	11.2			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1177	-	-	-	645	
HCM Lane V/C Ratio	0.063	-	-	-	0.094	
HCM Control Delay (s)	8.3	-	-	-	11.2	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	58	624	326	21	13	31
Future Vol, veh/h	58	624	326	21	13	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	678	354	23	14	34
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	377	0	-	0	819	177
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	465	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1178	-	-	-	314	835
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1178	-	-	-	297	835
Mov Cap-2 Maneuver	-	-	-	-	297	-
Stage 1	-	-	-	-	645	-
Stage 2	-	-	-	-	599	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	12.3			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1178	-	-	-	544	
HCM Lane V/C Ratio	0.054	-	-	-	0.088	
HCM Control Delay (s)	8.2	-	-	-	12.3	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	

Intersection

Int Delay, s/veh 7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	445	186	126	223	2	137	0	33	0	1	3
Future Vol, veh/h	2	445	186	126	223	2	137	0	33	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	454	190	129	228	2	140	0	34	0	1	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	230	0	0	644	0	0	831	946	227	718	1135	115
Stage 1	-	-	-	-	-	-	458	458	-	487	487	-
Stage 2	-	-	-	-	-	-	373	488	-	231	648	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1335	-	-	937	-	-	262	260	776	316	201	916
Stage 1	-	-	-	-	-	-	552	565	-	531	549	-
Stage 2	-	-	-	-	-	-	620	548	-	751	464	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1335	-	-	937	-	-	228	218	776	265	169	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	218	-	265	169	-
Stage 1	-	-	-	-	-	-	551	564	-	530	462	-
Stage 2	-	-	-	-	-	-	519	461	-	717	463	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	3.6		41.4		13.4	
HCM LOS				E		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	264	1335	-	-	937	-	-	435
HCM Lane V/C Ratio	0.657	0.002	-	-	0.137	-	-	0.009
HCM Control Delay (s)	41.4	7.7	0	-	9.5	0.4	-	13.4
HCM Lane LOS	E	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	4.2	0	-	-	0.5	-	-	0

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	77	237	1	67	106	12
Future Vol, veh/h	77	237	1	67	106	12
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	266	1	75	119	13

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	353	0	297 220
Stage 1	-	-	-	-	220 -
Stage 2	-	-	-	-	77 -
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	-	-	1206	-	694 820
Stage 1	-	-	-	-	817 -
Stage 2	-	-	-	-	946 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1206	-	693 820
Mov Cap-2 Maneuver	-	-	-	-	693 -
Stage 1	-	-	-	-	817 -
Stage 2	-	-	-	-	945 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.3
HCM LOS		B	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	704	-	-	1206	-
HCM Lane V/C Ratio	0.188	-	-	0.001	-
HCM Control Delay (s)	11.3	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

APPENDIX C. NCHRP 684 (INTERNAL CAPTURE) WORKSHEETS

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Stafford Buisness Park		Organization:	Felsburg, Holt & Ullevig	
Project Location:	Aurora, CO		Performed By:	Philip Dunham	
Scenario Description:	AM Street Peak Hour		Date:	12/4/2018	
Analysis Year:	Long Term		Checked By:		
Analysis Period:	AM Street Peak Hour		Date:		

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	-	-	-	0	0	0
Retail	820, 850	110	KSF	320	196	124
Restaurant	-	-	-	0	0	0
Cinema/Entertainment	-	-	-	0	0	0
Residential	-	-	-	0	0	0
Hotel	310	200	Rooms	95	56	39
All Other Land Uses ²	130, 945, 912			1,992	1,549	443
				2,407	1,801	606

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	0.00	0%	0%	0.00	0%	0%
Retail	0.00	0%	0%	0.00	0%	0%
Restaurant	0.00	0%	0%	0.00	0%	0%
Cinema/Entertainment	0.00	0%	0%	0.00	0%	0%
Residential	0.00	0%	0%	0.00	0%	0%
Hotel	0.00	0%	0%	0.00	0%	0%
All Other Land Uses ²	0.00	0%	0%	0.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	5	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	2,407	1,801	606
Internal Capture Percentage	0%	0%	1%
External Vehicle-Trips ⁵	2,397	1,796	601
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	3%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	0%	13%

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Stafford Buisness Park		Organization:	Felsburg, Holt & Ullevig	
Project Location:	Aurora, CO		Performed By:	Philip Dunham	
Scenario Description:	PM Street Peak Hour		Date:	12/4/2018	
Analysis Year:	Long Term		Checked By:		
Analysis Period:	PM Street Peak Hour		Date:		

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	-	-	-	0	0	0
Retail	820, 850	125	KSF	791	390	401
Restaurant	-	-	-	0	0	0
Cinema/Entertainment	-	-	-	0	0	0
Residential	-	-	-	0	0	0
Hotel	310	200	Rooms	124	63	61
All Other Land Uses ²	130, 944, 912			2,118	545	1,573
				3,033	998	2,035

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	0.00	0%	0%	0.00	0%	0%
Retail	0.00	0%	0%	0.00	0%	0%
Restaurant	0.00	0%	0%	0.00	0%	0%
Cinema/Entertainment	0.00	0%	0%	0.00	0%	0%
Residential	0.00	0%	0%	0.00	0%	0%
Hotel	0.00	0%	0%	0.00	0%	0%
All Other Land Uses ²	0.00	0%	0%	0.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1250	1000		-	
Retail					-	
Restaurant					-	
Cinema/Entertainment					-	
Residential		-	-			
Hotel					-	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	11
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	8	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	3,033	998	2,035
Internal Capture Percentage	1%	2%	1%
External Vehicle-Trips ⁵	2,995	979	2,016
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	2%	3%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	17%	13%

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

APPENDIX D. 2020-22 BACKGROUND LOS

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	30	351	2	2	685	29	3	42	1	
Future Volume (vph)	30	351	2	2	685	29	3	42	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	30.0	25.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	15.0	30.0	35.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	12.0%	24.0%	28%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	33.2	33.3	33.3	33.9	30.2	30.2	5.5	8.3	6.8	
Actuated g/C Ratio	0.62	0.62	0.62	0.64	0.57	0.57	0.10	0.16	0.13	
v/c Ratio	0.07	0.17	0.00	0.00	0.37	0.03	0.01	0.17	0.37	
Control Delay	5.6	7.4	0.0	5.0	11.5	0.1	30.7	23.6	11.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.6	7.4	0.0	5.0	11.5	0.1	30.7	23.6	11.5	
LOS	A	A	A	A	B	A	C	C	B	
Approach Delay		7.2			11.0				15.1	
Approach LOS		A			B				B	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 53.3

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 10.4

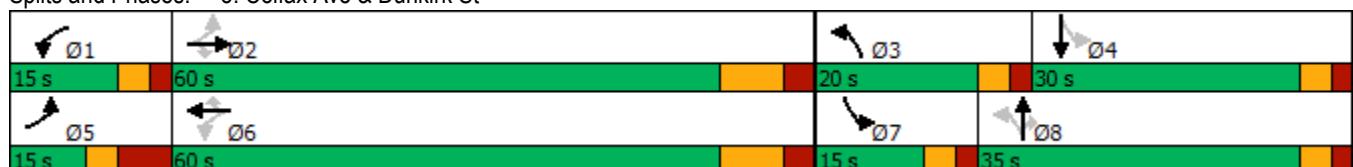
Intersection LOS: B

Intersection Capacity Utilization 45.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	30	351	2	2	685	29	3	0	0	42	1	98
Future Volume (veh/h)	30	351	2	2	685	29	3	0	0	42	1	98
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	382	0	2	745	32	3	0	0	46	1	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	345	1674		517	1368	610	325	43		303	1	156
Arrive On Green	0.04	0.47	0.00	0.00	0.39	0.39	0.00	0.00	0.00	0.08	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	15	1573
Grp Volume(v), veh/h	33	382	0	2	745	32	3	0	0	46	0	108
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1587
Q Serve(g_s), s	0.6	3.6	0.0	0.0	9.3	0.7	0.0	0.0	0.0	1.3	0.0	3.7
Cycle Q Clear(g_c), s	0.6	3.6	0.0	0.0	9.3	0.7	0.0	0.0	0.0	1.3	0.0	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	345	1674		517	1368	610	325	43		303	0	158
V/C Ratio(X)	0.10	0.23		0.00	0.54	0.05	0.01	0.00		0.15	0.00	0.68
Avail Cap(c_a), veh/h	501	3193		826	3193	1424	1224	989		473	0	699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.5	8.9	0.0	10.6	13.6	11.0	26.9	0.0	0.0	22.2	0.0	24.7
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.2	0.0	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.3	1.7	0.0	0.0	5.1	0.4	0.0	0.0	0.0	1.0	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.6	9.0	0.0	10.6	14.3	11.0	26.9	0.0	0.0	22.4	0.0	28.6
LnGrp LOS	B	A		B	B	B	C	A		C	A	C
Approach Vol, veh/h	415		A		779			3	A		154	
Approach Delay, s/veh	9.2				14.2			26.9			26.7	
Approach LOS		A			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.2	35.7	5.2	10.6	10.0	30.9	9.6	6.3				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.0	5.6	2.0	5.7	2.6	11.3	3.3	0.0				
Green Ext Time (p_c), s	0.0	4.7	0.0	0.5	0.0	10.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	58	331	697	23	25	114
Future Vol, veh/h	58	331	697	23	25	114
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	348	734	24	26	120
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	758	0	-	0	995	367
Stage 1	-	-	-	-	734	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	849	-	-	-	274	630
Stage 1	-	-	-	-	424	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	849	-	-	-	254	630
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	721	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.4	0	15.2			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	849	-	-	-	498	-
HCM Lane V/C Ratio	0.072	-	-	-	0.294	-
HCM Control Delay (s)	9.6	-	-	-	15.2	-
HCM Lane LOS	A	-	-	-	C	-
HCM 95th %tile Q(veh)	0.2	-	-	-	1.2	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	12	346	674	10	28	52
Future Vol, veh/h	12	346	674	10	28	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	372	725	11	30	56
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	736	0	-	0	937	363
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	212	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	865	-	-	-	263	634
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	803	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	865	-	-	-	259	634
Mov Cap-2 Maneuver	-	-	-	-	259	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	803	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.3	0	15.7			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	865	-	-	-	421	
HCM Lane V/C Ratio	0.015	-	-	-	0.204	
HCM Control Delay (s)	9.2	-	-	-	15.7	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.8	

Intersection

Int Delay, s/veh 14.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	237	127	96	418	2	244	1	6	0	2	3
Future Vol, veh/h	1	237	127	96	418	2	244	1	6	0	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	255	137	103	449	2	262	1	6	0	2	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	451	0	0	392	0	0	689	914	128	786	1050	226
Stage 1	-	-	-	-	-	-	257	257	-	656	656	-
Stage 2	-	-	-	-	-	-	432	657	-	130	394	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1106	-	-	1163	-	-	332	272	898	283	226	777
Stage 1	-	-	-	-	-	-	725	694	-	421	460	-
Stage 2	-	-	-	-	-	-	572	460	-	860	604	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1106	-	-	1163	-	-	305	248	898	261	206	777
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	248	-	261	206	-
Stage 1	-	-	-	-	-	-	724	693	-	421	419	-
Stage 2	-	-	-	-	-	-	517	419	-	852	603	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	1.6		61		14.9	
HCM LOS				F		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1106	-	-	1163	-	-	368
HCM Lane V/C Ratio	0.871	0.001	-	-	0.089	-	-	0.015
HCM Control Delay (s)	61	8.3	0	-	8.4	-	-	14.9
HCM Lane LOS	F	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	7.9	0	-	-	0.3	-	-	0

Intersection

Int Delay, s/veh 3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations						
Traffic Vol, veh/h	60	164	8	144	113	7
Future Vol, veh/h	60	164	8	144	113	7
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	178	9	157	123	8

Major/Minor	Major1	Major2	Minor1
-------------	--------	--------	--------

Conflicting Flow All	0	0	243	0	329	154
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	175	-
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	-	-	1323	-	665	892
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1323	-	660	892
Mov Cap-2 Maneuver	-	-	-	-	660	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	849	-

Approach	EB	WB	NB
----------	----	----	----

HCM Control Delay, s	0	0.4	11.7
----------------------	---	-----	------

HCM LOS	B
---------	---

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	670	-	-	1323	-
HCM Lane V/C Ratio	0.195	-	-	0.007	-
HCM Control Delay (s)	11.7	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	85	779	37	12	378	30	14	5	22	6
Future Volume (vph)	85	779	37	12	378	30	14	5	22	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	25.0	10.0	30.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	35.0	15.0	30.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	28.0%	12.0%	24.0%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	38.8	41.4	41.4	34.9	28.8	28.8	6.5	5.6	7.3	6.1
Actuated g/C Ratio	0.70	0.75	0.75	0.63	0.52	0.52	0.12	0.10	0.13	0.11
v/c Ratio	0.14	0.32	0.03	0.03	0.23	0.04	0.04	0.03	0.10	0.29
Control Delay	5.2	7.1	0.1	4.8	12.3	0.1	23.4	29.4	24.0	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	7.1	0.1	4.8	12.3	0.1	23.4	29.4	24.0	14.3
LOS	A	A	A	A	B	A	C	C	C	B
Approach Delay		6.6				11.2			24.9	16.9
Approach LOS		A				B			C	B

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 55.5

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 8.8

Intersection LOS: A

Intersection Capacity Utilization 49.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	85	779	37	12	378	30	14	5	0	22	6	54
Future Volume (veh/h)	85	779	37	12	378	30	14	5	0	22	6	54
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	93	856	0	13	415	33	15	5	0	24	7	59
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	479	1569		322	1209	539	475	120		334	20	166
Arrive On Green	0.07	0.44	0.00	0.02	0.34	0.34	0.02	0.06	0.00	0.07	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	171	1440
Grp Volume(v), veh/h	93	856	0	13	415	33	15	5	0	24	0	66
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1611
Q Serve(g_s), s	1.9	10.4	0.0	0.3	5.1	0.8	0.2	0.1	0.0	0.7	0.0	2.2
Cycle Q Clear(g_c), s	1.9	10.4	0.0	0.3	5.1	0.8	0.2	0.1	0.0	0.7	0.0	2.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	479	1569		322	1209	539	475	120		334	0	186
V/C Ratio(X)	0.19	0.55		0.04	0.34	0.06	0.03	0.04		0.07	0.00	0.35
Avail Cap(c_a), veh/h	573	3084		596	3084	1375	1293	955		513	0	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	12.1	0.0	12.4	14.5	13.1	24.8	25.8	0.0	22.3	0.0	24.0
Incr Delay (d2), s/veh	0.1	0.6	0.0	0.0	0.4	0.1	0.0	0.1	0.0	0.1	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	5.4	0.0	0.2	3.0	0.5	0.2	0.1	0.0	0.5	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.3	12.7	0.0	12.5	14.8	13.2	24.9	25.9	0.0	22.4	0.0	24.8
LnGrp LOS	B	B		B	B	B	C	C		C	A	C
Approach Vol, veh/h	949		A		461			20	A		90	
Approach Delay, s/veh	12.6				14.7			25.1			24.2	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	34.9	6.1	11.8	11.9	29.0	9.1	8.8				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.3	12.4	2.2	4.2	3.9	7.1	2.7	2.1				
Green Ext Time (p_c), s	0.0	12.2	0.0	0.2	0.0	5.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	71	731	354	11	11	48
Future Vol, veh/h	71	731	354	11	11	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	803	389	12	12	53
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	401	0	-	0	866	195
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	477	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	1154	-	-	-	325	814
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1154	-	-	-	303	814
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	556	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	11.5			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1154	-	-	-	619	
HCM Lane V/C Ratio	0.068	-	-	-	0.105	
HCM Control Delay (s)	8.3	-	-	-	11.5	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	61	661	346	22	14	33
Future Vol, veh/h	61	661	346	22	14	33
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	718	376	24	15	36
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	465	0	-	0	932	253
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	491	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1093	-	-	-	265	746
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	581	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1025	-	-	-	218	700
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	545	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	14.7			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1025	-	-	-	422	
HCM Lane V/C Ratio	0.065	-	-	-	0.121	
HCM Control Delay (s)	8.8	-	-	-	14.7	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	

Intersection

Int Delay, s/veh 8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	472	197	134	236	2	143	0	35	0	1	3
Future Vol, veh/h	2	472	197	134	236	2	143	0	35	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	482	201	137	241	2	146	0	36	0	1	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	243	0	0	683	0	0	881	1003	241	761	1203	122
Stage 1	-	-	-	-	-	-	486	486	-	516	516	-
Stage 2	-	-	-	-	-	-	395	517	-	245	687	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1320	-	-	906	-	-	241	241	760	295	183	906
Stage 1	-	-	-	-	-	-	531	549	-	510	533	-
Stage 2	-	-	-	-	-	-	602	532	-	737	446	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1320	-	-	906	-	-	211	204	760	248	155	906
Mov Cap-2 Maneuver	-	-	-	-	-	-	211	204	-	248	155	-
Stage 1	-	-	-	-	-	-	529	547	-	508	453	-
Stage 2	-	-	-	-	-	-	508	452	-	700	445	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	3.5		52		13.9	
HCM LOS				F		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	246	1320	-	-	906	-	-	410
HCM Lane V/C Ratio	0.738	0.002	-	-	0.151	-	-	0.01
HCM Control Delay (s)	52	7.7	0	-	9.7	-	-	13.9
HCM Lane LOS	F	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	5.2	0	-	-	0.5	-	-	0

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	82	251	1	71	112	13
Future Vol, veh/h	82	251	1	71	112	13
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	282	1	80	126	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	374	0	315 233
Stage 1	-	-	-	-	233 -
Stage 2	-	-	-	-	82 -
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	-	-	1184	-	678 806
Stage 1	-	-	-	-	806 -
Stage 2	-	-	-	-	941 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1184	-	677 806
Mov Cap-2 Maneuver	-	-	-	-	677 -
Stage 1	-	-	-	-	806 -
Stage 2	-	-	-	-	940 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	688	-	-	1184	-
HCM Lane V/C Ratio	0.204	-	-	0.001	-
HCM Control Delay (s)	11.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	31	371	2	2	724	30	3	45	1	
Future Volume (vph)	31	371	2	2	724	30	3	45	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	30.0	25.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	15.0	30.0	35.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	12.0%	24.0%	28%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	34.0	34.2	34.2	34.7	31.0	31.0	5.5	8.5	6.9	
Actuated g/C Ratio	0.63	0.63	0.63	0.64	0.57	0.57	0.10	0.16	0.13	
v/c Ratio	0.07	0.18	0.00	0.00	0.39	0.03	0.01	0.18	0.38	
Control Delay	5.6	7.3	0.0	5.0	11.6	0.1	31.7	24.3	11.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.6	7.3	0.0	5.0	11.6	0.1	31.7	24.3	11.6	
LOS	A	A	A	A	B	A	C	C	B	
Approach Delay		7.2			11.1				15.5	
Approach LOS		A			B				B	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 54.3

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.4

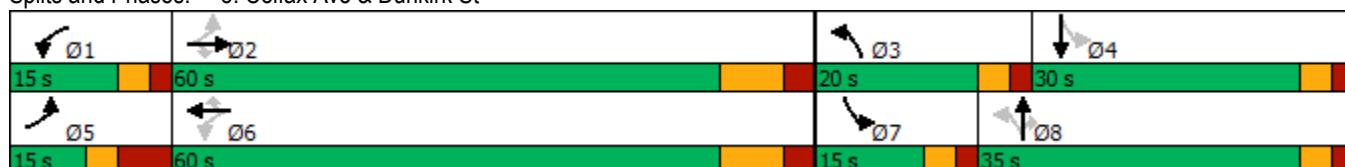
Intersection LOS: B

Intersection Capacity Utilization 46.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	31	371	2	2	724	30	3	0	0	45	1	103
Future Volume (veh/h)	31	371	2	2	724	30	3	0	0	45	1	103
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No	No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	403	0	2	787	33	3	0	0	49	1	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	1713		518	1413	630	328	52		303	1	162
Arrive On Green	0.04	0.48	0.00	0.00	0.40	0.40	0.00	0.00	0.00	0.08	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	14	1573
Grp Volume(v), veh/h	34	403	0	2	787	33	3	0	0	49	0	113
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1587
Q Serve(g_s), s	0.6	3.9	0.0	0.0	10.1	0.8	0.0	0.0	0.0	1.4	0.0	4.0
Cycle Q Clear(g_c), s	0.6	3.9	0.0	0.0	10.1	0.8	0.0	0.0	0.0	1.4	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	338	1713		518	1413	630	328	52		303	0	164
V/C Ratio(X)	0.10	0.24		0.00	0.56	0.05	0.01	0.00		0.16	0.00	0.69
Avail Cap(c_a), veh/h	485	3082		816	3082	1375	1195	954		465	0	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.5	8.9	0.0	10.6	13.7	10.9	27.6	0.0	0.0	22.8	0.0	25.5
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.2	0.0	3.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.3	1.9	0.0	0.0	5.6	0.4	0.0	0.0	0.0	1.1	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.6	9.0	0.0	10.6	14.4	11.0	27.6	0.0	0.0	23.0	0.0	29.3
LnGrp LOS	B	A		B	B	B	C	A		C	A	C
Approach Vol, veh/h	437		A		822			3	A		162	
Approach Delay, s/veh	9.2				14.3			27.6			27.4	
Approach LOS		A			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.2	37.3	5.2	11.1	10.1	32.4	9.7	6.6				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.0	5.9	2.0	6.0	2.6	12.1	3.4	0.0				
Green Ext Time (p_c), s	0.0	5.0	0.0	0.5	0.0	11.3	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	349	737	25	27	121
Future Vol, veh/h	62	349	737	25	27	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	367	776	26	28	127
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	802	0	-	0	1053	388
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	817	-	-	-	254	611
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	817	-	-	-	234	611
Mov Cap-2 Maneuver	-	-	-	-	234	-
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	707	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.5	0	16.3			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	817	-	-	-	472	
HCM Lane V/C Ratio	0.08	-	-	-	0.33	
HCM Control Delay (s)	9.8	-	-	-	16.3	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4	

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	12	365	712	10	29	55
Future Vol, veh/h	12	365	712	10	29	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	392	766	11	31	59
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	777	0	-	0	988	383
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	222	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	835	-	-	-	244	615
Stage 1	-	-	-	-	419	-
Stage 2	-	-	-	-	794	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	835	-	-	-	240	615
Mov Cap-2 Maneuver	-	-	-	-	240	-
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	794	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.3	0	16.6			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	835	-	-	-	399	
HCM Lane V/C Ratio	0.015	-	-	-	0.226	
HCM Control Delay (s)	9.4	-	-	-	16.6	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.9	

Intersection

Int Delay, s/veh 19.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	251	134	102	441	2	253	1	7	0	2	3
Future Vol, veh/h	1	251	134	102	441	2	253	1	7	0	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	270	144	110	474	2	272	1	8	0	2	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	476	0	0	414	0	0	730	968	135	833	1111	238
Stage 1	-	-	-	-	-	-	272	272	-	695	695	-
Stage 2	-	-	-	-	-	-	458	696	-	138	416	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1082	-	-	1141	-	-	310	252	889	261	208	763
Stage 1	-	-	-	-	-	-	711	683	-	399	442	-
Stage 2	-	-	-	-	-	-	552	441	-	851	590	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1082	-	-	1141	-	-	283	228	889	239	188	763
Mov Cap-2 Maneuver	-	-	-	-	-	-	283	228	-	239	188	-
Stage 1	-	-	-	-	-	-	710	682	-	399	400	-
Stage 2	-	-	-	-	-	-	494	399	-	842	589	-

Approach	EB	WB		NB		SB						
HCM Control Delay, s	0	1.6		86		15.7						
HCM LOS				F		C						
<hr/>												
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	288	1082	-	-	1141	-	-	343				
HCM Lane V/C Ratio	0.974	0.001	-	-	0.096	-	-	0.016				
HCM Control Delay (s)	86	8.3	0	-	8.5	-	-	15.7				
HCM Lane LOS	F	A	A	-	A	-	-	C				
HCM 95th %tile Q(veh)	9.8	0	-	-	0.3	-	-	0				

Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	64	174	9	152	120	8
Future Vol, veh/h	64	174	9	152	120	8
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	189	10	165	130	9
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	259	0	350	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	185	-
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	-	-	1306	-	647	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	847	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1306	-	642	879
Mov Cap-2 Maneuver	-	-	-	-	642	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	840	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.4	12			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	653	-	-	1306	-	
HCM Lane V/C Ratio	0.213	-	-	0.007	-	
HCM Control Delay (s)	12	-	-	7.8	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.8	-	-	0	-	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑↑
Traffic Volume (vph)	90	823	39	12	400	31	15	6	24	7
Future Volume (vph)	90	823	39	12	400	31	15	6	24	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	25.0	10.0	30.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	35.0	15.0	30.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	28.0%	12.0%	24.0%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	39.5	42.1	42.1	35.4	29.3	29.3	6.5	5.7	7.4	6.2
Actuated g/C Ratio	0.70	0.75	0.75	0.63	0.52	0.52	0.12	0.10	0.13	0.11
v/c Ratio	0.15	0.34	0.04	0.03	0.24	0.04	0.04	0.04	0.11	0.30
Control Delay	5.2	7.1	0.1	4.8	12.3	0.1	24.1	30.0	24.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	7.1	0.1	4.8	12.3	0.1	24.1	30.0	24.5	14.6
LOS	A	A	A	A	B	A	C	C	C	B
Approach Delay		6.6			11.2			25.9		17.2
Approach LOS		A			B			C		B

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 56.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 8.9

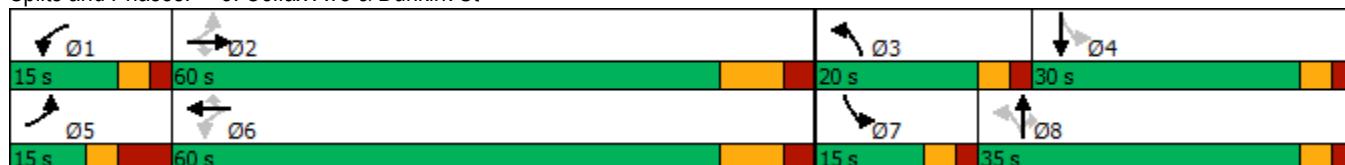
Intersection LOS: A

Intersection Capacity Utilization 50.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/08/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	90	823	39	12	400	31	15	6	0	24	7	57
Future Volume (veh/h)	90	823	39	12	400	31	15	6	0	24	7	57
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	904	0	13	440	34	16	7	0	26	8	63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	469	1572		306	1210	539	481	124		336	21	169
Arrive On Green	0.07	0.44	0.00	0.02	0.34	0.34	0.02	0.07	0.00	0.07	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	182	1431
Grp Volume(v), veh/h	99	904	0	13	440	34	16	7	0	26	0	71
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1613
Q Serve(g_s), s	2.1	11.3	0.0	0.3	5.5	0.9	0.3	0.2	0.0	0.8	0.0	2.4
Cycle Q Clear(g_c), s	2.1	11.3	0.0	0.3	5.5	0.9	0.3	0.2	0.0	0.8	0.0	2.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	469	1572		306	1210	539	481	124		336	0	190
V/C Ratio(X)	0.21	0.58		0.04	0.36	0.06	0.03	0.06		0.08	0.00	0.37
Avail Cap(c_a), veh/h	558	3051		576	3051	1361	1286	944		509	0	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	12.4	0.0	12.6	14.8	13.2	24.9	26.0	0.0	22.4	0.0	24.2
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.0	0.4	0.1	0.0	0.1	0.0	0.1	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.1	6.0	0.0	0.2	3.2	0.5	0.2	0.2	0.0	0.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.4	13.1	0.0	12.7	15.1	13.3	25.0	26.1	0.0	22.4	0.0	25.1
LnGrp LOS	B	B		B	B	B	C	C		C	A	C
Approach Vol, veh/h	1003		A		487			23	A		97	
Approach Delay, s/veh	12.9				15.0			25.3			24.4	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	35.3	6.2	12.0	12.0	29.2	9.2	8.9				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.3	13.3	2.3	4.4	4.1	7.5	2.8	2.2				
Green Ext Time (p_c), s	0.0	13.0	0.0	0.3	0.0	5.8	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	75	773	374	11	11	50
Future Vol, veh/h	75	773	374	11	11	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	849	411	12	12	55
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	423	0	-	0	915	206
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	504	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	1133	-	-	-	305	800
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1133	-	-	-	283	800
Mov Cap-2 Maneuver	-	-	-	-	283	-
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	539	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.7	0	11.7			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1133	-	-	-	602	
HCM Lane V/C Ratio	0.073	-	-	-	0.111	
HCM Control Delay (s)	8.4	-	-	-	11.7	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	65	699	365	24	15	35
Future Vol, veh/h	65	699	365	24	15	35
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	760	397	26	16	38
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	488	0	-	0	984	264
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	522	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1071	-	-	-	246	734
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	560	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1005	-	-	-	201	689
Mov Cap-2 Maneuver	-	-	-	-	201	-
Stage 1	-	-	-	-	523	-
Stage 2	-	-	-	-	525	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	15.4			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1005	-	-	-	399	
HCM Lane V/C Ratio	0.07	-	-	-	0.136	
HCM Control Delay (s)	8.9	-	-	-	15.4	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5	

Intersection

Int Delay, s/veh 11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	498	208	141	250	2	153	0	37	0	1	3
Future Vol, veh/h	2	498	208	141	250	2	153	0	37	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	508	212	144	255	2	156	0	38	0	1	3

Major/Minor	Major1	Major2		Minor1		Minor2	
Conflicting Flow All	257	0	0	720	0	0	928 1057 254 802 1268 129
Stage 1	-	-	-	-	-	512	512 - 544 544 -
Stage 2	-	-	-	-	-	416	545 - 258 724 -
Critical Hdwy	4.14	-	-	4.14	-	-	7.54 6.54 6.94 7.54 6.54 6.94
Critical Hdwy Stg 1	-	-	-	-	-	6.54	5.54 - 6.54 5.54 -
Critical Hdwy Stg 2	-	-	-	-	-	6.54	5.54 - 6.54 5.54 -
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52 4.02 3.32 3.52 4.02 3.32
Pot Cap-1 Maneuver	1305	-	-	877	-	-	223 224 745 275 167 897
Stage 1	-	-	-	-	-	513	535 - 491 517 -
Stage 2	-	-	-	-	-	585	517 - 724 429 -
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1305	-	-	877	-	-	193 187 745 228 139 897
Mov Cap-2 Maneuver	-	-	-	-	-	193	187 - 228 139 -
Stage 1	-	-	-	-	-	511	533 - 490 432 -
Stage 2	-	-	-	-	-	486	432 - 685 428 -

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	3.6		73.6		14.6	
HCM LOS				F		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	1305	-	-	877	-	-	380
HCM Lane V/C Ratio	0.858	0.002	-	-	0.164	-	-	0.011
HCM Control Delay (s)	73.6	7.8	0	-	9.9	-	-	14.6
HCM Lane LOS	F	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	6.8	0	-	-	0.6	-	-	0

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	86	265	1	75	119	13
Future Vol, veh/h	86	265	1	75	119	13
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	298	1	84	134	15
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	395	0	332	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	86	-
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	-	-	1164	-	663	793
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	937	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1164	-	662	793
Mov Cap-2 Maneuver	-	-	-	-	662	-
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	936	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.1	11.9			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	673	-	-	1164	-	
HCM Lane V/C Ratio	0.22	-	-	0.001	-	
HCM Control Delay (s)	11.9	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.8	-	-	0	-	

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	33	394	2	2	769	32	4	48	1	
Future Volume (vph)	33	394	2	2	769	32	4	48	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	31.0	26.0
Total Split (s)	12.0	65.0	65.0	12.0	65.0	65.0	12.0	12.0	31.0	31.0
Total Split (%)	10.0%	54.2%	54.2%	10.0%	54.2%	54.2%	10.0%	10.0%	25.8%	26%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	98.5	96.2	96.2	95.8	91.7	91.7	5.4	10.8	7.7	
Actuated g/C Ratio	0.82	0.80	0.80	0.80	0.76	0.76	0.04	0.09	0.06	
v/c Ratio	0.07	0.15	0.00	0.00	0.31	0.03	0.03	0.33	0.56	
Control Delay	3.1	3.9	0.0	4.5	8.2	0.5	55.2	54.2	20.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	3.1	3.9	0.0	4.5	8.2	0.5	55.2	54.2	20.2	
LOS	A	A	A	A	A	A	E	D	C	
Approach Delay		3.9			7.9				30.6	
Approach LOS		A			A				C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 46.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	33	394	2	2	769	32	4	0	0	48	1	109
Future Volume (veh/h)	33	394	2	2	769	32	4	0	0	48	1	109
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	428	0	2	836	35	4	0	0	52	1	118
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	489	2542		714	2448	1092	187	104		216	1	147
Arrive On Green	0.03	0.72	0.00	0.00	0.69	0.69	0.01	0.00	0.00	0.04	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	13	1574
Grp Volume(v), veh/h	36	428	0	2	836	35	4	0	0	52	0	119
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1587
Q Serve(g_s), s	0.7	4.7	0.0	0.0	11.5	0.8	0.1	0.0	0.0	3.2	0.0	8.8
Cycle Q Clear(g_c), s	0.7	4.7	0.0	0.0	11.5	0.8	0.1	0.0	0.0	3.2	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	489	2542		714	2448	1092	187	104		216	0	148
V/C Ratio(X)	0.07	0.17		0.00	0.34	0.03	0.02	0.00		0.24	0.00	0.80
Avail Cap(c_a), veh/h	541	2542		813	2448	1092	371	390		242	0	331
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.4	5.5	0.0	5.7	7.6	5.9	53.1	0.0	0.0	48.8	0.0	53.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.4	0.0	7.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.4	2.5	0.0	0.0	6.5	0.5	0.1	0.0	0.0	2.6	0.0	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.5	5.7	0.0	5.7	8.0	6.0	53.1	0.0	0.0	49.2	0.0	60.6
LnGrp LOS	A	A		A	A	A	D	A		D	A	E
Approach Vol, veh/h	464		A		873			4	A		171	
Approach Delay, s/veh	5.7				7.9			53.1			57.1	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	91.8	5.6	17.2	8.5	88.7	10.2	12.6				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	59.0	7.0	25.0	7.0	59.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.0	6.7	2.1	10.8	2.7	13.5	5.2	0.0				
Green Ext Time (p_c), s	0.0	5.5	0.0	0.4	0.0	12.8	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				12.9								
HCM 6th LOS				B								
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	65	371	783	26	29	129
Future Vol, veh/h	65	371	783	26	29	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	391	824	27	31	136
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	851	0	-	0	1116	412
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	292	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	783	-	-	-	234	589
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	783	-	-	-	214	589
Mov Cap-2 Maneuver	-	-	-	-	214	-
Stage 1	-	-	-	-	348	-
Stage 2	-	-	-	-	695	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.5	0	15			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	783	-	-	-	214	589
HCM Lane V/C Ratio	0.087	-	-	-	0.143	0.231
HCM Control Delay (s)	10	-	-	-	24.6	12.9
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	0.9

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Vol, veh/h	13	388	757	11	31	58
Future Vol, veh/h	13	388	757	11	31	58
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	417	814	12	33	62
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	891	0	-	0	1116	472
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	757	-	-	-	202	538
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	710	-	-	-	174	505
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	336	-
Stage 2	-	-	-	-	732	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.3	0	19.2			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	710	-	-	-	174	505
HCM Lane V/C Ratio	0.02	-	-	-	0.192	0.123
HCM Control Delay (s)	10.2	-	-	-	30.5	13.1
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.4



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↗	↖
Traffic Volume (vph)	267	143	108	469	274	7
Future Volume (vph)	267	143	108	469	274	7
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2			1	6	4
Permitted Phases				2	6	4
Detector Phase	2	2	1	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	24.0	24.0
Total Split (s)	55.0	55.0	15.0	70.0	50.0	50.0
Total Split (%)	45.8%	45.8%	12.5%	58.3%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	80.3	80.3	93.7	92.2	15.8	15.8
Actuated g/C Ratio	0.67	0.67	0.78	0.77	0.13	0.13
v/c Ratio	0.12	0.14	0.14	0.19	0.65	0.04
Control Delay	8.7	3.6	3.8	4.2	56.3	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	3.6	3.8	4.2	56.3	23.3
LOS	A	A	A	A	E	C
Approach Delay	6.9			4.1	55.4	
Approach LOS	A			A	E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 16.4

Intersection LOS: B

Intersection Capacity Utilization 34.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
07/09/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	267	143	108	469	274	7
Future Volume (veh/h)	267	143	108	469	274	7
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	287	154	116	504	295	8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2535	1131	785	2813	375	172
Arrive On Green	0.71	0.71	0.04	0.79	0.11	0.11
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	287	154	116	504	295	8
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	3.0	3.7	1.9	4.1	10.0	0.5
Cycle Q Clear(g_c), s	3.0	3.7	1.9	4.1	10.0	0.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2535	1131	785	2813	375	172
V/C Ratio(X)	0.11	0.14	0.15	0.18	0.79	0.05
Avail Cap(c_a), veh/h	2535	1131	868	2813	1267	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.4	5.5	3.5	3.0	52.2	47.9
Incr Delay (d2), s/veh	0.1	0.3	0.1	0.0	3.7	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.6	1.8	1.1	2.2	7.8	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.5	5.7	3.6	3.1	55.9	48.1
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	441			620	303	
Approach Delay, s/veh	5.5			3.2	55.7	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+R _c), s	9.4	91.6		19.0	101.0	
Change Period (Y+R _c), s	4.5	6.0		6.0	6.0	
Max Green Setting (Gmax), s	10.5	49.0		44.0	64.0	
Max Q Clear Time (g_c+l1), s	3.9	5.7		12.0	6.1	
Green Ext Time (p_c), s	0.1	2.1		1.0	3.9	
Intersection Summary						
HCM 6th Ctrl Delay			15.6			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗ ↘ ↖ ↙ ↘					
Traffic Vol, veh/h	10	162	127	8	68	184
Future Vol, veh/h	10	162	127	8	68	184
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	200	0	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	176	138	9	74	200

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	491	143	0	0	147
Stage 1	143	-	-	-	-
Stage 2	348	-	-	-	-
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	537	905	-	-	1435
Stage 1	884	-	-	-	-
Stage 2	715	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	509	905	-	-	1435
Mov Cap-2 Maneuver	509	-	-	-	-
Stage 1	884	-	-	-	-
Stage 2	678	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	509	905	1435	-
HCM Lane V/C Ratio	-	-	0.021	0.195	0.052	-
HCM Control Delay (s)	-	-	12.2	9.9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.7	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑↑
Traffic Volume (vph)	95	875	42	13	425	33	15	6	25	7
Future Volume (vph)	95	875	42	13	425	33	15	6	25	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases			2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	26.0	10.0	31.0
Total Split (s)	18.0	65.0	65.0	12.0	59.0	59.0	12.0	31.0	12.0	31.0
Total Split (%)	15.0%	54.2%	54.2%	10.0%	49.2%	49.2%	10.0%	25.8%	10.0%	25.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	99.1	96.1	96.1	93.9	87.6	87.6	7.4	5.8	11.4	6.7
Actuated g/C Ratio	0.83	0.80	0.80	0.78	0.73	0.73	0.06	0.05	0.10	0.06
v/c Ratio	0.14	0.34	0.04	0.03	0.18	0.03	0.07	0.08	0.18	0.49
Control Delay	3.4	6.1	0.0	4.4	6.9	0.2	48.6	55.7	47.8	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	6.1	0.0	4.4	6.9	0.2	48.6	55.7	47.8	26.5
LOS	A	A	A	A	A	A	D	E	D	C
Approach Delay		5.6			6.3			50.8		32.2
Approach LOS		A			A			D		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.9

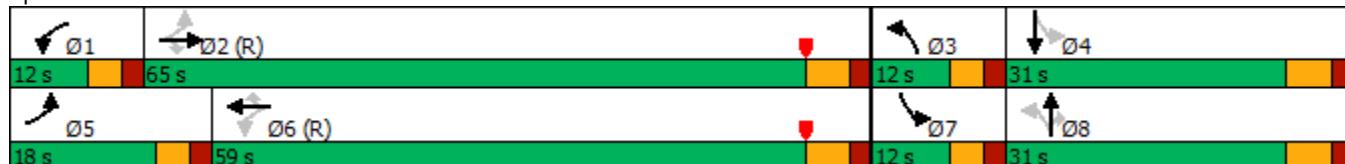
Intersection LOS: A

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	95	875	42	13	425	33	15	6	0	25	7	61
Future Volume (veh/h)	95	875	42	13	425	33	15	6	0	25	7	61
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	951	0	14	462	36	16	7	0	27	8	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	717	2560		452	2472	1102	227	75		184	11	91
Arrive On Green	0.04	0.72	0.00	0.02	0.70	0.70	0.02	0.04	0.00	0.04	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	174	1437
Grp Volume(v), veh/h	103	951	0	14	462	36	16	7	0	27	0	74
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1612
Q Serve(g_s), s	1.9	12.3	0.0	0.3	5.5	0.8	0.5	0.4	0.0	1.7	0.0	5.4
Cycle Q Clear(g_c), s	1.9	12.3	0.0	0.3	5.5	0.8	0.5	0.4	0.0	1.7	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	717	2560		452	2472	1102	227	75		184	0	103
V/C Ratio(X)	0.14	0.37		0.03	0.19	0.03	0.07	0.09		0.15	0.00	0.72
Avail Cap(c_a), veh/h	838	2560		529	2472	1102	369	390		215	0	336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.6	6.4	0.0	5.4	6.4	5.7	53.6	55.5	0.0	51.5	0.0	55.1
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.0	0.2	0.1	0.1	0.4	0.0	0.3	0.0	6.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	6.5	0.0	0.1	3.0	0.5	0.4	0.4	0.0	1.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.7	6.8	0.0	5.4	6.6	5.7	53.7	55.9	0.0	51.7	0.0	62.1
LnGrp LOS	A	A		A	A	A	D	E		D	A	E
Approach Vol, veh/h	1054		A		512			23	A		101	
Approach Delay, s/veh	6.6				6.5			54.4			59.3	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	92.4	7.1	13.6	9.8	89.5	9.9	10.8				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	59.0	7.0	25.0	13.0	53.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.3	14.3	2.5	7.4	3.9	7.5	3.7	2.4				
Green Ext Time (p_c), s	0.0	14.7	0.0	0.3	0.1	6.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	80	821	397	12	12	54
Future Vol, veh/h	80	821	397	12	12	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	84	864	418	13	13	57
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	431	0	-	0	932	209
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	514	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	1125	-	-	-	298	797
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1125	-	-	-	276	797
Mov Cap-2 Maneuver	-	-	-	-	276	-
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	532	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	11.5			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1125	-	-	-	276	797
HCM Lane V/C Ratio	0.075	-	-	-	0.046	0.071
HCM Control Delay (s)	8.5	-	-	-	18.7	9.9
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Vol, veh/h	69	743	388	25	15	37
Future Vol, veh/h	69	743	388	25	15	37
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	799	417	27	16	40
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	509	0	-	0	1030	274
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	548	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1052	-	-	-	229	724
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	543	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	987	-	-	-	186	679
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	509	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	15.1			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	987	-	-	-	186	679
HCM Lane V/C Ratio	0.075	-	-	-	0.087	0.059
HCM Control Delay (s)	8.9	-	-	-	26.2	10.6
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	0.2



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑
Traffic Volume (vph)	530	221	150	265	163	39
Future Volume (vph)	530	221	150	265	163	39
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2			1	6	4
Permitted Phases				2	6	
Detector Phase				2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	24.0	24.0
Total Split (s)	55.0	55.0	15.0	70.0	50.0	50.0
Total Split (%)	45.8%	45.8%	12.5%	58.3%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	84.0	84.0	98.0	96.5	11.5	11.5
Actuated g/C Ratio	0.70	0.70	0.82	0.80	0.10	0.10
v/c Ratio	0.23	0.20	0.23	0.10	0.53	0.22
Control Delay	10.6	5.6	3.3	2.8	57.2	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	5.6	3.3	2.8	57.2	17.2
LOS	B	A	A	A	E	B
Approach Delay	9.1			2.9	49.5	
Approach LOS	A			A	D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 13.2

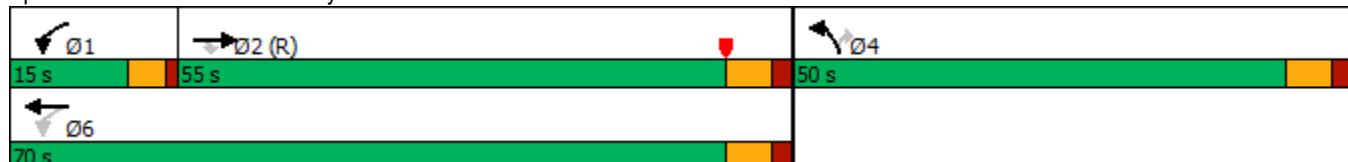
Intersection LOS: B

Intersection Capacity Utilization 41.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
07/09/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖↗	↗
Traffic Volume (veh/h)	530	221	150	265	163	39
Future Volume (veh/h)	530	221	150	265	163	39
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	570	238	161	285	175	42
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2662	1187	607	2942	249	114
Arrive On Green	0.75	0.75	0.04	0.83	0.07	0.07
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	570	238	161	285	175	42
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	5.8	5.3	2.3	1.8	5.9	3.0
Cycle Q Clear(g_c), s	5.8	5.3	2.3	1.8	5.9	3.0
Prop In Lane	1.00	1.00			1.00	1.00
Lane Grp Cap(c), veh/h	2662	1187	607	2942	249	114
V/C Ratio(X)	0.21	0.20	0.27	0.10	0.70	0.37
Avail Cap(c_a), veh/h	2662	1187	689	2942	1267	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.5	4.4	2.8	1.9	54.4	53.1
Incr Delay (d2), s/veh	0.2	0.4	0.2	0.0	3.6	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	2.8	2.4	1.2	0.8	4.8	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.7	4.8	3.0	1.9	58.0	55.0
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	808			446	217	
Approach Delay, s/veh	4.7			2.3	57.5	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+R _c), s	9.5	95.9		14.6		105.4
Change Period (Y+R _c), s	4.5	6.0		6.0		6.0
Max Green Setting (Gmax), s	10.5	49.0		44.0		64.0
Max Q Clear Time (g_c+l1), s	4.3	7.8		7.9		3.8
Green Ext Time (p_c), s	0.2	4.4		0.7		2.1
Intersection Summary						
HCM 6th Ctrl Delay			11.8			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	1	80	126	14	92	282
Future Vol, veh/h	1	80	126	14	92	282
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	200	0	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	87	137	15	100	307

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	652	145	0	0	152
Stage 1	145	-	-	-	-
Stage 2	507	-	-	-	-
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	433	902	-	-	1429
Stage 1	882	-	-	-	-
Stage 2	605	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	403	902	-	-	1429
Mov Cap-2 Maneuver	403	-	-	-	-
Stage 1	882	-	-	-	-
Stage 2	563	-	-	-	-

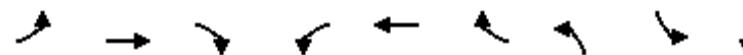
Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	403	902	1429	-
HCM Lane V/C Ratio	-	-	0.003	0.096	0.07	-
HCM Control Delay (s)	-	-	14	9.4	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.3	0.2	-

APPENDIX E. 2040 BACKGROUND LOS

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
03/13/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	40	1270	5	5	1490	35	5	45	5	
Future Volume (vph)	40	1270	5	5	1490	35	5	45	5	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	31.0	26.0
Total Split (s)	13.0	64.0	64.0	13.0	64.0	64.0	12.0	12.0	31.0	31.0
Total Split (%)	10.8%	53.3%	53.3%	10.8%	53.3%	53.3%	10.0%	10.0%	25.8%	26%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	98.8	96.5	96.5	95.1	90.0	90.0	5.4	10.4	7.3	
Actuated g/C Ratio	0.82	0.80	0.80	0.79	0.75	0.75	0.04	0.09	0.06	
v/c Ratio	0.19	0.48	0.00	0.02	0.61	0.03	0.03	0.32	0.60	
Control Delay	4.7	6.0	0.0	2.4	4.0	0.1	55.2	54.4	22.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.7	6.0	0.0	2.4	4.0	0.1	55.2	54.4	22.6	
LOS	A	A	A	A	A	A	E	D	C	
Approach Delay		6.0				4.0			31.5	
Approach LOS		A				A			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 6.4

Intersection LOS: A

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
03/13/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	40	1270	5	5	1490	35	5	0	0	45	5	110
Future Volume (veh/h)	40	1270	5	5	1490	35	5	0	0	45	5	110
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No	No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	1380	0	5	1620	38	5	0	0	49	5	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	2512		276	2422	1080	192	115		222	6	148
Arrive On Green	0.03	0.71	0.00	0.01	1.00	1.00	0.01	0.00	0.00	0.04	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	64	1531
Grp Volume(v), veh/h	43	1380	0	5	1620	38	5	0	0	49	0	125
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1595
Q Serve(g_s), s	0.9	22.3	0.0	0.1	0.0	0.0	0.2	0.0	0.0	3.0	0.0	9.2
Cycle Q Clear(g_c), s	0.9	22.3	0.0	0.1	0.0	0.0	0.2	0.0	0.0	3.0	0.0	9.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.96
Lane Grp Cap(c), veh/h	321	2512		276	2422	1080	192	115		222	0	155
V/C Ratio(X)	0.13	0.55		0.02	0.67	0.04	0.03	0.00		0.22	0.00	0.81
Avail Cap(c_a), veh/h	384	2512		383	2422	1080	371	390		251	0	332
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.0	8.4	0.0	7.4	0.0	0.0	52.3	0.0	0.0	48.5	0.0	53.1
Incr Delay (d2), s/veh	0.1	0.9	0.0	0.0	1.5	0.1	0.0	0.0	0.0	0.4	0.0	7.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.5	11.1	0.0	0.1	0.9	0.0	0.1	0.0	0.0	2.5	0.0	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.2	9.3	0.0	7.4	1.5	0.1	52.3	0.0	0.0	48.8	0.0	60.3
LnGrp LOS	A	A		A	A	A	D	A		D	A	E
Approach Vol, veh/h	1423		A		1663			5	A		174	
Approach Delay, s/veh	9.2				1.5			52.3			57.1	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.8	90.8	5.8	17.6	8.8	87.8	10.0	13.4				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	8.0	58.0	7.0	25.0	8.0	58.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.1	24.3	2.2	11.2	2.9	2.0	5.0	0.0				
Green Ext Time (p_c), s	0.0	20.8	0.0	0.5	0.0	35.5	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			7.9									
HCM 6th LOS			A									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	80	1235	1395	40	35	135
Future Vol, veh/h	80	1235	1395	40	35	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	84	1300	1468	42	37	142
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1510	0	-	0	2156	734
Stage 1	-	-	-	-	1468	-
Stage 2	-	-	-	-	688	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	439	-	-	-	56	363
Stage 1	-	-	-	-	175	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	439	-	-	-	45	363
Mov Cap-2 Maneuver	-	-	-	-	45	-
Stage 1	-	-	-	-	142	-
Stage 2	-	-	-	-	430	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.9	0	62.3			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	439	-	-	-	45	363
HCM Lane V/C Ratio	0.192	-	-	-	0.819	0.391
HCM Control Delay (s)	15.1	-	-	-	220.7	21.2
HCM Lane LOS	C	-	-	-	F	C
HCM 95th %tile Q(veh)	0.7	-	-	-	3.2	1.8



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	60	1210	1350	40	50	85
Future Volume (vph)	60	1210	1350	40	50	85
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	24.0	23.0	23.0
Total Split (s)	12.0	95.0	83.0	83.0	25.0	25.0
Total Split (%)	10.0%	79.2%	69.2%	69.2%	20.8%	20.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	101.0	100.0	90.8	90.8	9.0	9.0
Actuated g/C Ratio	0.84	0.83	0.76	0.76	0.08	0.08
v/c Ratio	0.22	0.44	0.54	0.04	0.41	0.45
Control Delay	4.2	6.2	2.0	0.1	61.2	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	6.2	2.0	0.1	61.2	17.5
LOS	A	A	A	A	E	B
Approach Delay		6.1	1.9		33.8	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 95 (79%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 5.4

Intersection LOS: A

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Colfax Ave & Himalaya St



HCM 6th Signalized Intersection Summary
10: Colfax Ave & Himalaya St

Stafford Business Park
03/13/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	60	1210	1350	40	50	85
Future Volume (veh/h)	60	1210	1350	40	50	85
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	1301	1452	43	54	91
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	2962	2683	1197	133	119
Arrive On Green	0.05	1.00	0.75	0.75	0.07	0.07
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	65	1301	1452	43	54	91
Grp Sat Flow(s), veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	0.9	0.0	20.3	0.8	3.5	6.8
Cycle Q Clear(g_c), s	0.9	0.0	20.3	0.8	3.5	6.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	332	2962	2683	1197	133	119
V/C Ratio(X)	0.20	0.44	0.54	0.04	0.41	0.77
Avail Cap(c_a), veh/h	370	2962	2683	1197	297	264
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.8	0.0	6.1	3.7	53.0	54.5
Incr Delay (d2), s/veh	0.3	0.5	0.8	0.1	2.0	9.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.4	0.4	9.2	0.4	3.0	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.0	0.5	6.9	3.8	54.9	64.4
LnGrp LOS	A	A	A	A	D	E
Approach Vol, veh/h	1366	1495		145		
Approach Delay, s/veh	0.7	6.8		60.9		
Approach LOS	A	A		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	106.0		14.0	9.4	96.6	
Change Period (Y+R _c), s	6.0		5.0	5.0	6.0	
Max Green Setting (Gmax), s	89.0		20.0	7.0	77.0	
Max Q Clear Time (g_c+l1), s	2.0		8.8	2.9	22.3	
Green Ext Time (p_c), s	11.5		0.3	0.0	13.9	
Intersection Summary						
HCM 6th Ctrl Delay			6.6			
HCM 6th LOS			A			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (vph)	875	350	450	675	875	975
Future Volume (vph)	875	350	450	675	875	975
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases						6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	10.0	10.0	24.0	24.0	24.0
Total Split (s)	45.0	30.0	30.0	75.0	45.0	45.0
Total Split (%)	37.5%	25.0%	25.0%	62.5%	37.5%	37.5%
Yellow Time (s)	4.0	3.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	5.0	5.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag		
Lead-Lag Optimize?	Yes	Yes		Yes		
Recall Mode	None	None	None	C-Min	C-Min	None
Act Effect Green (s)	47.1	75.0	21.9	60.9	34.0	87.1
Actuated g/C Ratio	0.39	0.62	0.18	0.51	0.28	0.73
v/c Ratio	0.48	0.38	0.77	0.28	0.65	0.90
Control Delay	23.5	11.2	61.6	20.5	40.3	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	11.2	61.6	20.5	40.3	25.9
LOS	C	B	E	C	D	C
Approach Delay	20.0			36.9	32.7	
Approach LOS	C			D	C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 20 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 82.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
03/13/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (veh/h)	875	350	450	675	875	975
Future Volume (veh/h)	875	350	450	675	875	975
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	941	376	484	726	941	1048
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1203	639	566	3373	2324	1101
Arrive On Green	0.24	0.24	0.05	0.22	0.46	0.46
Sat Flow, veh/h	5023	1585	3456	5274	5274	1585
Grp Volume(v), veh/h	941	376	484	726	941	1048
Grp Sat Flow(s), veh/h/ln	1674	1585	1728	1702	1702	1585
Q Serve(g_s), s	21.0	22.3	16.7	14.0	14.8	54.6
Cycle Q Clear(g_c), s	21.0	22.3	16.7	14.0	14.8	54.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1203	639	566	3373	2324	1101
V/C Ratio(X)	0.78	0.59	0.86	0.22	0.40	0.95
Avail Cap(c_a), veh/h	1633	775	720	3373	2324	1101
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(l)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.7	28.0	55.4	21.4	21.8	13.9
Incr Delay (d2), s/veh	1.6	0.8	8.1	0.1	0.5	17.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	13.0	27.2	13.1	10.5	10.0	47.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	44.3	28.8	63.5	21.5	22.4	31.7
LnGrp LOS	D	C	E	C	C	C
Approach Vol, veh/h	1317			1210	1989	
Approach Delay, s/veh	39.9			38.3	27.3	
Approach LOS	D			D	C	
Timer - Assigned Phs	2			4	5	6
Phs Duration (G+Y+R _c), s	85.3			34.7	24.6	60.6
Change Period (Y+R _c), s	6.0			6.0	5.0	6.0
Max Green Setting (Gmax), s	69.0			39.0	25.0	39.0
Max Q Clear Time (g_c+l1), s	16.0			24.3	18.7	56.6
Green Ext Time (p_c), s	5.3			4.5	1.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay				33.9		
HCM 6th LOS				C		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑↑	↑	↑↑	↑↑↑
Traffic Volume (vph)	475	625	500	325	525	700
Future Volume (vph)	475	625	500	325	525	700
Turn Type	Prot	pm+ov	NA	pm+ov	Prot	NA
Protected Phases	8	1	2	8	1	6
Permitted Phases			8		2	
Detector Phase	8	1	2	8	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	23.0	24.0	24.0	23.0	24.0
Total Split (s)	40.0	35.0	45.0	40.0	35.0	80.0
Total Split (%)	33.3%	29.2%	37.5%	33.3%	29.2%	66.7%
Yellow Time (s)	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	5.0	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes		
Recall Mode	None	None	C-Min	None	None	C-Min
Act Effect Green (s)	24.0	51.9	57.1	87.0	22.0	84.0
Actuated g/C Ratio	0.20	0.43	0.48	0.72	0.18	0.70
v/c Ratio	0.75	0.90	0.22	0.30	0.91	0.21
Control Delay	52.2	41.4	20.1	6.1	88.3	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	41.4	20.1	6.1	88.3	2.8
LOS	D	D	C	A	F	A
Approach Delay	46.0		14.6		39.4	
Approach LOS	D		B		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 76 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 35.2

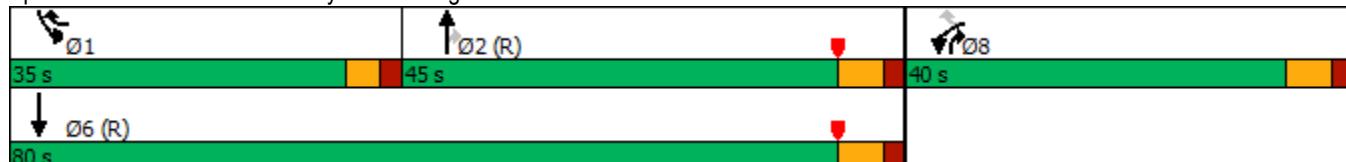
Intersection LOS: D

Intersection Capacity Utilization 57.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 16: Picadilly Rd & Realigned Colfax Ave



HCM 6th Signalized Intersection Summary
16: Picadilly Rd & Realigned Colfax Ave

Stafford Business Park
03/13/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑↑	↑	↑↑	↑↑↑
Traffic Volume (veh/h)	475	625	500	325	525	700
Future Volume (veh/h)	475	625	500	325	525	700
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	516	0	543	353	571	761
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	604		2509	1056	664	3703
Arrive On Green	0.17	0.00	0.49	0.49	0.06	0.24
Sat Flow, veh/h	3456	1585	5274	1585	3456	5274
Grp Volume(v), veh/h	516	0	543	353	571	761
Grp Sat Flow(s), veh/h/ln	1728	1585	1702	1585	1728	1702
Q Serve(g_s), s	17.4	0.0	7.3	11.5	19.6	14.3
Cycle Q Clear(g_c), s	17.4	0.0	7.3	11.5	19.6	14.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	604		2509	1056	664	3703
V/C Ratio(X)	0.85		0.22	0.33	0.86	0.21
Avail Cap(c_a), veh/h	979		2509	1056	864	3703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	0.33
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.0	0.0	17.4	8.6	54.6	18.0
Incr Delay (d2), s/veh	4.2	0.0	0.2	0.9	7.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	12.2	0.0	5.0	10.5	14.8	10.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	52.3	0.0	17.6	9.5	61.6	18.1
LnGrp LOS	D		B	A	E	B
Approach Vol, veh/h	516	A	896		1332	
Approach Delay, s/veh	52.3		14.4		36.8	
Approach LOS	D		B		D	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+Rc), s	28.0	65.0		93.0		27.0
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	30.0	39.0		74.0		34.0
Max Q Clear Time (g_c+l1), s	21.6	13.5		16.3		19.4
Green Ext Time (p_c), s	1.4	4.8		5.6		1.6
Intersection Summary						
HCM 6th Ctrl Delay			32.4			
HCM 6th LOS			C			
Notes						
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	90	1170	1335	90	55	55
Future Volume (vph)	90	1170	1335	90	55	55
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	24.0	23.0	23.0
Total Split (s)	12.0	90.0	78.0	78.0	30.0	30.0
Total Split (%)	10.0%	75.0%	65.0%	65.0%	25.0%	25.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	102.7	102.9	90.1	90.1	9.4	9.4
Actuated g/C Ratio	0.86	0.86	0.75	0.75	0.08	0.08
v/c Ratio	0.32	0.42	0.55	0.08	0.43	0.34
Control Delay	7.7	1.9	7.4	1.1	61.6	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	1.9	7.4	1.1	61.6	17.6
LOS	A	A	A	A	E	B
Approach Delay		2.3	7.0		39.6	
Approach LOS		A	A		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 70 (58%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 6.2

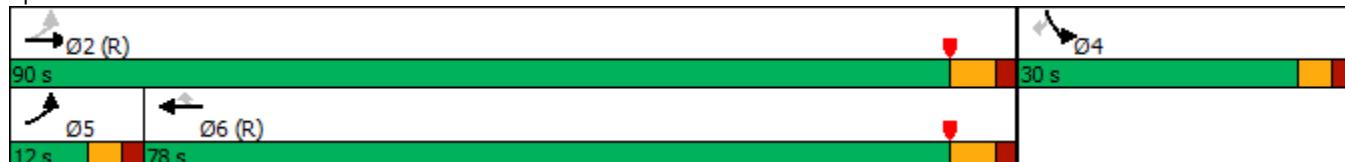
Intersection LOS: A

Intersection Capacity Utilization 59.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 18: Colfax Ave & Libson St





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	90	1170	1335	90	55	55
Future Volume (veh/h)	90	1170	1335	90	55	55
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	1272	1451	98	60	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	336	3032	2741	1223	98	87
Arrive On Green	0.08	1.00	0.77	0.77	0.06	0.06
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	98	1272	1451	98	60	60
Grp Sat Flow(s), veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	1.2	0.0	18.9	1.8	4.0	4.5
Cycle Q Clear(g_c), s	1.2	0.0	18.9	1.8	4.0	4.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	336	3032	2741	1223	98	87
V/C Ratio(X)	0.29	0.42	0.53	0.08	0.61	0.69
Avail Cap(c_a), veh/h	369	3032	2741	1223	371	330
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.39	0.39	1.00	1.00
Uniform Delay (d), s/veh	4.2	0.0	5.3	3.3	55.4	55.7
Incr Delay (d2), s/veh	0.5	0.4	0.3	0.1	6.0	9.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.5	0.3	6.8	0.7	3.5	7.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	4.7	0.4	5.6	3.4	61.4	64.8
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1370	1549		120		
Approach Delay, s/veh	0.7	5.4		63.1		
Approach LOS	A	A		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	108.4		11.6	9.8	98.6	
Change Period (Y+R _c), s	6.0		5.0	5.0	6.0	
Max Green Setting (Gmax), s	84.0		25.0	7.0	72.0	
Max Q Clear Time (g_c+l1), s	2.0		6.5	3.2	20.9	
Green Ext Time (p_c), s	11.1		0.3	0.1	14.1	
Intersection Summary						
HCM 6th Ctrl Delay			5.6			
HCM 6th LOS			A			

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
03/13/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	105	1610	40	15	1455	35	15	5	35	5
Future Volume (vph)	105	1610	40	15	1455	35	15	5	35	5
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	26.0	10.0	31.0
Total Split (s)	12.0	65.0	65.0	12.0	65.0	65.0	12.0	31.0	12.0	31.0
Total Split (%)	10.0%	54.2%	54.2%	10.0%	54.2%	54.2%	10.0%	25.8%	10.0%	25.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	97.6	92.6	92.6	90.2	83.9	83.9	8.0	6.1	11.4	6.8
Actuated g/C Ratio	0.81	0.77	0.77	0.75	0.70	0.70	0.07	0.05	0.10	0.06
v/c Ratio	0.47	0.65	0.04	0.08	0.65	0.03	0.07	0.05	0.25	0.52
Control Delay	10.8	10.3	0.1	2.3	10.1	0.1	48.3	54.0	50.0	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	10.3	0.1	2.3	10.1	0.1	48.3	54.0	50.0	24.2
LOS	B	B	A	A	B	A	D	D	D	C
Approach Delay		10.1			9.8			49.7		32.0
Approach LOS		B			A			D		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.9

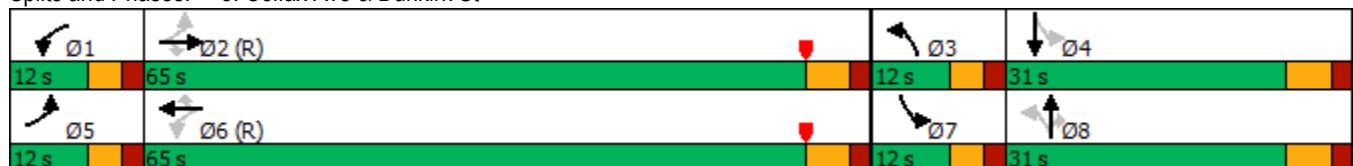
Intersection LOS: B

Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
03/13/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	105	1610	40	15	1455	35	15	5	0	35	5	75
Future Volume (veh/h)	105	1610	40	15	1455	35	15	5	0	35	5	75
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	115	1769	0	16	1599	38	16	5	0	38	5	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	2525		205	2441	1089	226	89		197	7	108
Arrive On Green	0.04	0.71	0.00	0.01	0.46	0.46	0.02	0.05	0.00	0.04	0.07	0.07
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	92	1507
Grp Volume(v), veh/h	115	1769	0	16	1599	38	16	5	0	38	0	87
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1599
Q Serve(g_s), s	2.3	34.4	0.0	0.3	41.7	1.6	0.5	0.3	0.0	2.4	0.0	6.4
Cycle Q Clear(g_c), s	2.3	34.4	0.0	0.3	41.7	1.6	0.5	0.3	0.0	2.4	0.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	237	2525		205	2441	1089	226	89		197	0	115
V/C Ratio(X)	0.49	0.70		0.08	0.65	0.03	0.07	0.06		0.19	0.00	0.76
Avail Cap(c_a), veh/h	268	2525		278	2441	1089	368	390		228	0	333
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	10.0	0.0	9.8	21.4	10.6	52.8	54.6	0.0	50.9	0.0	54.7
Incr Delay (d2), s/veh	1.1	1.6	0.0	0.1	1.4	0.1	0.1	0.2	0.0	0.3	0.0	7.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	2.8	16.8	0.0	0.2	25.4	1.0	0.4	0.3	0.0	2.0	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.5	11.7	0.0	9.9	22.8	10.6	52.9	54.8	0.0	51.2	0.0	62.1
LnGrp LOS	B	B		A	C	B	D	D		D	A	E
Approach Vol, veh/h		1884	A		1653			21	A		125	
Approach Delay, s/veh		12.0			22.4			53.3			58.8	
Approach LOS		B			C			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R _c), s	7.1	91.3	7.1	14.6	9.9	88.4	10.0	11.7				
Change Period (Y+R _c), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	59.0	7.0	25.0	7.0	59.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.3	36.4	2.5	8.4	4.3	43.7	4.4	2.3				
Green Ext Time (p_c), s	0.0	19.3	0.0	0.3	0.0	13.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			18.5									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection

Int Delay, s/veh 25.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	145	1500	1375	50	60	130
Future Vol, veh/h	145	1500	1375	50	60	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	1648	1511	55	66	143

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1566	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	-
Pot Cap-1 Maneuver	418	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	418	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	\$ 415.5
HCM LOS		F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	418	-	-	-	22	351
HCM Lane V/C Ratio	0.381	-	-	-	2.997	0.407
HCM Control Delay (s)	18.8	-	-	-	\$ 1268	22.1
HCM Lane LOS	C	-	-	-	F	C
HCM 95th %tile Q(veh)	1.8	-	-	-	8.4	1.9

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	200	1360	1240	115	115	185
Future Volume (vph)	200	1360	1240	115	115	185
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	24.0	23.0	23.0
Total Split (s)	21.0	95.0	74.0	74.0	25.0	25.0
Total Split (%)	17.5%	79.2%	61.7%	61.7%	20.8%	20.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	96.2	95.2	79.3	79.3	13.8	13.8
Actuated g/C Ratio	0.80	0.79	0.66	0.66	0.12	0.12
v/c Ratio	0.63	0.53	0.58	0.12	0.62	0.56
Control Delay	16.9	2.9	3.6	0.2	63.1	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	2.9	3.6	0.2	63.1	12.6
LOS	B	A	A	A	E	B
Approach Delay		4.7	3.3		32.0	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 48 (40%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 6.7

Intersection LOS: A

Intersection Capacity Utilization 65.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Colfax Ave & Himalaya St



HCM 6th Signalized Intersection Summary
10: Colfax Ave & Himalaya St

Stafford Business Park
03/13/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	200	1360	1240	115	115	185
Future Volume (veh/h)	200	1360	1240	115	115	185
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	217	1478	1348	125	125	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	330	2717	2359	1052	256	228
Arrive On Green	0.12	1.00	0.66	0.66	0.14	0.14
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	217	1478	1348	125	125	201
Grp Sat Flow(s), veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	4.7	0.0	24.7	3.5	7.8	14.9
Cycle Q Clear(g_c), s	4.7	0.0	24.7	3.5	7.8	14.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	330	2717	2359	1052	256	228
V/C Ratio(X)	0.66	0.54	0.57	0.12	0.49	0.88
Avail Cap(c_a), veh/h	462	2717	2359	1052	297	264
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.8	0.0	10.9	7.4	47.3	50.4
Incr Delay (d2), s/veh	2.2	0.8	1.0	0.2	1.4	25.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	3.6	0.5	13.5	2.0	6.4	20.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	13.0	0.8	11.9	7.6	48.7	75.4
LnGrp LOS	B	A	B	A	D	E
Approach Vol, veh/h	1695	1473		326		
Approach Delay, s/veh	2.4	11.6		65.2		
Approach LOS	A	B		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	97.7		22.3	12.1	85.6	
Change Period (Y+R _c), s	6.0		5.0	5.0	6.0	
Max Green Setting (Gmax), s	89.0		20.0	16.0	68.0	
Max Q Clear Time (g_c+l1), s	2.0		16.9	6.7	26.7	
Green Ext Time (p_c), s	16.2		0.3	0.4	13.1	
Intersection Summary						
HCM 6th Ctrl Delay			12.1			
HCM 6th LOS			B			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (vph)	1125	375	450	575	800	875
Future Volume (vph)	1125	375	450	575	800	875
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases						6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	10.0	10.0	24.0	24.0	24.0
Total Split (s)	60.0	32.0	32.0	60.0	28.0	60.0
Total Split (%)	50.0%	26.7%	26.7%	50.0%	23.3%	50.0%
Yellow Time (s)	4.0	3.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	5.0	5.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag		
Lead-Lag Optimize?	Yes	Yes		Yes		
Recall Mode	None	None	None	C-Min	C-Min	None
Act Effect Green (s)	53.7	81.4	21.7	54.3	27.6	87.3
Actuated g/C Ratio	0.45	0.68	0.18	0.45	0.23	0.73
v/c Ratio	0.51	0.36	0.74	0.25	0.70	0.76
Control Delay	24.5	8.8	58.3	23.4	47.0	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	8.8	58.3	23.4	47.0	15.5
LOS	C	A	E	C	D	B
Approach Delay	20.5			38.7	30.5	
Approach LOS	C			D	C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 29.0

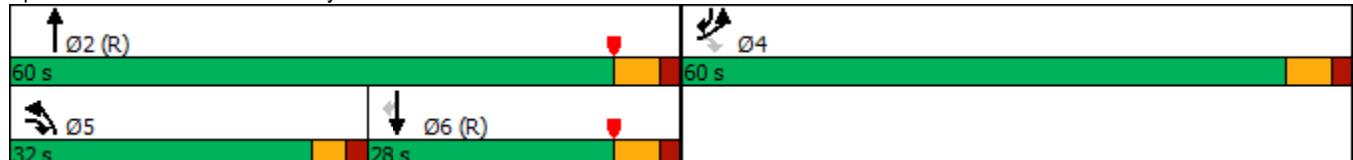
Intersection LOS: C

Intersection Capacity Utilization 76.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
03/13/2019

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (veh/h)	1125	375	450	575	800	875
Future Volume (veh/h)	1125	375	450	575	800	875
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1148	383	459	587	816	893
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1426	700	545	3146	2127	1110
Arrive On Green	0.28	0.28	0.05	0.20	0.42	0.42
Sat Flow, veh/h	5023	1585	3456	5274	5274	1585
Grp Volume(v), veh/h	1148	383	459	587	816	893
Grp Sat Flow(s), veh/h/ln	1674	1585	1728	1702	1702	1585
Q Serve(g_s), s	25.5	21.3	15.8	11.4	13.3	46.4
Cycle Q Clear(g_c), s	25.5	21.3	15.8	11.4	13.3	46.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1426	700	545	3146	2127	1110
V/C Ratio(X)	0.81	0.55	0.84	0.19	0.38	0.80
Avail Cap(c_a), veh/h	2260	963	778	3146	2127	1110
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(l)	0.76	0.76	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	24.7	55.4	22.9	24.3	12.3
Incr Delay (d2), s/veh	0.9	0.5	5.8	0.1	0.5	6.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	14.8	26.4	12.3	8.6	9.3	38.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	40.8	25.2	61.2	23.0	24.8	18.6
LnGrp LOS	D	C	E	C	C	B
Approach Vol, veh/h	1531			1046	1709	
Approach Delay, s/veh	36.9			39.8	21.5	
Approach LOS	D			D	C	
Timer - Assigned Phs	2			4	5	6
Phs Duration (G+Y+R _c), s	79.9			40.1	23.9	56.0
Change Period (Y+R _c), s	6.0			6.0	5.0	6.0
Max Green Setting (Gmax), s	54.0			54.0	27.0	22.0
Max Q Clear Time (g_c+l1), s	13.4			27.5	17.8	48.4
Green Ext Time (p_c), s	4.0			6.6	1.1	0.0
Intersection Summary						
HCM 6th Ctrl Delay				31.5		
HCM 6th LOS				C		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑↑	↑	↑↑	↑↑↑
Traffic Volume (vph)	425	525	500	400	550	625
Future Volume (vph)	425	525	500	400	550	625
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	8	1	2		1	6
Permitted Phases			8		2	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	23.0	24.0	24.0	23.0	24.0
Total Split (s)	39.0	44.0	37.0	37.0	44.0	81.0
Total Split (%)	32.5%	36.7%	30.8%	30.8%	36.7%	67.5%
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	21.5	53.9	55.1	55.1	27.4	87.5
Actuated g/C Ratio	0.18	0.45	0.46	0.46	0.23	0.73
v/c Ratio	0.75	0.77	0.23	0.45	0.76	0.18
Control Delay	54.5	30.7	21.5	4.1	72.1	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.5	30.7	21.5	4.1	72.1	1.6
LOS	D	C	C	A	E	A
Approach Delay	41.3		13.8		34.6	
Approach LOS	D		B		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 30.5

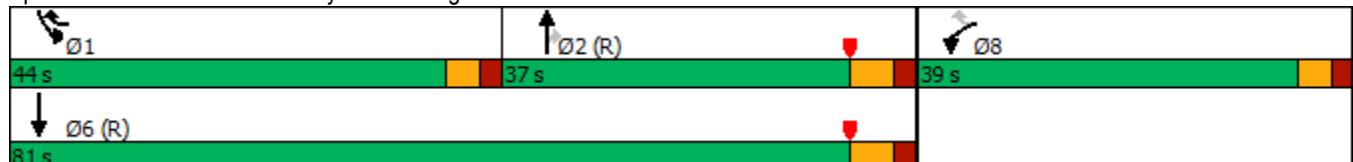
Intersection LOS: C

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Picadilly Rd & Realigned Colfax Ave



HCM 6th Signalized Intersection Summary
16: Picadilly Rd & Realigned Colfax Ave

Stafford Business Park
03/13/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑↑	↑	↑↑	↑↑↑
Traffic Volume (veh/h)	425	525	500	400	550	625
Future Volume (veh/h)	425	525	500	400	550	625
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	462	0	543	435	598	679
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	550		2588	804	693	3825
Arrive On Green	0.16	0.00	0.51	0.51	0.20	0.75
Sat Flow, veh/h	3456	1585	5274	1585	3456	5274
Grp Volume(v), veh/h	462	0	543	435	598	679
Grp Sat Flow(s), veh/h/ln	1728	1585	1702	1585	1728	1702
Q Serve(g_s), s	15.6	0.0	7.0	22.4	20.1	4.6
Cycle Q Clear(g_c), s	15.6	0.0	7.0	22.4	20.1	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	550		2588	804	693	3825
V/C Ratio(X)	0.84		0.21	0.54	0.86	0.18
Avail Cap(c_a), veh/h	979		2588	804	1123	3825
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	0.0	16.3	20.1	46.4	4.4
Incr Delay (d2), s/veh	3.5	0.0	0.2	2.6	4.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	11.3	0.0	4.8	13.0	13.6	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	52.5	0.0	16.5	22.7	50.5	4.5
LnGrp LOS	D		B	C	D	A
Approach Vol, veh/h	462	A	978		1277	
Approach Delay, s/veh	52.5		19.3		26.0	
Approach LOS	D		B		C	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	29.1	66.8		95.9		24.1
Change Period (Y+R _c), s	5.0	6.0		6.0		5.0
Max Green Setting (Gmax), s	39.0	31.0		75.0		34.0
Max Q Clear Time (g_c+l1), s	22.1	24.4		6.6		17.6
Green Ext Time (p_c), s	2.0	2.7		4.9		1.5
Intersection Summary						
HCM 6th Ctrl Delay			28.1			
HCM 6th LOS			C			
Notes						
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	320	1155	1010	315	345	345
Future Volume (vph)	320	1155	1010	315	345	345
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	23.0	23.0	23.0	23.0	23.0
Total Split (s)	30.0	82.0	52.0	52.0	38.0	38.0
Total Split (%)	25.0%	68.3%	43.3%	43.3%	31.7%	31.7%
Yellow Time (s)	3.0	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	81.6	80.6	55.1	55.1	29.4	29.4
Actuated g/C Ratio	0.68	0.67	0.46	0.46	0.24	0.24
v/c Ratio	0.80	0.53	0.68	0.38	0.87	0.56
Control Delay	42.3	13.6	26.3	5.0	63.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	13.6	26.3	5.0	63.4	6.9
LOS	D	B	C	A	E	A
Approach Delay		19.8	21.2		35.2	
Approach LOS		B	C		D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 119 (99%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 23.4

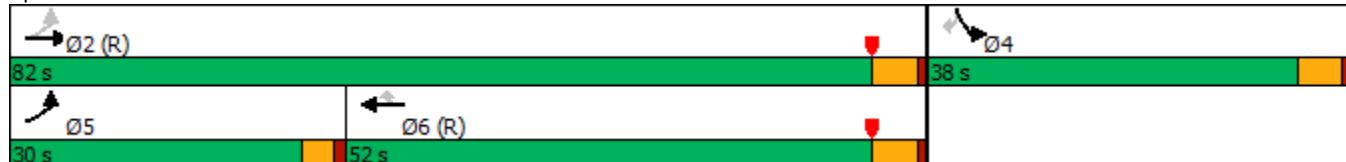
Intersection LOS: C

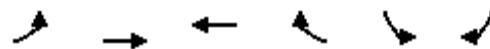
Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Colfax Ave & Libson St



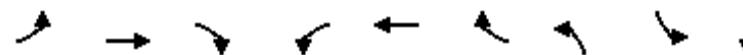


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	320	1155	1010	315	345	345
Future Volume (veh/h)	320	1155	1010	315	345	345
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	1255	1098	342	375	375
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	387	2349	1786	797	455	405
Arrive On Green	0.04	0.22	0.50	0.50	0.26	0.26
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	348	1255	1098	342	375	375
Grp Sat Flow(s), veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	12.2	37.5	26.7	16.4	23.8	27.7
Cycle Q Clear(g_c), s	12.2	37.5	26.7	16.4	23.8	27.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	387	2349	1786	797	455	405
V/C Ratio(X)	0.90	0.53	0.61	0.43	0.82	0.93
Avail Cap(c_a), veh/h	550	2349	1786	797	490	436
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.57	0.57	1.00	1.00
Uniform Delay (d), s/veh	28.2	30.6	21.5	18.9	42.1	43.6
Incr Delay (d2), s/veh	13.6	0.9	0.9	1.0	10.3	24.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	11.2	24.9	14.6	8.9	17.3	32.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	41.8	31.4	22.4	19.9	52.5	68.4
LnGrp LOS	D	C	C	B	D	E
Approach Vol, veh/h	1603	1440		750		
Approach Delay, s/veh	33.7	21.8		60.4		
Approach LOS	C	C		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	84.3		35.7	19.0	65.3	
Change Period (Y+R _c), s	5.0		5.0	4.0	5.0	
Max Green Setting (Gmax), s	77.0		33.0	26.0	47.0	
Max Q Clear Time (g_c+l1), s	39.5		29.7	14.2	28.7	
Green Ext Time (p_c), s	10.8		1.0	0.8	8.3	
Intersection Summary						
HCM 6th Ctrl Delay		34.5				
HCM 6th LOS		C				

APPENDIX F. 2020-22 TOTAL TRAFFIC LOS

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019



Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10
Lane Configurations	1	2↑	1	2↑	1	2↑	1	2↑	1	2↑
Traffic Volume (vph)	30	419	2	2	714	29	3	42	1	
Future Volume (vph)	30	419	2	2	714	29	3	42	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	30.0	25.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	15.0	30.0	35.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	12.0%	24.0%	28%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	34.6	34.9	34.9	35.3	31.7	31.7	5.5	8.5	7.0	
Actuated g/C Ratio	0.63	0.63	0.63	0.64	0.58	0.58	0.10	0.15	0.13	
v/c Ratio	0.07	0.22	0.00	0.00	0.41	0.04	0.01	0.18	0.39	
Control Delay	5.6	7.5	0.0	5.0	11.9	0.1	32.0	25.0	12.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.6	7.5	0.0	5.0	11.9	0.1	32.0	25.0	12.2	
LOS	A	A	A	A	B	A	C	C	B	
Approach Delay		7.4			11.4				16.0	
Approach LOS		A			B				B	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 55

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 10.6

Intersection LOS: B

Intersection Capacity Utilization 45.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	30	419	2	2	714	29	3	0	0	42	1	98
Future Volume (veh/h)	30	419	2	2	714	29	3	0	0	42	1	98
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	33	455	0	2	776	32	3	0	0	46	1	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	320	1617		479	1340	598	324	51		290	1	152
Arrive On Green	0.04	0.49	0.00	0.00	0.40	0.40	0.00	0.00	0.00	0.08	0.10	0.10
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	14	1473
Grp Volume(v), veh/h	33	455	0	2	776	32	3	0	0	46	0	108
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1487
Q Serve(g_s), s	0.7	4.8	0.0	0.0	10.8	0.8	0.1	0.0	0.0	1.5	0.0	4.2
Cycle Q Clear(g_c), s	0.7	4.8	0.0	0.0	10.8	0.8	0.1	0.0	0.0	1.5	0.0	4.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	320	1617		479	1340	598	324	51		290	0	153
V/C Ratio(X)	0.10	0.28		0.00	0.58	0.05	0.01	0.00		0.16	0.00	0.71
Avail Cap(c_a), veh/h	458	2861		756	2861	1276	1129	886		441	0	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.6	9.1	0.0	10.5	13.8	10.8	27.8	0.0	0.0	23.1	0.0	25.7
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.2	0.0	4.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.3	2.2	0.0	0.0	5.6	0.4	0.0	0.0	0.0	1.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.7	9.3	0.0	10.5	14.7	10.9	27.8	0.0	0.0	23.3	0.0	30.1
LnGrp LOS	B	A		B	B	C	A		C	A	C	
Approach Vol, veh/h	488		A		810			3	A		154	
Approach Delay, s/veh	9.4				14.5			27.8			28.1	
Approach LOS		A			B			C		C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.2	37.8	5.2	11.1	10.1	32.9	9.6	6.7				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.0	6.8	2.1	6.2	2.7	12.8	3.5	0.0				
Green Ext Time (p_c), s	0.0	5.8	0.0	0.5	0.0	11.1	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	399	726	23	25	114
Future Vol, veh/h	58	399	726	23	25	114
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	61	420	764	24	26	120
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	788	0	-	0	1054	382
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	290	-
Critical Hdwy	4.3	-	-	-	6.45	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6.2	-
Follow-up Hdwy	2.3	-	-	-	3.75	3.4
Pot Cap-1 Maneuver	777	-	-	-	239	594
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	675	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	777	-	-	-	220	594
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	675	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.3	0	16.6			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	777	-	-	-	455	
HCM Lane V/C Ratio	0.079	-	-	-	0.322	
HCM Control Delay (s)	10	-	-	-	16.6	
HCM Lane LOS	B	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4	

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	12	412	703	10	28	52
Future Vol, veh/h	12	412	703	10	28	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	13	443	756	11	30	56
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	767	0	-	0	1004	378
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	248	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	792	-	-	-	225	597
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	747	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	792	-	-	-	221	597
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	747	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.3	0	17.5			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	792	-	-	-	374	
HCM Lane V/C Ratio	0.016	-	-	-	0.23	
HCM Control Delay (s)	9.6	-	-	-	17.5	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9	

Intersection

Int Delay, s/veh 34

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	244	136	96	505	2	283	1	6	0	2	3
Future Vol, veh/h	1	244	136	96	505	2	283	1	6	0	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	1	262	146	103	543	2	304	1	6	0	2	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	545	0	0	408	0	0	743	1015	131	884	1160	273
Stage 1	-	-	-	-	-	-	264	264	-	750	750	-
Stage 2	-	-	-	-	-	-	479	751	-	134	410	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4	3.6	4.1	3.4
Pot Cap-1 Maneuver	967	-	-	1092	-	-	~289	224	869	227	183	701
Stage 1	-	-	-	-	-	-	696	669	-	352	398	-
Stage 2	-	-	-	-	-	-	516	398	-	833	574	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	967	-	-	1092	-	-	~264	203	869	208	166	701
Mov Cap-2 Maneuver	-	-	-	-	-	-	~264	203	-	208	166	-
Stage 1	-	-	-	-	-	-	695	668	-	352	361	-
Stage 2	-	-	-	-	-	-	462	361	-	825	573	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	0	1.4		146.8		17		
HCM LOS				F		C		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	268	967	-	-	1092	-	-	306
HCM Lane V/C Ratio	1.164	0.001	-	-	0.095	-	-	0.018
HCM Control Delay (s)	146.8	8.7	0	-	8.6	-	-	17
HCM Lane LOS	F	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	13.9	0	-	-	0.3	-	-	0.1

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	3.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	62	171	8	153	143	7
Future Vol, veh/h	62	171	8	153	143	7
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	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	67	186	9	166	155	8
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	253	0	344	160
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1267	-	637	865
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1267	-	632	865
Mov Cap-2 Maneuver	-	-	-	-	632	-
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	822	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.4	12.5			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	640	-	-	1267	-	
HCM Lane V/C Ratio	0.255	-	-	0.007	-	
HCM Control Delay (s)	12.5	-	-	7.9	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1	-	-	0	-	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↘	↖
Traffic Volume (vph)	374	31	126	665	29	7
Future Volume (vph)	374	31	126	665	29	7
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2			1	6	8
Permitted Phases				2	6	
Detector Phase	2	2	1		6	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	24.0	90.0	30.0	30.0
Total Split (%)	55.0%	55.0%	20.0%	75.0%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	95.4	95.4	107.0	108.8	8.2	8.2
Actuated g/C Ratio	0.80	0.80	0.89	0.91	0.07	0.07
v/c Ratio	0.16	0.03	0.19	0.24	0.33	0.08
Control Delay	3.8	1.6	2.0	1.5	61.2	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	1.6	2.0	1.5	61.2	28.9
LOS	A	A	A	A	E	C
Approach Delay	3.6				1.6	54.7
Approach LOS	A				A	D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.8

Intersection LOS: A

Intersection Capacity Utilization 32.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (veh/h)	374	31	126	665	29	7
Future Volume (veh/h)	374	31	126	665	29	7
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1530	1530	1752	1530	1530
Adj Flow Rate, veh/h	407	34	137	723	32	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	25	25	10	25	25
Cap, veh/h	2715	1057	733	2977	45	40
Arrive On Green	0.82	0.82	0.04	0.89	0.03	0.03
Sat Flow, veh/h	3416	1296	1457	3416	1457	1296
Grp Volume(v), veh/h	407	34	137	723	32	8
Grp Sat Flow(s), veh/h/ln	1664	1296	1457	1664	1457	1296
Q Serve(g_s), s	3.1	0.6	1.6	3.5	2.6	0.7
Cycle Q Clear(g_c), s	3.1	0.6	1.6	3.5	2.6	0.7
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2715	1057	733	2977	45	40
V/C Ratio(X)	0.15	0.03	0.19	0.24	0.72	0.20
Avail Cap(c_a), veh/h	2715	1057	909	2977	310	275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.3	2.1	1.2	0.9	57.6	56.7
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.2	19.1	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	0.2	0.1	0.1	2.2	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	2.4	2.2	1.3	1.0	76.7	59.2
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	441			860	40	
Approach Delay, s/veh	2.4			1.1	73.2	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	9.4	102.4		111.8		8.2
Change Period (Y+R _c), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	19.5	61.5		85.5		25.5
Max Q Clear Time (g_c+l1), s	3.6	5.1		5.5		4.6
Green Ext Time (p_c), s	0.3	2.6		4.9		0.1
Intersection Summary						
HCM 6th Ctrl Delay			3.7			
HCM 6th LOS			A			

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	396	39	0	694	0	9
Future Vol, veh/h	396	39	0	694	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	25	10	10	10	25
Mvmt Flow	430	42	0	754	0	10
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	215
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.55
Pot Cap-1 Maneuver	-	-	0	-	0	723
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	723
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	10			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	723	-	-	-		
HCM Lane V/C Ratio	0.014	-	-	-		
HCM Control Delay (s)	10	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0	-	-	-		

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	85	796	37	12	501	30	14	5	22	6
Future Volume (vph)	85	796	37	12	501	30	14	5	22	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	25.0	10.0	30.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	35.0	15.0	30.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	28.0%	12.0%	24.0%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	40.2	42.9	42.9	36.2	30.1	30.1	6.5	5.7	7.5	6.2
Actuated g/C Ratio	0.71	0.75	0.75	0.64	0.53	0.53	0.11	0.10	0.13	0.11
v/c Ratio	0.17	0.35	0.04	0.03	0.32	0.04	0.04	0.03	0.11	0.31
Control Delay	5.3	7.2	0.1	4.8	12.8	0.1	24.8	31.0	25.4	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	7.2	0.1	4.8	12.8	0.1	24.8	31.0	25.4	15.2
LOS	A	A	A	A	B	A	C	C	C	B
Approach Delay		6.8				11.9			26.3	17.9
Approach LOS		A				B			C	B

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 57

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 9.4

Intersection LOS: A

Intersection Capacity Utilization 49.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/09/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	85	796	37	12	501	30	14	5	0	22	6	54
Future Volume (veh/h)	85	796	37	12	501	30	14	5	0	22	6	54
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	93	875	0	13	551	33	15	5	0	24	7	59
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	398	1477		295	1141	509	459	112		319	18	155
Arrive On Green	0.07	0.44	0.00	0.02	0.34	0.34	0.02	0.06	0.00	0.07	0.12	0.12
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	160	1349
Grp Volume(v), veh/h	93	875	0	13	551	33	15	5	0	24	0	66
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1509
Q Serve(g_s), s	2.1	11.7	0.0	0.3	7.7	0.9	0.3	0.2	0.0	0.7	0.0	2.4
Cycle Q Clear(g_c), s	2.1	11.7	0.0	0.3	7.7	0.9	0.3	0.2	0.0	0.7	0.0	2.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	398	1477		295	1141	509	459	112		319	0	174
V/C Ratio(X)	0.23	0.59		0.04	0.48	0.06	0.03	0.04		0.08	0.00	0.38
Avail Cap(c_a), veh/h	485	2875		550	2875	1283	1222	890		486	0	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	12.4	0.0	12.5	15.3	13.0	25.0	25.9	0.0	22.5	0.0	24.2
Incr Delay (d2), s/veh	0.2	0.8	0.0	0.0	0.7	0.1	0.0	0.1	0.0	0.1	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	5.7	0.0	0.2	4.2	0.5	0.2	0.1	0.0	0.5	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	11.7	13.2	0.0	12.6	16.0	13.2	25.0	26.1	0.0	22.5	0.0	25.2
LnGrp LOS	B	B		B	B	B	C	C		C	A	C
Approach Vol, veh/h	968		A		597			20	A		90	
Approach Delay, s/veh	13.1				15.7			25.3			24.5	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	35.2	6.1	11.8	11.9	29.2	9.1	8.8				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.3	13.7	2.3	4.4	4.1	9.7	2.7	2.2				
Green Ext Time (p_c), s	0.0	12.5	0.0	0.2	0.0	7.5	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Int Delay, s/veh 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	71	748	477	11	11	48
Future Vol, veh/h	71	748	477	11	11	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	78	822	524	12	12	53

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	536	0	-
Stage 1	-	-	524
Stage 2	-	-	485
Critical Hdwy	4.3	-	-
6.45	-	-	7.1
Critical Hdwy Stg 1	-	-	6
Critical Hdwy Stg 2	-	-	6.2
Follow-up Hdwy	2.3	-	-
3.75	-	-	3.4
Pot Cap-1 Maneuver	974	-	-
Stage 1	-	-	520
Stage 2	-	-	530
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	974	-	-
234	-	-	713
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	478
Stage 2	-	-	530

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	974	-	-	-	516
HCM Lane V/C Ratio	0.08	-	-	-	0.126
HCM Control Delay (s)	9	-	-	-	13
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.4

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	61	678	469	22	14	33
Future Vol, veh/h	61	678	469	22	14	33
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	66	737	510	24	15	36

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	599	0	-
Stage 1	-	-	575
Stage 2	-	-	501
Critical Hdwy	4.3	-	-
7.1			
Critical Hdwy Stg 1	-	-	6
Critical Hdwy Stg 2	-	-	6
Follow-up Hdwy	2.3	-	-
3.4			
Pot Cap-1 Maneuver	921	-	-
Stage 1	-	-	504
Stage 2	-	-	552
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	864	-	-
613			
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	437
Stage 2	-	-	518

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	17.6
HCM LOS		C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	864	-	-	-	336
HCM Lane V/C Ratio	0.077	-	-	-	0.152
HCM Control Delay (s)	9.5	-	-	-	17.6
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Intersection

Int Delay, s/veh 13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	500	235	134	259	2	153	0	35	0	1	3
Future Vol, veh/h	2	500	235	134	259	2	153	0	35	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	510	240	137	264	2	156	0	36	0	1	3

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	266	0	0	750	0	0	921	1054	255	798	1293	133
Stage 1	-	-	-	-	-	-	514	514	-	539	539	-
Stage 2	-	-	-	-	-	-	407	540	-	259	754	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4	3.6	4.1	3.4
Pot Cap-1 Maneuver	1239	-	-	804	-	-	213	212	721	263	151	867
Stage 1	-	-	-	-	-	-	491	514	-	474	500	-
Stage 2	-	-	-	-	-	-	571	500	-	701	397	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1239	-	-	804	-	-	183	176	721	217	125	867
Mov Cap-2 Maneuver	-	-	-	-	-	-	183	176	-	217	125	-
Stage 1	-	-	-	-	-	-	490	512	-	473	415	-
Stage 2	-	-	-	-	-	-	471	415	-	664	396	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	0	3.5		85.3		15.4		
HCM LOS				F		C		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	213	1239	-	-	804	-	-	349
HCM Lane V/C Ratio	0.901	0.002	-	-	0.17	-	-	0.012
HCM Control Delay (s)	85.3	7.9	0	-	10.4	-	-	15.4
HCM Lane LOS	F	A	A	-	B	-	-	C
HCM 95th %tile Q(veh)	7.3	0	-	-	0.6	-	-	0

Intersection

Int Delay, s/veh 2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	91	280	1	74	119	13
Future Vol, veh/h	91	280	1	74	119	13
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	89	89	89	89	89	89
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	102	315	1	83	134	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	417	0	345 260
Stage 1	-	-	-	-	260 -
Stage 2	-	-	-	-	85 -
Critical Hdwy	-	-	4.2	-	6.5 6.3
Critical Hdwy Stg 1	-	-	-	-	5.5 -
Critical Hdwy Stg 2	-	-	-	-	5.5 -
Follow-up Hdwy	-	-	2.29	-	3.59 3.39
Pot Cap-1 Maneuver	-	-	1100	-	636 760
Stage 1	-	-	-	-	765 -
Stage 2	-	-	-	-	919 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1100	-	635 760
Mov Cap-2 Maneuver	-	-	-	-	635 -
Stage 1	-	-	-	-	765 -
Stage 2	-	-	-	-	918 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.2
HCM LOS		B	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	645	-	-	1100	-
HCM Lane V/C Ratio	0.23	-	-	0.001	-
HCM Control Delay (s)	12.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	709	7	33	382	123	28
Future Volume (vph)	709	7	33	382	123	28
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2			1	6	8
Permitted Phases				2	6	
Detector Phase				2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	65.0	65.0	15.0	80.0	40.0	40.0
Total Split (%)	54.2%	54.2%	12.5%	66.7%	33.3%	33.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	87.7	87.7	94.4	94.4	16.6	16.6
Actuated g/C Ratio	0.73	0.73	0.79	0.79	0.14	0.14
v/c Ratio	0.32	0.01	0.08	0.16	0.68	0.15
Control Delay	7.4	4.1	4.1	3.7	65.2	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	4.1	4.1	3.7	65.2	15.4
LOS	A	A	A	A	E	B
Approach Delay	7.3				3.7	55.9
Approach LOS	A				A	E

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.9

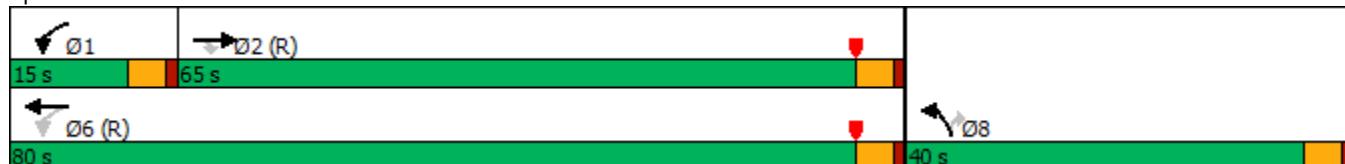
Intersection LOS: B

Intersection Capacity Utilization 41.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave



HCM 6th Signalized Intersection Summary
18: Libson St & Colfax Ave

Stafford Business Park
07/09/2019

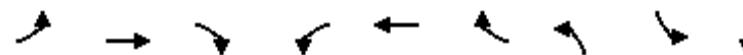


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (veh/h)	709	7	33	382	123	28
Future Volume (veh/h)	709	7	33	382	123	28
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1530	1530	1752	1530	1530
Adj Flow Rate, veh/h	779	8	36	420	135	31
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	25	25	10	25	25
Cap, veh/h	2488	969	480	2710	162	144
Arrive On Green	0.75	0.75	0.03	0.81	0.11	0.11
Sat Flow, veh/h	3416	1296	1457	3416	1457	1296
Grp Volume(v), veh/h	779	8	36	420	135	31
Grp Sat Flow(s), veh/h/ln	1664	1296	1457	1664	1457	1296
Q Serve(g_s), s	9.3	0.2	0.6	3.2	10.9	2.6
Cycle Q Clear(g_c), s	9.3	0.2	0.6	3.2	10.9	2.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2488	969	480	2710	162	144
V/C Ratio(X)	0.31	0.01	0.08	0.15	0.84	0.22
Avail Cap(c_a), veh/h	2488	969	565	2710	431	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.0	3.8	3.2	2.4	52.3	48.6
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.1	10.7	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	4.2	0.1	0.2	1.0	7.9	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.3	3.9	3.3	2.5	63.0	49.3
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	787			456	166	
Approach Delay, s/veh	5.3			2.6	60.4	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	8.0	94.2		102.2		17.8
Change Period (Y+R _c), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	10.5	60.5		75.5		35.5
Max Q Clear Time (g_c+l1), s	2.6	11.3		5.2		12.9
Green Ext Time (p_c), s	0.0	5.3		2.6		0.5
Intersection Summary						
HCM 6th Ctrl Delay			10.9			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	678	10	0	505	0	38
Future Vol, veh/h	678	10	0	505	0	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	25	10	10	10	25
Mvmt Flow	745	11	0	555	0	42
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	373
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.55
Pot Cap-1 Maneuver	-	-	0	-	0	563
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	563
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	11.9			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	563	-	-	-		
HCM Lane V/C Ratio	0.074	-	-	-		
HCM Control Delay (s)	11.9	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019



Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	31	507	2	2	783	30	3	45	1	
Future Volume (vph)	31	507	2	2	783	30	3	45	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	30.0	25.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	15.0	30.0	35.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	12.0%	24.0%	28%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	36.7	37.1	37.1	37.5	33.9	33.9	5.6	8.8	7.2	
Actuated g/C Ratio	0.64	0.65	0.65	0.65	0.59	0.59	0.10	0.15	0.13	
v/c Ratio	0.08	0.26	0.00	0.00	0.44	0.04	0.01	0.20	0.40	
Control Delay	5.5	7.5	0.0	4.5	11.8	0.1	34.3	26.8	12.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.5	7.5	0.0	4.5	11.8	0.1	34.3	26.8	12.6	
LOS	A	A	A	A	B	A	C	C	B	
Approach Delay		7.3			11.4				16.9	
Approach LOS		A			B				B	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 57.4

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 10.5

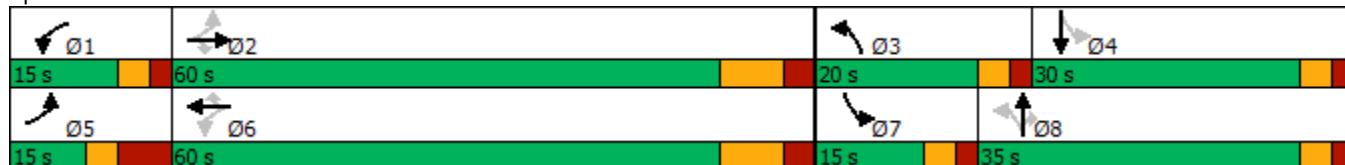
Intersection LOS: B

Intersection Capacity Utilization 46.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	31	507	2	2	783	30	3	0	0	45	1	103
Future Volume (veh/h)	31	507	2	2	783	30	3	0	0	45	1	103
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No	No		No
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	34	551	0	2	851	33	3	0	0	49	1	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	308	1682		446	1414	631	318	62		286	1	157
Arrive On Green	0.04	0.51	0.00	0.00	0.42	0.42	0.00	0.00	0.00	0.08	0.11	0.11
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	13	1473
Grp Volume(v), veh/h	34	551	0	2	851	33	3	0	0	49	0	113
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1487
Q Serve(g_s), s	0.7	6.2	0.0	0.0	12.4	0.8	0.1	0.0	0.0	1.6	0.0	4.6
Cycle Q Clear(g_c), s	0.7	6.2	0.0	0.0	12.4	0.8	0.1	0.0	0.0	1.6	0.0	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	308	1682		446	1414	631	318	62		286	0	158
V/C Ratio(X)	0.11	0.33		0.00	0.60	0.05	0.01	0.00		0.17	0.00	0.72
Avail Cap(c_a), veh/h	434	2698		707	2698	1204	1077	835		427	0	591
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.6	9.2	0.0	10.3	14.0	10.6	29.1	0.0	0.0	24.3	0.0	27.2
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.2	0.0	4.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.4	2.9	0.0	0.0	6.5	0.5	0.0	0.0	0.0	1.2	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	10.8	9.5	0.0	10.3	14.9	10.7	29.1	0.0	0.0	24.5	0.0	31.6
LnGrp LOS	B	A		B	B	C	A		C	A	C	
Approach Vol, veh/h	585		A		886			3	A		162	
Approach Delay, s/veh	9.5				14.7			29.1			29.5	
Approach LOS		A			B			C		C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.2	40.8	5.3	11.7	10.2	35.7	9.7	7.2				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.0	8.2	2.1	6.6	2.7	14.4	3.6	0.0				
Green Ext Time (p_c), s	0.0	7.2	0.0	0.5	0.0	12.3	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.3									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	485	796	25	27	121
Future Vol, veh/h	62	485	796	25	27	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	65	511	838	26	28	127
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	864	0	-	0	1172	419
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	334	-
Critical Hdwy	4.3	-	-	-	6.45	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6.2	-
Follow-up Hdwy	2.3	-	-	-	3.75	3.4
Pot Cap-1 Maneuver	726	-	-	-	204	561
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	639	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	726	-	-	-	186	561
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	639	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.2	0	19.1			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	726	-	-	-	410	
HCM Lane V/C Ratio	0.09	-	-	-	0.38	
HCM Control Delay (s)	10.4	-	-	-	19.1	
HCM Lane LOS	B	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	1.7	

Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	12	501	771	10	29	55
Future Vol, veh/h	12	501	771	10	29	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	13	539	829	11	31	59

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	840	0	-
Stage 1	-	-	829
Stage 2	-	-	296
Critical Hdwy	4.3	-	-
7.1			
Critical Hdwy Stg 1	-	-	6
Critical Hdwy Stg 2	-	-	6
Follow-up Hdwy	2.3	-	-
3.4			
Pot Cap-1 Maneuver	742	-	-
Stage 1	-	-	369
Stage 2	-	-	705
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	742	-	-
184			565
Mov Cap-2 Maneuver	-	-	-
184			-
Stage 1	-	-	362
Stage 2	-	-	705

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	742	-	-	-	329
HCM Lane V/C Ratio	0.017	-	-	-	0.275
HCM Control Delay (s)	9.9	-	-	-	20
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1

Intersection

Int Delay, s/veh 77.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	265	152	102	616	2	330	1	7	0	2	3
Future Vol, veh/h	1	265	152	102	616	2	330	1	7	0	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	325	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	1	285	163	110	662	2	355	1	8	0	2	3

Major/Minor	Major1	Major2		Minor1		Minor2	
Conflicting Flow All	664	0	0	448	0	0	839 1171 143 1028 1333 332
Stage 1	-	-	-	-	-	287	287 - 883 883 -
Stage 2	-	-	-	-	-	552	884 - 145 450 -
Critical Hdwy	4.3	-	-	4.3	-	7.7	6.7 7.1 7.7 6.7 7.1
Critical Hdwy Stg 1	-	-	-	-	-	6.7	5.7 - 6.7 5.7 -
Critical Hdwy Stg 2	-	-	-	-	-	6.7	5.7 - 6.7 5.7 -
Follow-up Hdwy	2.3	-	-	2.3	-	3.6	4.1 3.4 3.6 4.1 3.4
Pot Cap-1 Maneuver	869	-	-	1054	-	~246	180 854 178 143 641
Stage 1	-	-	-	-	-	674	653 - 291 344 -
Stage 2	-	-	-	-	-	466	344 - 820 550 -
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	869	-	-	1054	-	~222	161 854 161 128 641
Mov Cap-2 Maneuver	-	-	-	-	-	~222	161 - 161 128 -
Stage 1	-	-	-	-	-	673	652 - 290 308 -
Stage 2	-	-	-	-	-	412	308 - 810 549 -

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	1.2		\$ 334.9		20	
HCM LOS				F		C	
<hr/>							
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR SBLn1
Capacity (veh/h)	225	869	-	-	1054	-	- 246
HCM Lane V/C Ratio	1.615	0.001	-	-	0.104	-	- 0.022
HCM Control Delay (s)	\$ 334.9	9.1	0	-	8.8	-	- 20
HCM Lane LOS	F	A	A	-	A	-	- C
HCM 95th %tile Q(veh)	23.2	0	-	-	0.3	-	- 0.1

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	68	188	9	171	176	8
Future Vol, veh/h	68	188	9	171	176	8
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	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	74	204	10	186	191	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	278	0	382 176
Stage 1	-	-	-	-	176 -
Stage 2	-	-	-	-	206 -
Critical Hdwy	-	-	4.2	-	6.5 6.3
Critical Hdwy Stg 1	-	-	-	-	5.5 -
Critical Hdwy Stg 2	-	-	-	-	5.5 -
Follow-up Hdwy	-	-	2.29	-	3.59 3.39
Pot Cap-1 Maneuver	-	-	1240	-	605 847
Stage 1	-	-	-	-	836 -
Stage 2	-	-	-	-	810 -
Platoon blocked, %	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1240	-	600 847
Mov Cap-2 Maneuver	-	-	-	-	600 -
Stage 1	-	-	-	-	836 -
Stage 2	-	-	-	-	803 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	608	-	-	1240	-
HCM Lane V/C Ratio	0.329	-	-	0.008	-
HCM Control Delay (s)	13.8	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (vph)	404	58	252	696	59	14
Future Volume (vph)	404	58	252	696	59	14
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			2			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	55.0	55.0	35.0	90.0	30.0	30.0
Total Split (%)	45.8%	45.8%	29.2%	75.0%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	83.4	83.4	17.1	105.8	8.1	8.1
Actuated g/C Ratio	0.70	0.70	0.14	0.88	0.07	0.07
v/c Ratio	0.19	0.07	0.69	0.26	0.34	0.15
Control Delay	7.7	2.3	57.8	1.7	57.6	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	2.3	57.8	1.7	57.6	25.4
LOS	A	A	E	A	E	C
Approach Delay	7.1			16.6	51.5	
Approach LOS	A			B	D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 15.4

Intersection LOS: B

Intersection Capacity Utilization 33.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave



HCM 6th Signalized Intersection Summary
18: Libson St & Colfax Ave

Stafford Business Park
07/11/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	404	58	252	696	59	14
Future Volume (veh/h)	404	58	252	696	59	14
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1530	1530	1752	1530	1530
Adj Flow Rate, veh/h	439	63	274	757	64	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	25	25	10	25	25
Cap, veh/h	2439	950	334	2957	104	
Arrive On Green	0.73	0.73	0.12	0.89	0.04	0.00
Sat Flow, veh/h	3416	1296	2826	3416	2826	1296
Grp Volume(v), veh/h	439	63	274	757	64	0
Grp Sat Flow(s), veh/h/ln	1664	1296	1413	1664	1413	1296
Q Serve(g_s), s	4.9	1.6	11.4	3.9	2.7	0.0
Cycle Q Clear(g_c), s	4.9	1.6	11.4	3.9	2.7	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2439	950	334	2957	104	
V/C Ratio(X)	0.18	0.07	0.82	0.26	0.62	
Avail Cap(c_a), veh/h	2439	950	718	2957	601	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.9	4.5	51.7	1.0	57.0	0.0
Incr Delay (d2), s/veh	0.2	0.1	5.0	0.2	5.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	2.3	0.6	7.4	0.2	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.1	4.6	56.7	1.2	62.8	0.0
LnGrp LOS	A	A	E	A	E	
Approach Vol, veh/h	502			1031	64	A
Approach Delay, s/veh	5.0			15.9	62.8	
Approach LOS	A			B	E	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	18.7	92.4		111.1		8.9
Change Period (Y+R _c), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	30.5	50.5		85.5		25.5
Max Q Clear Time (g_c+l1), s	13.4	6.9		5.9		4.7
Green Ext Time (p_c), s	0.8	2.9		5.2		0.2

Intersection Summary

HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	444	78	0	755	0	18
Future Vol, veh/h	444	78	0	755	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	25	10	10	10	25
Mvmt Flow	483	85	0	821	0	20
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	242
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.55
Pot Cap-1 Maneuver	-	-	0	-	0	693
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	693
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	10.3			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	693	-	-	-		
HCM Lane V/C Ratio	0.028	-	-	-		
HCM Control Delay (s)	10.3	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	-		

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑↑
Traffic Volume (vph)	90	858	39	12	646	31	15	6	24	7
Future Volume (vph)	90	858	39	12	646	31	15	6	24	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	25.0	10.0	30.0
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	20.0	35.0	15.0	30.0
Total Split (%)	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%	16.0%	28.0%	12.0%	24.0%
Yellow Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	9.0	9.0	5.0	9.0	9.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
Act Effect Green (s)	41.8	42.3	42.3	37.9	32.1	32.1	6.6	5.8	7.6	6.3
Actuated g/C Ratio	0.68	0.69	0.69	0.62	0.53	0.53	0.11	0.09	0.12	0.10
v/c Ratio	0.21	0.41	0.04	0.03	0.41	0.04	0.05	0.04	0.13	0.34
Control Delay	5.7	8.1	0.1	4.6	14.0	0.1	26.6	32.8	27.4	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	8.1	0.1	4.6	14.0	0.1	26.6	32.8	27.4	16.1
LOS	A	A	A	A	B	A	C	C	C	B
Approach Delay		7.5			13.3			28.5		19.1
Approach LOS		A			B			C		B

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 61.1

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 10.6

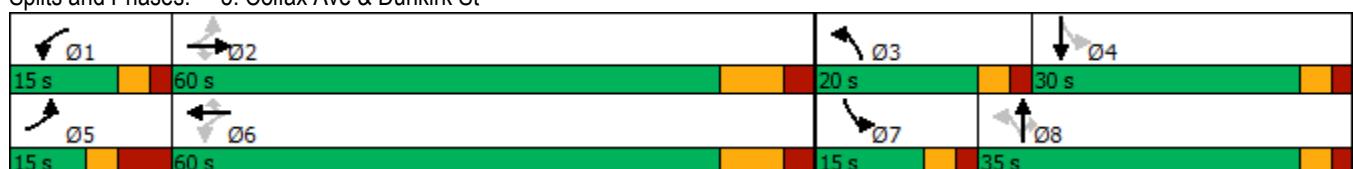
Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	90	858	39	12	646	31	15	6	0	24	7	57
Future Volume (veh/h)	90	858	39	12	646	31	15	6	0	24	7	57
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	99	943	0	13	710	34	16	7	0	26	8	63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	356	1542		283	1216	542	451	113		312	19	153
Arrive On Green	0.07	0.46	0.00	0.02	0.37	0.37	0.02	0.06	0.00	0.07	0.11	0.11
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	170	1340
Grp Volume(v), veh/h	99	943	0	13	710	34	16	7	0	26	0	71
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1511
Q Serve(g_s), s	2.2	13.2	0.0	0.3	10.7	0.9	0.3	0.2	0.0	0.8	0.0	2.7
Cycle Q Clear(g_c), s	2.2	13.2	0.0	0.3	10.7	0.9	0.3	0.2	0.0	0.8	0.0	2.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	356	1542		283	1216	542	451	113		312	0	173
V/C Ratio(X)	0.28	0.61		0.05	0.58	0.06	0.04	0.06		0.08	0.00	0.41
Avail Cap(c_a), veh/h	434	2736		525	2736	1220	1171	847		465	0	609
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.7	12.5	0.0	12.4	15.9	12.8	26.2	27.3	0.0	23.6	0.0	25.5
Incr Delay (d2), s/veh	0.3	0.8	0.0	0.0	1.0	0.1	0.0	0.2	0.0	0.1	0.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.1	6.5	0.0	0.2	5.9	0.5	0.2	0.2	0.0	0.6	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.0	13.3	0.0	12.4	16.8	12.9	26.2	27.4	0.0	23.7	0.0	26.7
LnGrp LOS	B	B		B	B	B	C	C		C	A	C
Approach Vol, veh/h	1042		A		757			23	A		97	
Approach Delay, s/veh	13.2				16.6			26.6			25.9	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	37.8	6.2	12.1	12.1	31.7	9.3	9.0				
Change Period (Y+Rc), s	5.0	9.0	5.0	5.0	8.0	9.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	51.0	15.0	25.0	7.0	51.0	10.0	30.0				
Max Q Clear Time (g_c+l1), s	2.3	15.2	2.3	4.7	4.2	12.7	2.8	2.2				
Green Ext Time (p_c), s	0.0	13.5	0.0	0.3	0.0	10.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	75	808	620	11	11	50
Future Vol, veh/h	75	808	620	11	11	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	82	888	681	12	12	55
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	693	0	-	0	1200	341
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	519	-
Critical Hdwy	4.3	-	-	-	6.45	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6.2	-
Follow-up Hdwy	2.3	-	-	-	3.75	3.4
Pot Cap-1 Maneuver	847	-	-	-	196	632
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	508	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	847	-	-	-	177	632
Mov Cap-2 Maneuver	-	-	-	-	177	-
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	508	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	14.9			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	847	-	-	-	432	
HCM Lane V/C Ratio	0.097	-	-	-	0.155	
HCM Control Delay (s)	9.7	-	-	-	14.9	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	65	734	611	24	15	35
Future Vol, veh/h	65	734	611	24	15	35
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	71	798	664	26	16	38

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	755	0	-	0	1270
Stage 1	-	-	-	-	729
Stage 2	-	-	-	-	541
Critical Hdwy	4.3	-	-	-	7
Critical Hdwy Stg 1	-	-	-	-	6
Critical Hdwy Stg 2	-	-	-	-	6
Follow-up Hdwy	2.3	-	-	-	3.6
Pot Cap-1 Maneuver	801	-	-	-	149
Stage 1	-	-	-	-	418
Stage 2	-	-	-	-	526
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	751	-	-	-	119
Mov Cap-2 Maneuver	-	-	-	-	119
Stage 1	-	-	-	-	355
Stage 2	-	-	-	-	493

Approach	EB	WB	SB	
HCM Control Delay, s	0.8	0	22.2	
HCM LOS			C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	751	-	-	-	263
HCM Lane V/C Ratio	0.094	-	-	-	0.207
HCM Control Delay (s)	10.3	-	-	-	22.2
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.8

Intersection												
Int Delay, s/veh 27.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	554	284	141	296	2	173	0	37	0	1	3
Future Vol, veh/h	2	554	284	141	296	2	173	0	37	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	325	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	565	290	144	302	2	177	0	38	0	1	3
Major/Minor												
Major1		Major2			Minor1			Minor2				
Conflicting Flow All	304	0	0	855	0	0	1009	1161	283	878	1450	152
Stage 1	-	-	-	-	-	-	569	569	-	591	591	-
Stage 2	-	-	-	-	-	-	440	592	-	287	859	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4	3.6	4.1	3.4
Pot Cap-1 Maneuver	1198	-	-	732	-	-	183	182	691	230	121	842
Stage 1	-	-	-	-	-	-	455	485	-	441	473	-
Stage 2	-	-	-	-	-	-	545	473	-	674	353	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1198	-	-	732	-	-	~153	146	691	184	97	842
Mov Cap-2 Maneuver	-	-	-	-	-	-	~153	146	-	184	97	-
Stage 1	-	-	-	-	-	-	454	484	-	440	380	-
Stage 2	-	-	-	-	-	-	435	380	-	635	352	-
Approach												
EB			WB			NB			SB			
HCM Control Delay, s	0			3.6			188.2			17.7		
HCM LOS							F			C		
Notes												
~: Volume exceeds capacity			\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon			

Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	105	322	1	80	134	13
Future Vol, veh/h	105	322	1	80	134	13
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	89	89	89	89	89	89
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	118	362	1	90	151	15
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	480	0	391	299
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1042	-	598	722
Stage 1	-	-	-	-	734	-
Stage 2	-	-	-	-	912	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1042	-	597	722
Mov Cap-2 Maneuver	-	-	-	-	597	-
Stage 1	-	-	-	-	734	-
Stage 2	-	-	-	-	911	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.1	13.2			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	606	-	-	1042	-	
HCM Lane V/C Ratio	0.273	-	-	0.001	-	
HCM Control Delay (s)	13.2	-	-	8.5	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1.1	-	-	0	-	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Volume (vph)	784	15	66	406	246	56
Future Volume (vph)	784	15	66	406	246	56
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2			1	6	8
Permitted Phases				2	6	
Detector Phase				2	1	6
Switch Phase						8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	55.0	55.0	15.0	70.0	50.0	50.0
Total Split (%)	45.8%	45.8%	12.5%	58.3%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	85.2	85.2	93.9	93.9	17.1	17.1
Actuated g/C Ratio	0.71	0.71	0.78	0.78	0.14	0.14
v/c Ratio	0.37	0.02	0.10	0.17	0.68	0.26
Control Delay	8.2	3.2	3.7	3.7	57.2	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	3.2	3.7	3.7	57.2	13.3
LOS	A	A	A	A	E	B
Approach Delay	8.1				3.7	49.0
Approach LOS	A				A	D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 14.7

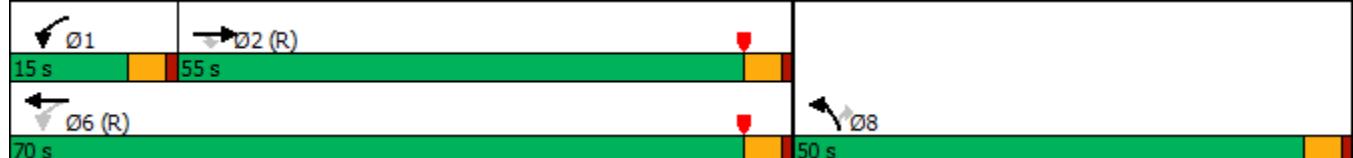
Intersection LOS: B

Intersection Capacity Utilization 42.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	784	15	66	406	246	56
Future Volume (veh/h)	784	15	66	406	246	56
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1530	1530	1752	1530	1530
Adj Flow Rate, veh/h	862	16	73	446	270	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	25	25	10	25	25
Cap, veh/h	2434	948	866	2685	334	
Arrive On Green	0.73	0.73	0.04	0.81	0.12	0.00
Sat Flow, veh/h	3416	1296	2826	3416	2826	1296
Grp Volume(v), veh/h	862	16	73	446	270	0
Grp Sat Flow(s), veh/h/ln	1664	1296	1413	1664	1413	1296
Q Serve(g_s), s	11.3	0.4	0.7	3.6	11.2	0.0
Cycle Q Clear(g_c), s	11.3	0.4	0.7	3.6	11.2	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2434	948	866	2685	334	
V/C Ratio(X)	0.35	0.02	0.08	0.17	0.81	
Avail Cap(c_a), veh/h	2434	948	1006	2685	1071	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.8	4.4	3.6	2.6	51.6	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.1	4.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	5.4	0.2	0.2	1.2	7.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.3	4.4	3.7	2.7	56.2	0.0
LnGrp LOS	A	A	A	A	E	
Approach Vol, veh/h	878			519	270	A
Approach Delay, s/veh	6.2			2.9	56.2	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	9.1	92.3		101.3		18.7
Change Period (Y+R _c), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	10.5	50.5		65.5		45.5
Max Q Clear Time (g_c+l1), s	2.7	13.3		5.6		13.2
Green Ext Time (p_c), s	0.1	6.0		2.7		1.0

Intersection Summary

HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	723	20	0	652	0	76
Future Vol, veh/h	723	20	0	652	0	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	25	10	10	10	25
Mvmt Flow	795	22	0	716	0	84
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	398
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.55
Pot Cap-1 Maneuver	-	-	0	-	0	541
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	541
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	12.9			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	541	-	-	-		
HCM Lane V/C Ratio	0.154	-	-	-		
HCM Control Delay (s)	12.9	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.5	-	-	-		

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	33	567	2	2	844	32	4	48	1	
Future Volume (vph)	33	567	2	2	844	32	4	48	1	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	31.0	26.0
Total Split (s)	13.0	64.0	64.0	13.0	64.0	64.0	12.0	12.0	31.0	31.0
Total Split (%)	10.8%	53.3%	53.3%	10.8%	53.3%	53.3%	10.0%	10.0%	25.8%	26%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	98.5	96.2	96.2	95.8	91.7	91.7	5.4	10.8	7.7	
Actuated g/C Ratio	0.82	0.80	0.80	0.80	0.76	0.76	0.04	0.09	0.06	
v/c Ratio	0.08	0.22	0.00	0.00	0.34	0.03	0.03	0.33	0.56	
Control Delay	3.2	4.2	0.0	6.0	9.7	0.6	55.2	54.2	20.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	3.2	4.2	0.0	6.0	9.7	0.6	55.2	54.2	20.2	
LOS	A	A	A	A	A	A	E	D	C	
Approach Delay		4.1			9.4				30.6	
Approach LOS		A			A				C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 9.6

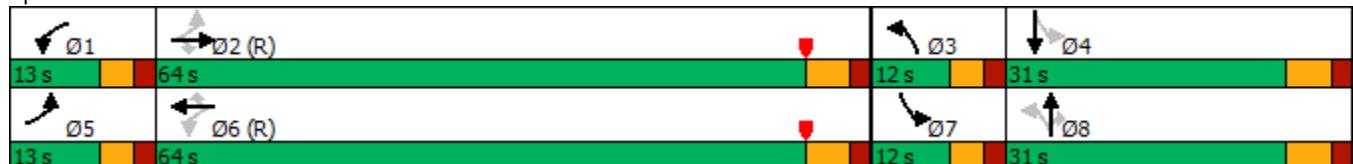
Intersection LOS: A

Intersection Capacity Utilization 46.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	33	567	2	2	844	32	4	0	0	48	1	109
Future Volume (veh/h)	33	567	2	2	844	32	4	0	0	48	1	109
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	616	0	2	917	35	4	0	0	52	1	118
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	454	2542		594	2448	1092	187	104		216	1	147
Arrive On Green	0.03	0.72	0.00	0.00	0.69	0.69	0.01	0.00	0.00	0.04	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	13	1574
Grp Volume(v), veh/h	36	616	0	2	917	35	4	0	0	52	0	119
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1587
Q Serve(g_s), s	0.7	7.2	0.0	0.0	13.0	0.8	0.1	0.0	0.0	3.2	0.0	8.8
Cycle Q Clear(g_c), s	0.7	7.2	0.0	0.0	13.0	0.8	0.1	0.0	0.0	3.2	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	454	2542		594	2448	1092	187	104		216	0	148
V/C Ratio(X)	0.08	0.24		0.00	0.37	0.03	0.02	0.00		0.24	0.00	0.80
Avail Cap(c_a), veh/h	521	2542		708	2448	1092	371	390		242	0	331
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.6	5.9	0.0	5.8	7.8	5.9	53.1	0.0	0.0	48.8	0.0	53.3
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.4	0.0	7.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.4	3.8	0.0	0.0	7.4	0.5	0.1	0.0	0.0	2.6	0.0	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	6.1	0.0	5.8	8.3	6.0	53.1	0.0	0.0	49.2	0.0	60.6
LnGrp LOS	A	A		A	A	A	D	A		D	A	E
Approach Vol, veh/h	652		A		954			4	A		171	
Approach Delay, s/veh	6.1				8.2			53.1			57.1	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	91.8	5.6	17.2	8.5	88.7	10.2	12.6				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	8.0	58.0	7.0	25.0	8.0	58.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.0	9.2	2.1	10.8	2.7	15.0	5.2	0.0				
Green Ext Time (p_c), s	0.0	8.4	0.0	0.4	0.0	14.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				12.2								
HCM 6th LOS				B								
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	65	544	858	23	29	129
Future Vol, veh/h	65	544	858	23	29	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	573	903	24	31	136
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	927	0	-	0	1268	452
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	365	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	733	-	-	-	191	555
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	733	-	-	-	173	555
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	637	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.1	0	20.6			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	733	-	-	-	395	
HCM Lane V/C Ratio	0.093	-	-	-	0.421	
HCM Control Delay (s)	10.4	-	-	-	20.6	
HCM Lane LOS	B	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	2	

Intersection

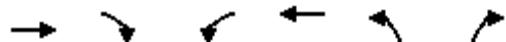
Int Delay, s/veh 1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	Y
Traffic Vol, veh/h	13	561	832	11	31	58
Future Vol, veh/h	13	561	832	11	31	58
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	603	895	12	33	62

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	972	0	-	0	1290	513
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	330	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	705	-	-	-	155	506
Stage 1	-	-	-	-	332	-
Stage 2	-	-	-	-	701	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	661	-	-	-	133	475
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	27.9
HCM LOS		D	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	661	-	-	-	251
HCM Lane V/C Ratio	0.021	-	-	-	0.381
HCM Control Delay (s)	10.6	-	-	-	27.9
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	1.7



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖↗	↗
Traffic Volume (vph)	281	169	206	592	319	10
Future Volume (vph)	281	169	206	592	319	10
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2			1	6	8
Permitted Phases				2	6	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	10.0	24.0	10.0	10.0
Total Split (s)	40.0	40.0	45.0	85.0	35.0	35.0
Total Split (%)	33.3%	33.3%	37.5%	70.8%	29.2%	29.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	Min	None	None
Act Effect Green (s)	66.2	66.2	20.5	91.7	17.3	17.3
Actuated g/C Ratio	0.55	0.55	0.17	0.76	0.14	0.14
v/c Ratio	0.15	0.19	0.74	0.24	0.69	0.05
Control Delay	12.5	6.2	61.0	4.6	56.2	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	6.2	61.0	4.6	56.2	20.7
LOS	B	A	E	A	E	C
Approach Delay	10.2			19.1	55.1	
Approach LOS	B			B	E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 24.1

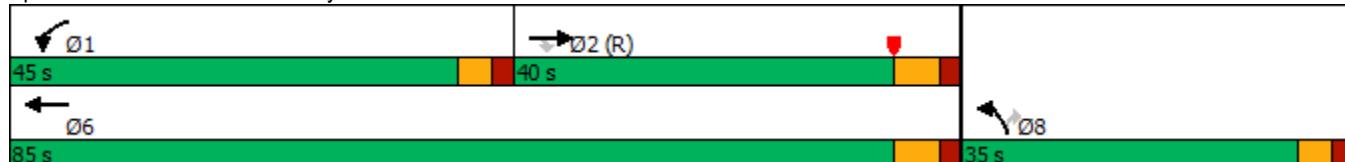
Intersection LOS: C

Intersection Capacity Utilization 41.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
07/11/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖↗	↗
Traffic Volume (veh/h)	281	169	206	592	319	10
Future Volume (veh/h)	281	169	206	592	319	10
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	302	182	222	637	343	11
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2135	952	256	2793	422	194
Arrive On Green	0.20	0.20	0.14	0.79	0.12	0.12
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	302	182	222	637	343	11
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	8.4	11.5	14.6	5.6	11.6	0.7
Cycle Q Clear(g_c), s	8.4	11.5	14.6	5.6	11.6	0.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2135	952	256	2793	422	194
V/C Ratio(X)	0.14	0.19	0.87	0.23	0.81	0.06
Avail Cap(c_a), veh/h	2135	952	594	2793	864	396
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.99	0.99	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	23.8	50.3	3.3	51.3	46.5
Incr Delay (d2), s/veh	0.1	0.4	8.7	0.0	3.8	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	6.2	8.0	11.5	3.0	8.8	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	22.7	24.2	59.0	3.4	55.1	46.7
LnGrp LOS	C	C	E	A	E	D
Approach Vol, veh/h	484			859	354	
Approach Delay, s/veh	23.3			17.7	54.9	
Approach LOS	C			B	D	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	22.2	78.1		100.3		19.7
Change Period (Y+R _c), s	5.0	6.0		6.0		5.0
Max Green Setting (Gmax), s	40.0	34.0		79.0		30.0
Max Q Clear Time (g_c+l1), s	16.6	13.5		7.6		13.6
Green Ext Time (p_c), s	0.6	2.1		5.2		1.1
Intersection Summary						
HCM 6th Ctrl Delay			27.1			
HCM 6th LOS			C			

Intersection

Int Delay, s/veh 5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	30	6	10	10	25	162	74	145	8	68	192	98
Future Vol, veh/h	30	6	10	10	25	162	74	145	8	68	192	98
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	0	-	0	200	-	0	0	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	7	11	11	27	176	80	158	9	74	209	107

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	693	684	209	743	787	163	316	0	0	167	0	0
Stage 1	357	357	-	323	323	-	-	-	-	-	-	-
Stage 2	336	327	-	420	464	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	358	371	831	331	324	882	1244	-	-	1411	-	-
Stage 1	661	628	-	689	650	-	-	-	-	-	-	-
Stage 2	678	648	-	611	564	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	243	329	831	294	287	882	1244	-	-	1411	-	-
Mov Cap-2 Maneuver	243	329	-	294	287	-	-	-	-	-	-	-
Stage 1	619	595	-	645	608	-	-	-	-	-	-	-
Stage 2	485	607	-	565	535	-	-	-	-	-	-	-

Approach	EB	WB			NB			SB				
HCM Control Delay, s	18.6	11.6			2.6			1.5				
HCM LOS	C	B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1244	-	-	243	329	831	294	287	882	1411	-	-
HCM Lane V/C Ratio	0.065	-	-	0.134	0.02	0.013	0.037	0.095	0.2	0.052	-	-
HCM Control Delay (s)	8.1	-	-	22.1	16.2	9.4	17.7	18.9	10.1	7.7	-	-
HCM Lane LOS	A	-	-	C	C	A	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.1	0	0.1	0.3	0.7	0.2	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (vph)	445	81	141	770	48	5
Future Volume (vph)	445	81	141	770	48	5
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			2			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	23.0	23.0
Total Split (s)	55.0	55.0	35.0	90.0	30.0	30.0
Total Split (%)	45.8%	45.8%	29.2%	75.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0	3.5	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	88.7	88.7	10.7	105.1	7.2	7.2
Actuated g/C Ratio	0.74	0.74	0.09	0.88	0.06	0.06
v/c Ratio	0.19	0.07	0.50	0.27	0.25	0.05
Control Delay	6.9	3.1	68.3	1.2	56.3	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	3.1	68.3	1.2	56.3	32.0
LOS	A	A	E	A	E	C
Approach Delay	6.3			11.6	54.2	
Approach LOS	A			B	D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 34.6%

ICU Level of Service A

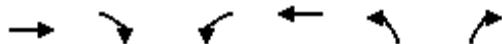
Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave



HCM 6th Signalized Intersection Summary
18: Libson St & Colfax Ave

Stafford Business Park
07/11/2019

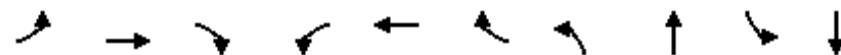


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	445	81	141	770	48	5
Future Volume (veh/h)	445	81	141	770	48	5
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	484	88	153	837	52	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2748	1226	219	3106	119	
Arrive On Green	0.77	0.77	0.06	0.87	0.03	0.00
Sat Flow, veh/h	3647	1585	3456	3647	3456	1585
Grp Volume(v), veh/h	484	88	153	837	52	0
Grp Sat Flow(s), veh/h/ln	1777	1585	1728	1777	1728	1585
Q Serve(g_s), s	4.3	1.6	5.2	4.7	1.8	0.0
Cycle Q Clear(g_c), s	4.3	1.6	5.2	4.7	1.8	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2748	1226	219	3106	119	
V/C Ratio(X)	0.18	0.07	0.70	0.27	0.44	
Avail Cap(c_a), veh/h	2748	1226	878	3106	720	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.92	0.92	1.00	0.00
Uniform Delay (d), s/veh	3.6	3.3	55.1	1.2	56.8	0.0
Incr Delay (d2), s/veh	0.1	0.1	3.7	0.2	2.5	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.9	0.7	4.1	0.4	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	3.7	3.4	58.8	1.4	59.3	0.0
LnGrp LOS	A	A	E	A	E	
Approach Vol, veh/h	572			990	52	A
Approach Delay, s/veh	3.7			10.3	59.3	
Approach LOS	A			B	E	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	12.1	98.8		110.9		9.1
Change Period (Y+R _c), s	4.5	6.0		6.0		5.0
Max Green Setting (Gmax), s	30.5	49.0		84.0		25.0
Max Q Clear Time (g_c+l1), s	7.2	6.3		6.7		3.8
Green Ext Time (p_c), s	0.4	3.2		5.8		0.1
Intersection Summary						
HCM 6th Ctrl Delay			9.5			
HCM 6th LOS			A			
Notes						
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.						

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	509	74	0	818	0	17
Future Vol, veh/h	509	74	0	818	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	553	80	0	889	0	18
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	277
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	720
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	720
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	10.1			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	720	-	-	-		
HCM Lane V/C Ratio	0.026	-	-	-		
HCM Control Delay (s)	10.1	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	-		

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑↑
Traffic Volume (vph)	95	920	42	13	738	33	15	6	25	7
Future Volume (vph)	95	920	42	13	738	33	15	6	25	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	26.0	10.0	31.0
Total Split (s)	15.0	64.0	64.0	13.0	62.0	62.0	12.0	31.0	12.0	31.0
Total Split (%)	12.5%	53.3%	53.3%	10.8%	51.7%	51.7%	10.0%	25.8%	10.0%	25.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	99.1	96.1	96.1	93.9	87.6	87.6	7.4	5.8	11.4	6.7
Actuated g/C Ratio	0.83	0.80	0.80	0.78	0.73	0.73	0.06	0.05	0.10	0.06
v/c Ratio	0.19	0.35	0.04	0.03	0.31	0.03	0.07	0.08	0.18	0.49
Control Delay	3.8	6.2	0.0	5.8	11.2	0.5	48.6	55.7	47.8	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	6.2	0.0	5.8	11.2	0.5	48.6	55.7	47.8	26.5
LOS	A	A	A	A	B	A	D	E	D	C
Approach Delay				5.7		10.6		50.8		32.2
Approach LOS				A		B		D		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 9.5

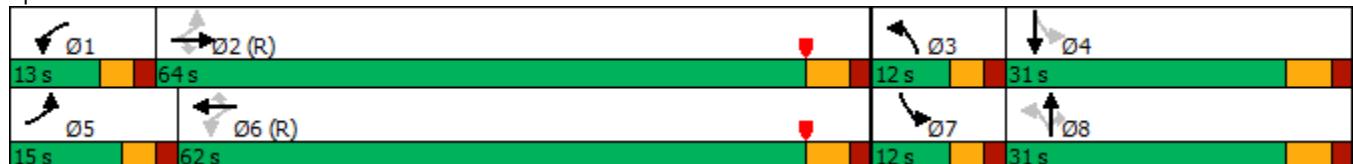
Intersection LOS: A

Intersection Capacity Utilization 51.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	95	920	42	13	738	33	15	6	0	25	7	61
Future Volume (veh/h)	95	920	42	13	738	33	15	6	0	25	7	61
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	1000	0	14	802	36	16	7	0	27	8	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	530	2560		432	2472	1102	227	75		184	11	91
Arrive On Green	0.04	0.72	0.00	0.02	0.70	0.70	0.02	0.04	0.00	0.04	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	174	1437
Grp Volume(v), veh/h	103	1000	0	14	802	36	16	7	0	27	0	74
Grp Sat Flow(s), veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	0	1612
Q Serve(g_s), s	1.9	13.1	0.0	0.3	10.6	0.8	0.5	0.4	0.0	1.7	0.0	5.4
Cycle Q Clear(g_c), s	1.9	13.1	0.0	0.3	10.6	0.8	0.5	0.4	0.0	1.7	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	530	2560		432	2472	1102	227	75		184	0	103
V/C Ratio(X)	0.19	0.39		0.03	0.32	0.03	0.07	0.09		0.15	0.00	0.72
Avail Cap(c_a), veh/h	606	2560		523	2472	1102	369	390		215	0	336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.0	6.5	0.0	5.5	7.2	5.7	53.6	55.5	0.0	51.5	0.0	55.1
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	0.3	0.1	0.1	0.4	0.0	0.3	0.0	6.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.0	7.0	0.0	0.1	6.0	0.5	0.4	0.4	0.0	1.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.1	7.0	0.0	5.5	7.5	5.7	53.7	55.9	0.0	51.7	0.0	62.1
LnGrp LOS	A	A		A	A	A	D	E		D	A	E
Approach Vol, veh/h	1103		A		852			23	A		101	
Approach Delay, s/veh	6.8				7.4			54.4			59.3	
Approach LOS		A			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	92.4	7.1	13.6	9.8	89.5	9.9	10.8				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	8.0	58.0	7.0	25.0	10.0	56.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.3	15.1	2.5	7.4	3.9	12.6	3.7	2.4				
Green Ext Time (p_c), s	0.0	15.5	0.0	0.3	0.1	12.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			10.1									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	Y	Y
Traffic Vol, veh/h	80	866	710	12	12	54
Future Vol, veh/h	80	866	710	12	12	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	84	912	747	13	13	57
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	760	0	-	0	1280	374
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	848	-	-	-	188	623
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	520	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	848	-	-	-	169	623
Mov Cap-2 Maneuver	-	-	-	-	169	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	520	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	15.3			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	848	-	-	-	419	-
HCM Lane V/C Ratio	0.099	-	-	-	0.166	-
HCM Control Delay (s)	9.7	-	-	-	15.3	-
HCM Lane LOS	A	-	-	-	C	-
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	Y	
Traffic Vol, veh/h	69	788	701	25	15	37
Future Vol, veh/h	69	788	701	25	15	37
Conflicting Peds, #/hr	65	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	200	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	847	754	27	16	40
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	846	0	-	0	1391	442
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	572	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	787	-	-	-	133	563
Stage 1	-	-	-	-	394	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	738	-	-	-	105	528
Mov Cap-2 Maneuver	-	-	-	-	105	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	495	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.8	0	24.1			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	738	-	-	-	244	
HCM Lane V/C Ratio	0.101	-	-	-	0.229	
HCM Control Delay (s)	10.4	-	-	-	24.1	
HCM Lane LOS	B	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.9	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖↗	↗
Traffic Volume (vph)	588	259	176	297	283	53
Future Volume (vph)	588	259	176	297	283	53
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1		8	
Permitted Phases			2		6	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	10.0	10.0
Total Split (s)	53.0	53.0	37.0	90.0	30.0	30.0
Total Split (%)	44.2%	44.2%	30.8%	75.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	Min	Min	None	None
Act Effect Green (s)	69.0	69.0	18.1	93.1	15.9	15.9
Actuated g/C Ratio	0.58	0.58	0.15	0.78	0.13	0.13
v/c Ratio	0.31	0.27	0.71	0.12	0.67	0.22
Control Delay	11.8	3.6	62.5	3.7	56.7	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	3.6	62.5	3.7	56.7	13.4
LOS	B	A	E	A	E	B
Approach Delay	9.3			25.5	49.9	
Approach LOS	A			C	D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 48.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
07/11/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	588	259	176	297	283	53
Future Volume (veh/h)	588	259	176	297	283	53
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	632	278	189	319	304	57
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2215	988	222	2835	382	175
Arrive On Green	1.00	1.00	0.12	0.80	0.11	0.11
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	632	278	189	319	304	57
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	0.0	0.0	12.5	2.4	10.3	4.0
Cycle Q Clear(g_c), s	0.0	0.0	12.5	2.4	10.3	4.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	2215	988	222	2835	382	175
V/C Ratio(X)	0.29	0.28	0.85	0.11	0.80	0.33
Avail Cap(c_a), veh/h	2215	988	460	2835	720	330
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.95	0.95	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	51.5	2.7	52.0	49.2
Incr Delay (d2), s/veh	0.3	0.7	9.0	0.0	3.8	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.2	0.3	10.2	1.2	8.0	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	0.3	0.7	60.4	2.7	55.8	50.3
LnGrp LOS	A	A	E	A	E	D
Approach Vol, veh/h	910			508	361	
Approach Delay, s/veh	0.4			24.2	55.0	
Approach LOS	A			C	D	
Timer - Assigned Phs	1	2		6		8
Phs Duration (G+Y+R _c), s	20.9	80.8		101.7		18.3
Change Period (Y+R _c), s	6.0	6.0		6.0		5.0
Max Green Setting (Gmax), s	31.0	47.0		84.0		25.0
Max Q Clear Time (g_c+l1), s	14.5	2.0		4.4		12.3
Green Ext Time (p_c), s	0.5	5.1		2.3		1.0
Intersection Summary						
HCM 6th Ctrl Delay			18.3			
HCM 6th LOS			B			

Intersection

Int Delay, s/veh 7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↖	↖	↑	↖	↖	↖	↖	↖	↑	↖
Traffic Vol, veh/h	129	24	39	1	6	80	19	131	14	92	315	26
Future Vol, veh/h	129	24	39	1	6	80	19	131	14	92	315	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	0	-	0	200	-	0	0	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	140	26	42	1	7	87	21	142	15	100	342	28

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	737	741	342	782	762	150	370	0	0	157	0	0
Stage 1	542	542	-	192	192	-	-	-	-	-	-	-
Stage 2	195	199	-	590	570	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	334	344	701	312	335	896	1189	-	-	1423	-	-
Stage 1	525	520	-	810	742	-	-	-	-	-	-	-
Stage 2	807	736	-	494	505	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	277	314	701	256	306	896	1189	-	-	1423	-	-
Mov Cap-2 Maneuver	277	314	-	256	306	-	-	-	-	-	-	-
Stage 1	516	484	-	795	729	-	-	-	-	-	-	-
Stage 2	709	723	-	408	470	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	10	0.9	1.6
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1189	-	-	277	314	701	256	306	896	1423	-	-
HCM Lane V/C Ratio	0.017	-	-	0.506	0.083	0.06	0.004	0.021	0.097	0.07	-	-
HCM Control Delay (s)	8.1	-	-	30.6	17.5	10.5	19.1	17	9.4	7.7	-	-
HCM Lane LOS	A	-	-	D	C	B	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.7	0.3	0.2	0	0.1	0.3	0.2	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (vph)	828	21	37	543	198	19
Future Volume (vph)	828	21	37	543	198	19
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases			2			4
Detector Phase	2	2	1	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	23.0	23.0
Total Split (s)	65.0	65.0	15.0	80.0	40.0	40.0
Total Split (%)	54.2%	54.2%	12.5%	66.7%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	3.5	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Min	C-Min	None	C-Min	None	None
Act Effect Green (s)	86.8	86.8	6.8	96.1	12.9	12.9
Actuated g/C Ratio	0.72	0.72	0.06	0.80	0.11	0.11
v/c Ratio	0.35	0.02	0.21	0.21	0.58	0.11
Control Delay	11.5	7.0	77.6	1.6	57.2	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	7.0	77.6	1.6	57.2	19.0
LOS	B	A	E	A	E	B
Approach Delay	11.4			6.4	53.8	
Approach LOS	B			A	D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 15.3

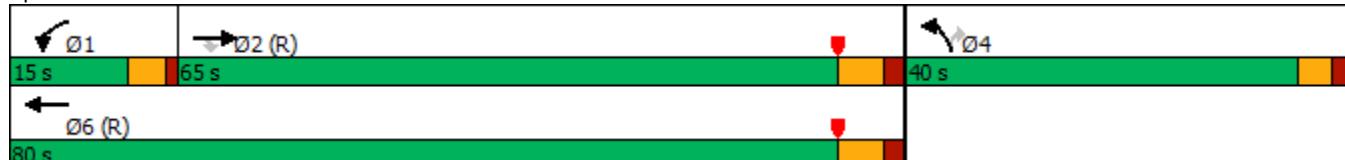
Intersection LOS: B

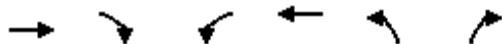
Intersection Capacity Utilization 37.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑↑	↑↑	↑
Traffic Volume (veh/h)	828	21	37	543	198	19
Future Volume (veh/h)	828	21	37	543	198	19
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	900	23	40	590	215	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2689	1199	106	2932	288	
Arrive On Green	0.76	0.76	0.03	0.82	0.08	0.00
Sat Flow, veh/h	3647	1585	3456	3647	3456	1585
Grp Volume(v), veh/h	900	23	40	590	215	0
Grp Sat Flow(s), veh/h/ln	1777	1585	1728	1777	1728	1585
Q Serve(g_s), s	9.9	0.4	1.4	4.2	7.3	0.0
Cycle Q Clear(g_c), s	9.9	0.4	1.4	4.2	7.3	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2689	1199	106	2932	288	
V/C Ratio(X)	0.33	0.02	0.38	0.20	0.75	
Avail Cap(c_a), veh/h	2689	1199	302	2932	1008	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.93	0.93	1.00	0.00
Uniform Delay (d), s/veh	4.8	3.6	57.0	2.2	53.8	0.0
Incr Delay (d2), s/veh	0.3	0.0	2.1	0.1	3.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	4.7	0.2	1.1	1.3	6.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.1	3.6	59.1	2.3	57.6	0.0
LnGrp LOS	A	A	E	A	E	
Approach Vol, veh/h	923			630	215	A
Approach Delay, s/veh	5.1			6.0	57.6	
Approach LOS	A			A	E	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+R _c), s	8.2	96.8		15.0		105.0
Change Period (Y+R _c), s	4.5	6.0		5.0		6.0
Max Green Setting (Gmax), s	10.5	59.0		35.0		74.0
Max Q Clear Time (g_c+l1), s	3.4	11.9		9.3		6.2
Green Ext Time (p_c), s	0.0	6.4		0.7		3.8
Intersection Summary						
HCM 6th Ctrl Delay			11.8			
HCM 6th LOS			B			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	777	19	0	741	0	72
Future Vol, veh/h	777	19	0	741	0	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	845	21	0	805	0	78
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	423
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	579
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	579
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	12.2			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	579	-	-	-		
HCM Lane V/C Ratio	0.135	-	-	-		
HCM Control Delay (s)	12.2	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.5	-	-	-		

APPENDIX G. 2040 TOTAL TRAFFIC LOS

Timings
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBL	SBT	Ø8
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	40	1767	5	5	1641	39	5	15	5	
Future Volume (vph)	40	1767	5	5	1641	39	5	15	5	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+pt	NA	
Protected Phases	5	2		1	6		3	7	4	8
Permitted Phases	2		2	6		6	8	4		
Detector Phase	5	2	2	1	6	6	3	7	4	
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	10.0	31.0	26.0
Total Split (s)	12.0	65.0	65.0	12.0	65.0	65.0	12.0	12.0	31.0	31.0
Total Split (%)	10.0%	54.2%	54.2%	10.0%	54.2%	54.2%	10.0%	10.0%	25.8%	26%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes								
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	99.0	96.6	96.6	95.1	90.0	90.0	5.9	10.3	7.2	
Actuated g/C Ratio	0.82	0.80	0.80	0.79	0.75	0.75	0.05	0.09	0.06	
v/c Ratio	0.25	0.74	0.00	0.03	0.73	0.04	0.03	0.12	0.62	
Control Delay	6.5	10.4	0.0	4.8	9.2	0.2	55.0	48.2	24.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.5	10.4	0.0	4.8	9.2	0.2	55.0	48.2	24.2	
LOS	A	B	A	A	A	A	D	D	C	
Approach Delay		10.3			9.0				26.9	
Approach LOS		B			A				C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 10.4

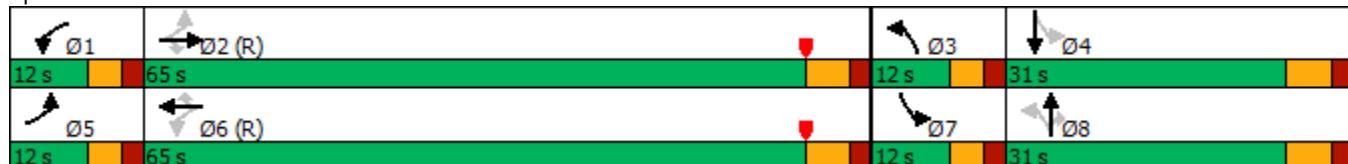
Intersection LOS: B

Intersection Capacity Utilization 66.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary
5: Colfax Ave & Dunkirk St

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	40	1767	5	5	1641	39	5	0	0	15	5	110
Future Volume (veh/h)	40	1767	5	5	1641	39	5	0	0	15	5	110
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	44	1942	0	5	1803	43	5	0	0	16	5	121
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	272	2335		131	2250	1004	186	118		218	6	147
Arrive On Green	0.03	0.70	0.00	0.01	1.00	1.00	0.01	0.00	0.00	0.04	0.10	0.10
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	59	1434
Grp Volume(v), veh/h	44	1942	0	5	1803	43	5	0	0	16	0	126
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1494
Q Serve(g_s), s	0.9	50.2	0.0	0.1	0.0	0.0	0.2	0.0	0.0	1.0	0.0	9.9
Cycle Q Clear(g_c), s	0.9	50.2	0.0	0.1	0.0	0.0	0.2	0.0	0.0	1.0	0.0	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.96
Lane Grp Cap(c), veh/h	272	2335		131	2250	1004	186	118		218	0	153
V/C Ratio(X)	0.16	0.83		0.04	0.80	0.04	0.03	0.00		0.07	0.00	0.83
Avail Cap(c_a), veh/h	316	2335		218	2250	1004	354	365		247	0	311
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.2	12.8	0.0	15.4	0.0	0.0	51.7	0.0	0.0	47.1	0.0	52.8
Incr Delay (d2), s/veh	0.2	3.6	0.0	0.1	3.1	0.1	0.0	0.0	0.0	0.1	0.0	8.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.5	22.7	0.0	0.1	1.8	0.0	0.1	0.0	0.0	0.8	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	16.5	0.0	15.5	3.1	0.1	51.7	0.0	0.0	47.2	0.0	60.9
LnGrp LOS	A	B		B	A	A	D	A		D	A	E
Approach Vol, veh/h		1986	A		1851			5	A		142	
Approach Delay, s/veh		16.2			3.1			51.7			59.4	
Approach LOS		B			A			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.8	90.2	5.8	18.3	8.8	87.1	10.0	14.1				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	59.0	7.0	25.0	7.0	59.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.1	52.2	2.2	11.9	2.9	2.0	3.0	0.0				
Green Ext Time (p_c), s	0.0	6.5	0.0	0.5	0.0	42.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.7									
HCM 6th LOS			B									
Notes												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection

Int Delay, s/veh 12.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	80	1738	1550	41	37	135
Future Vol, veh/h	80	1738	1550	41	37	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	88	1910	1703	45	41	148

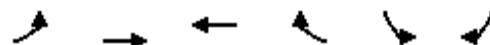
Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1748	0	-
Stage 1	-	-	1703
Stage 2	-	-	940
Critical Hdwy	4.3	-	-
6.45	-	-	7.1
Critical Hdwy Stg 1	-	-	-
6	-	-	-
Critical Hdwy Stg 2	-	-	-
6.2	-	-	-
Follow-up Hdwy	2.3	-	-
3.75	-	-	3.4
Pot Cap-1 Maneuver	322	-	-
120	-	-	-
298	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	322	-	-
~ 18	-	-	287
Mov Cap-2 Maneuver	-	-	-
~ 18	-	-	-
87	-	-	-
298	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	243.3
HCM LOS		F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	322	-	-	-	18	287
HCM Lane V/C Ratio	0.273	-	-	-	2.259	0.517
HCM Control Delay (s)	20.3	-	-	\$ 1020.7	30.2	
HCM Lane LOS	C	-	-	-	F	D
HCM 95th %tile Q(veh)	1.1	-	-	-	5.6	2.8

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	60	1715	1506	41	52	85
Future Volume (vph)	60	1715	1506	41	52	85
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	24.0	23.0	23.0
Total Split (s)	12.0	95.0	83.0	83.0	25.0	25.0
Total Split (%)	10.0%	79.2%	69.2%	69.2%	20.8%	20.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	100.5	99.5	90.3	90.3	9.5	9.5
Actuated g/C Ratio	0.84	0.83	0.75	0.75	0.08	0.08
v/c Ratio	0.28	0.69	0.66	0.04	0.44	0.46
Control Delay	5.2	9.6	7.0	1.3	62.4	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	9.6	7.0	1.3	62.4	17.7
LOS	A	A	A	A	E	B
Approach Delay		9.4	6.9		34.8	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Colfax Ave & Himalaya St



HCM 6th Signalized Intersection Summary
10: Colfax Ave & Himalaya St

Stafford Business Park
07/11/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	60	1715	1506	41	52	85
Future Volume (veh/h)	60	1715	1506	41	52	85
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	65	1864	1637	45	57	92
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	328	2759	2498	1114	132	118
Arrive On Green	0.04	0.83	1.00	1.00	0.08	0.08
Sat Flow, veh/h	1668	3416	3416	1485	1668	1485
Grp Volume(v), veh/h	65	1864	1637	45	57	92
Grp Sat Flow(s), veh/h/ln	1668	1664	1664	1485	1668	1485
Q Serve(g_s), s	1.0	26.1	0.0	0.0	3.9	7.3
Cycle Q Clear(g_c), s	1.0	26.1	0.0	0.0	3.9	7.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	328	2759	2498	1114	132	118
V/C Ratio(X)	0.20	0.68	0.66	0.04	0.43	0.78
Avail Cap(c_a), veh/h	364	2759	2498	1114	278	247
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.4	4.0	0.0	0.0	52.7	54.2
Incr Delay (d2), s/veh	0.3	1.3	1.4	0.1	2.2	10.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.4	8.8	0.8	0.0	3.1	10.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	2.7	5.3	1.4	0.1	54.8	64.8
LnGrp LOS	A	A	A	A	D	E
Approach Vol, veh/h	1929	1682		149		
Approach Delay, s/veh	5.2	1.3		61.0		
Approach LOS	A	A		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	105.5		14.5	9.4	96.0	
Change Period (Y+R _c), s	6.0		5.0	5.0	6.0	
Max Green Setting (Gmax), s	89.0		20.0	7.0	77.0	
Max Q Clear Time (g_c+l1), s	28.1		9.3	3.0	2.0	
Green Ext Time (p_c), s	25.1		0.3	0.0	20.5	
Intersection Summary						
HCM 6th Ctrl Delay		5.7				
HCM 6th LOS		A				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (vph)	952	493	522	797	1157	1308
Future Volume (vph)	952	493	522	797	1157	1308
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases						6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	10.0	10.0	24.0	24.0	24.0
Total Split (s)	45.0	30.0	30.0	75.0	45.0	45.0
Total Split (%)	37.5%	25.0%	25.0%	62.5%	37.5%	37.5%
Yellow Time (s)	4.0	3.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	5.0	5.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag		
Lead-Lag Optimize?	Yes	Yes		Yes		
Recall Mode	None	None	None	C-Min	C-Min	None
Act Effect Green (s)	41.2	70.9	23.7	66.8	38.1	85.3
Actuated g/C Ratio	0.34	0.59	0.20	0.56	0.32	0.71
v/c Ratio	0.61	0.58	0.85	0.31	0.79	1.27
Control Delay	28.7	30.8	49.4	10.3	41.7	148.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	30.8	49.4	10.3	41.7	148.4
LOS	C	C	D	B	D	F
Approach Delay	29.4			25.8	98.3	
Approach LOS	C			C	F	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 88 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 61.0

Intersection LOS: E

Intersection Capacity Utilization 105.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary
12: Picadilly Rd & Colfax Ave

Stafford Business Park
07/11/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (veh/h)	952	493	522	797	1157	1308
Future Volume (veh/h)	952	493	522	797	1157	1308
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	971	503	533	813	1181	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	1426	726	602	2855	1766	
Arrive On Green	0.30	0.30	0.06	0.20	0.37	0.00
Sat Flow, veh/h	4705	1485	3237	4940	4940	1485
Grp Volume(v), veh/h	971	503	533	813	1181	0
Grp Sat Flow(s), veh/h/ln	1568	1485	1618	1594	1594	1485
Q Serve(g_s), s	21.8	31.4	19.6	17.4	24.8	0.0
Cycle Q Clear(g_c), s	21.8	31.4	19.6	17.4	24.8	0.0
Prop In Lane	1.00	1.00	1.00		1.00	
Lane Grp Cap(c), veh/h	1426	726	602	2855	1766	
V/C Ratio(X)	0.68	0.69	0.89	0.28	0.67	
Avail Cap(c_a), veh/h	1529	759	674	2855	1766	
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(l)	0.75	0.75	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.7	23.7	55.0	26.4	31.7	0.0
Incr Delay (d2), s/veh	0.9	2.0	12.5	0.3	2.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	12.2	32.9	14.6	11.9	14.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	37.6	25.6	67.5	26.6	33.7	0.0
LnGrp LOS	D	C	E	C	C	
Approach Vol, veh/h	1474			1346	1181	A
Approach Delay, s/veh	33.5			42.8	33.7	
Approach LOS	C			D	C	
Timer - Assigned Phs	2			4	5	6
Phs Duration (G+Y+R _c), s	77.6			42.4	27.3	50.3
Change Period (Y+R _c), s	6.0			6.0	5.0	6.0
Max Green Setting (Gmax), s	69.0			39.0	25.0	39.0
Max Q Clear Time (g_c+l1), s	19.4			33.4	21.6	26.8
Green Ext Time (p_c), s	6.1			2.9	0.7	6.5
Intersection Summary						
HCM 6th Ctrl Delay			36.7			
HCM 6th LOS			D			
Notes						
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.						

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↑			↑	↑	↑↑↑	↑	↑	↑↑↑	↑
Traffic Vol, veh/h	0	0	48	0	0	61	33	1258	30	35	1538	77
Future Vol, veh/h	0	0	48	0	0	61	33	1258	30	35	1538	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	52	0	0	66	36	1367	33	38	1672	84
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	-	-	836	-	-	684	1756	0	0	1400	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.3	-	-	7.3	5.5	-	-	5.5	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	4	-	-	4	3.2	-	-	3.2	-	-
Pot Cap-1 Maneuver	0	0	254	0	0	321	152	-	-	232	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	254	-	-	321	152	-	-	232	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	22.8	19.1			0.9			0.5				
HCM LOS	C	C			C			C				
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	152	-	-	254	321	232	-	-				
HCM Lane V/C Ratio	0.236	-	-	0.205	0.207	0.164	-	-				
HCM Control Delay (s)	35.9	-	-	22.8	19.1	23.5	-	-				
HCM Lane LOS	E	-	-	C	C	C	-	-				
HCM 95th %tile Q(veh)	0.9	-	-	0.8	0.8	0.6	-	-				

Timings

Stafford Business Park

16: Picadilly Rd & 13th Ave/Realigned Colfax Ave

07/11/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑	↑	↑	↑↑↑	↑	↑↑	↑↑↑	↑
Traffic Volume (vph)	119	54	24	511	219	649	80	553	345	629	707	250
Future Volume (vph)	119	54	24	511	219	649	80	553	345	629	707	250
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4			8	2		2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	23.0	23.0	24.0	24.0	24.0	10.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	15.0	25.0	25.0	26.0	36.0	36.0	10.0	36.0	26.0	33.0	59.0	59.0
Total Split (%)	12.5%	20.8%	20.8%	21.7%	30.0%	30.0%	8.3%	30.0%	21.7%	27.5%	49.2%	49.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Min	None	None	C-Min	C-Min						
Act Effect Green (s)	27.9	16.6	16.6	28.9	30.8	30.8	34.6	27.8	62.7	27.9	49.8	49.8
Actuated g/C Ratio	0.23	0.14	0.14	0.24	0.26	0.26	0.29	0.23	0.52	0.23	0.42	0.42
v/c Ratio	0.49	0.28	0.07	0.72	0.62	0.95	0.45	0.55	0.40	0.93	0.39	0.39
Control Delay	32.2	47.9	0.4	44.7	62.2	54.8	30.5	44.1	4.5	50.0	17.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	19.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	47.9	0.4	44.7	62.2	74.4	30.5	44.1	4.5	50.0	17.6	3.5
LOS	C	D	A	D	E	E	C	D	A	D	B	A
Approach Delay		32.7			61.5				29.0		28.2	
Approach LOS		C			E			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 39.7

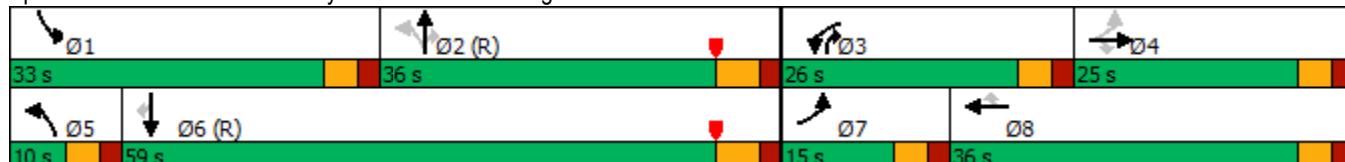
Intersection LOS: D

Intersection Capacity Utilization 70.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 16: Picadilly Rd & 13th Ave/Realigned Colfax Ave



HCM 6th Signalized Intersection Summary
16: Picadilly Rd & 13th Ave/Realigned Colfax Ave

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑	↑	↑	↑↑↑	↑	↑↑	↑↑↑	↑
Traffic Volume (veh/h)	119	54	24	511	219	649	80	553	345	629	707	250
Future Volume (veh/h)	119	54	24	511	219	649	80	553	345	629	707	250
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1752	1530	1752	1530	1752	1752	1752	1752	1530
Adj Flow Rate, veh/h	131	59	26	555	241	0	88	601	375	684	768	275
Peak Hour Factor	0.91	0.91	0.91	0.92	0.91	0.92	0.91	0.92	0.92	0.92	0.92	0.91
Percent Heavy Veh, %	25	25	25	10	25	10	25	10	10	10	10	25
Cap, veh/h	204	136	116	566	277		268	1588	753	741	2483	673
Arrive On Green	0.08	0.09	0.09	0.06	0.06	0.00	0.04	0.33	0.33	0.08	0.17	0.17
Sat Flow, veh/h	1457	1530	1296	3237	1530	1485	1457	4782	1485	3237	4782	1296
Grp Volume(v), veh/h	131	59	26	555	241	0	88	601	375	684	768	275
Grp Sat Flow(s), veh/h/ln	1457	1530	1296	1618	1530	1485	1457	1594	1485	1618	1594	1296
Q Serve(g_s), s	9.8	4.4	2.2	20.6	18.8	0.0	4.8	11.5	20.0	25.2	16.9	22.7
Cycle Q Clear(g_c), s	9.8	4.4	2.2	20.6	18.8	0.0	4.8	11.5	20.0	25.2	16.9	22.7
Prop In Lane	1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	204	136	116	566	277		268	1588	753	741	2483	673
V/C Ratio(X)	0.64	0.43	0.22	0.98	0.87		0.33	0.38	0.50	0.92	0.31	0.41
Avail Cap(c_a), veh/h	204	255	216	566	395		268	1588	753	755	2483	673
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(l)	1.00	1.00	1.00	0.39	0.39	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	51.8	50.8	56.3	55.0	0.0	25.1	30.6	19.5	54.4	30.9	33.3
Incr Delay (d2), s/veh	6.6	2.2	1.0	18.9	6.0	0.0	0.7	0.7	2.4	16.8	0.3	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	7.1	3.2	1.4	13.8	11.1	0.0	3.0	7.8	11.7	18.5	11.6	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	52.1	53.9	51.8	75.2	61.1	0.0	25.8	31.3	21.9	71.2	31.2	35.1
LnGrp LOS	D	D	D	E	E		C	C	C	E	C	D
Approach Vol, veh/h		216			796	A		1064			1727	
Approach Delay, s/veh		52.5			70.9			27.5			47.7	
Approach LOS		D			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	32.5	45.8	26.0	15.7	10.0	68.3	15.0	26.7				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	28.0	30.0	21.0	20.0	5.0	53.0	10.0	31.0				
Max Q Clear Time (g_c+l1), s	27.2	22.0	22.6	6.4	6.8	24.7	11.8	20.8				
Green Ext Time (p_c), s	0.3	3.2	0.0	0.2	0.0	6.5	0.0	0.9				
Intersection Summary												
HCM 6th Ctrl Delay		47.2										
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	Ø4	Ø8
Lane Configurations	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑↑	↑↑	↑	
Traffic Volume (vph)	90	1332	273	333	1407	90	85	58	55	55		
Future Volume (vph)	90	1332	273	333	1407	90	85	58	55	55		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+ov	pm+pt	pm+ov		
Protected Phases	5	2		1	6		3	1	7	5	4	8
Permitted Phases	2		2	6		6	8	8	4	4		
Detector Phase	5	2	2	1	6	6	3	1	7	5		
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	23.0	23.0	9.5	23.0	23.0	9.5	9.5	23.0	9.5	23.0	22.5
Total Split (s)	12.0	55.0	55.0	30.0	73.0	73.0	15.0	30.0	15.0	12.0	20.0	20.0
Total Split (%)	10.0%	45.8%	45.8%	25.0%	60.8%	60.8%	12.5%	25.0%	12.5%	10.0%	17%	17%
Yellow Time (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.5	3.5	4.0	3.0	4.0	3.5
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	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.0	5.0	5.0	4.5	5.0	5.0	4.5	4.5	5.0	4.0		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Act Effect Green (s)	88.6	81.6	81.6	102.3	91.8	91.8	8.7	17.9	8.2	6.0		
Actuated g/C Ratio	0.74	0.68	0.68	0.85	0.76	0.76	0.07	0.15	0.07	0.05		
v/c Ratio	0.20	0.65	0.32	0.60	0.61	0.09	0.40	0.22	0.28	0.33		
Control Delay	3.2	12.9	3.3	10.0	6.7	0.8	58.0	8.3	55.7	4.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	3.2	12.9	3.3	10.0	6.7	0.8	58.0	8.3	55.7	4.6		
LOS	A	B	A	A	A	A	E	A	E	A		
Approach Delay		10.8				7.0						
Approach LOS		B				A						

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 104 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.6

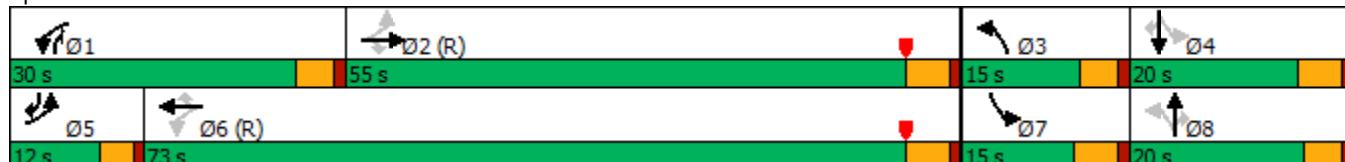
Intersection LOS: B

Intersection Capacity Utilization 67.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave



HCM 6th Signalized Intersection Summary
18: Libson St & Colfax Ave

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (veh/h)	90	1332	273	333	1407	90	85	0	58	55	0	55
Future Volume (veh/h)	90	1332	273	333	1407	90	85	0	58	55	0	55
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1752	1752	1530	1530	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	98	1448	300	366	1529	98	93	0	0	60	0	0
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92	0.91	0.91	0.91	0.92	0.91	0.92
Percent Heavy Veh, %	10	10	25	25	10	10	10	10	10	10	10	10
Cap, veh/h	606	2618	1020	608	2669	1190	261	1		254	1	
Arrive On Green	0.08	1.00	1.00	0.05	0.80	0.80	0.04	0.00	0.00	0.04	0.00	0.00
Sat Flow, veh/h	3237	3328	1296	2826	3328	1485	3237	1752	1485	3237	1752	1485
Grp Volume(v), veh/h	98	1448	300	366	1529	98	93	0	0	60	0	0
Grp Sat Flow(s), veh/h/ln	1618	1664	1296	1413	1664	1485	1618	1752	1485	1618	1752	1485
Q Serve(g_s), s	0.6	0.0	0.0	2.9	20.2	1.7	3.4	0.0	0.0	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0	2.9	20.2	1.7	3.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	606	2618	1020	608	2669	1190	261	1		254	1	
V/C Ratio(X)	0.16	0.55	0.29	0.60	0.57	0.08	0.36	0.00		0.24	0.00	
Avail Cap(c_a), veh/h	692	2618	1020	1064	2669	1190	403	226		390	219	
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.4	0.0	0.0	1.8	4.4	2.5	56.4	0.0	0.0	56.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.8	0.7	0.1	0.1	0.0	0.8	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	0.2	0.6	0.4	0.7	5.4	0.7	2.5	0.0	0.0	1.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	3.5	0.8	0.7	1.9	4.4	2.5	57.2	0.0	0.0	56.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	E	A		E	A	
Approach Vol, veh/h	1846				1993			93	A		60	A
Approach Delay, s/veh	1.0				3.9			57.2			56.5	
Approach LOS	A				A			E			E	

Intersection Summary

HCM 6th Ctrl Delay	4.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	1676	91	0	1547	0	19
Future Vol, veh/h	1676	91	0	1547	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1822	99	0	1682	0	21
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	911
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.4
Pot Cap-1 Maneuver	-	-	0	-	0	262
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	262
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	19.9			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	262	-	-	-		
HCM Lane V/C Ratio	0.079	-	-	-		
HCM Control Delay (s)	19.9	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile Q(veh)	0.3	-	-	-		

Timings
24: Realigned Colfax Ave & Site Driveway #3

Stafford Business Park

07/11/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	109	904	15	4	1321	30	6	0	20	0
Future Volume (vph)	109	904	15	4	1321	30	6	0	20	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases			4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	10.0	23.0	10.0	23.0
Total Split (s)	15.0	71.0	71.0	12.0	68.0	68.0	12.0	25.0	12.0	25.0
Total Split (%)	12.5%	59.2%	59.2%	10.0%	56.7%	56.7%	10.0%	20.8%	10.0%	20.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	Max	None	Max
Act Effect Green (s)	75.3	72.3	72.3	67.4	60.8	60.8	31.2	27.4	33.5	32.1
Actuated g/C Ratio	0.63	0.60	0.60	0.56	0.51	0.51	0.26	0.23	0.28	0.27
v/c Ratio	0.65	0.50	0.02	0.01	0.86	0.04	0.02	0.01	0.06	0.10
Control Delay	48.4	4.6	0.0	7.8	32.5	0.1	32.8	0.0	33.2	0.4
Queue Delay	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	4.9	0.0	7.8	32.9	0.1	32.8	0.0	33.2	0.4
LOS	D	A	A	A	C	A	C	A	C	A
Approach Delay		9.4			32.1			23.0		9.6
Approach LOS		A			C			C		A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 10 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 22.0

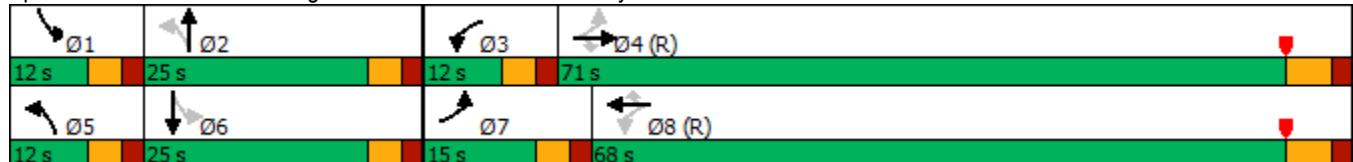
Intersection LOS: C

Intersection Capacity Utilization 63.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 24: Realigned Colfax Ave & Site Driveway #3



HCM 6th Signalized Intersection Summary
24: Realigned Colfax Ave & Site Driveway #3

Stafford Business Park
07/11/2019

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	
Traffic Volume (veh/h)	109	904	15	4	1321	30	6	0	3	20	0	52
Future Volume (veh/h)	109	904	15	4	1321	30	6	0	3	20	0	52
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	118	983	16	4	1436	33	7	0	3	22	0	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	229	2102	937	382	1972	880	260	0	247	315	0	267
Arrive On Green	0.09	1.00	1.00	0.01	0.59	0.59	0.01	0.00	0.17	0.02	0.00	0.18
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	118	983	16	4	1436	33	7	0	3	22	0	57
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1668	0	1485	1668	0	1485
Q Serve(g_s), s	3.3	0.0	0.0	0.1	37.1	1.1	0.4	0.0	0.2	1.3	0.0	3.9
Cycle Q Clear(g_c), s	3.3	0.0	0.0	0.1	37.1	1.1	0.4	0.0	0.2	1.3	0.0	3.9
Prop In Lane	1.00			1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	2102	937	382	1972	880	260	0	247	315	0	267
V/C Ratio(X)	0.51	0.47	0.02	0.01	0.73	0.04	0.03	0.00	0.01	0.07	0.00	0.21
Avail Cap(c_a), veh/h	295	2102	937	470	1972	880	343	0	247	376	0	267
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.63	0.63	0.63	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	0.0	9.7	17.5	10.2	41.0	0.0	41.8	40.1	0.0	42.0
Incr Delay (d2), s/veh	1.1	0.5	0.0	0.0	2.4	0.1	0.0	0.0	0.1	0.1	0.0	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	2.5	0.2	0.0	0.1	20.3	0.7	0.3	0.0	0.1	1.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.6	0.5	0.0	9.7	19.9	10.3	41.0	0.0	41.8	40.2	0.0	43.8
LnGrp LOS	B	A	A	A	B	B	D	A	D	D	A	D
Approach Vol, veh/h	1117				1473				10			79
Approach Delay, s/veh	2.3				19.7				41.3			42.8
Approach LOS	A				B				D			D
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	25.0	5.6	81.8	6.0	26.6	10.3	77.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	6.0	5.0	5.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	20.0	7.0	65.0	7.0	20.0	10.0	62.0				
Max Q Clear Time (g_c+l1), s	3.3	2.2	2.1	2.0	2.4	5.9	5.3	39.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	9.5	0.0	0.2	0.1	12.3				

Intersection Summary

HCM 6th Ctrl Delay 13.2

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection

Intersection Delay, s/veh 15.3

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	31	1	110	129	73	4	67	53	206	239	30
Future Vol, veh/h	7	31	1	110	129	73	4	67	53	206	239	30
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	8	34	1	121	142	80	4	74	58	226	263	33
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0
Approach												
Opposing Approach	WB			WB			NB			SB		
Opposing Lanes	1			1			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			1			1		
HCM Control Delay	10.6			17.3			11.2			15.4		
HCM LOS	B			C			B			C		

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	3%	18%	35%	100%	0%
Vol Thru, %	54%	79%	41%	0%	89%
Vol Right, %	43%	3%	23%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	124	39	312	206	269
LT Vol	4	7	110	206	0
Through Vol	67	31	129	0	239
RT Vol	53	1	73	0	30
Lane Flow Rate	136	43	343	226	296
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.237	0.082	0.58	0.435	0.52
Departure Headway (Hd)	6.249	6.878	6.091	6.913	6.327
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	574	519	593	521	571
Service Time	4.303	4.947	4.136	4.655	4.069
HCM Lane V/C Ratio	0.237	0.083	0.578	0.434	0.518
HCM Control Delay	11.2	10.6	17.3	14.9	15.8
HCM Lane LOS	B	B	C	B	C
HCM 95th-tile Q	0.9	0.3	3.7	2.2	3

HCS7 Roundabouts Report

General Information				Site Information															
Analyst	PJD				Intersection				13th Ave/Libson St										
Agency or Co.	FHU				E/W Street Name				13th Ave										
Date Performed	1/9/2019				N/S Street Name				Libson St										
Analysis Year	2040				Analysis Time Period (hrs)				0.25										
Time Analyzed	AM Peak Hour LT Total				Peak Hour Factor				0.92										
Project Description					Jurisdiction				City of Aurora										
Volume Adjustments and Site Characteristics																			
Approach	EB				WB				NB				SB						
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R			
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0			
Lane Assignment			LTR				LTR				LTR					LTR			
Volume (V), veh/h	0	7	31	1	0	110	129	73	0	4	67	56	0	206	239	30			
Percent Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25			
Flow Rate (v_{pce}), pc/h	0	10	42	1	0	149	175	99	0	5	91	76	0	280	325	41			
Right-Turn Bypass	None			None			None			None			None			None			
Conflicting Lanes	1			1			1			1			1			1			
Pedestrians Crossing, p/h	0			0			0			0			0			0			
Critical and Follow-Up Headway Adjustment																			
Approach	EB				WB				NB				SB						
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Left	Right	Bypass	Left	Right	Bypass	Left	Right			
Critical Headway (s)	4.9763			4.9763			4.9763			4.9763			4.9763			4.9763			
Follow-Up Headway (s)	2.6087			2.6087			2.6087			2.6087			2.6087			2.6087			
Flow Computations, Capacity and v/c Ratios																			
Approach	EB				WB				NB				SB						
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Left	Right	Bypass	Left	Right	Bypass	Left	Right			
Entry Flow (v_e), pc/h	53.00			423.00			172.00			646.00									
Entry Volume veh/h	42.40			338.40			137.60			516.80									
Circulating Flow (v_c), pc/h	754			106			332			329									
Exiting Flow (v_{ex}), pc/h	398			221			200			475									
Capacity (c_{pce}), pc/h	639.55			1238.58			983.58			986.60									
Capacity (c), veh/h	511.64			990.86			786.87			789.28									
v/c Ratio (x)	0.08			0.34			0.17			0.65									
Delay and Level of Service																			
Approach	EB				WB				NB				SB						
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Left	Right	Bypass	Left	Right	Bypass	Left	Right			
Lane Control Delay (d), s/veh	8.1			7.2			6.4			16.1									
Lane LOS	A			A			A			C									
95% Queue, veh	0.3			1.5			0.6			5.0									
Approach Delay, s/veh	8.1			7.2			6.4			16.1									
Approach LOS	A			A			A			C									
Intersection Delay, s/veh LOS	11.6						B												

Intersection

Int Delay, s/veh 48.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations 

Traffic Vol, veh/h 144 1120 2263 72 17 34

Future Vol, veh/h 144 1120 2263 72 17 34

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 150 - - 150 150 0

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 25 10 10 25 25 25

Mvmt Flow 157 1217 2460 78 18 37

Major/Minor	Major1	Major2	Minor2
-------------	--------	--------	--------

Conflicting Flow All 2538 0 - 0 3261 1230

Stage 1 - - - - 2460 -

Stage 2 - - - - 801 -

Critical Hdwy 5.8 - - - 6.2 7.6

Critical Hdwy Stg 1 - - - - 7.1 -

Critical Hdwy Stg 2 - - - - 6.5 -

Follow-up Hdwy 3.35 - - - 4.05 4.15

Pot Cap-1 Maneuver ~ 47 - - - ~ 12 121

Stage 1 - - - - 21 -

Stage 2 - - - - 318 -

Platoon blocked, % - - -

Mov Cap-1 Maneuver ~ 47 - - - 0 121

Mov Cap-2 Maneuver - - - - 0 -

Stage 1 - - - - 0 -

Stage 2 - - - - 318 -

Approach	EB	WB	SB
----------	----	----	----

HCM Control Delay, s 140.1 0

HCM LOS -

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
-----------------------	-----	-----	-----	-----	-------	-------

Capacity (veh/h) ~ 47 - - - - 121

HCM Lane V/C Ratio 3.33 - - - - 0.305

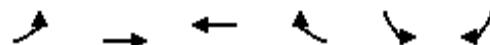
HCM Control Delay (s) \$ 1230.1 - - - - 47.3

HCM Lane LOS F - - - - E

HCM 95th %tile Q(veh) 17.1 - - - - 1.2

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑↑↑	↑	↑	↑
Traffic Volume (vph)	143	1120	2263	71	19	33
Future Volume (vph)	143	1120	2263	71	19	33
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	65.0	50.0	50.0	25.0	25.0
Total Split (%)	16.7%	72.2%	55.6%	55.6%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Max	Max
Act Effect Green (s)	60.1	60.1	45.5	45.5	20.5	20.5
Actuated g/C Ratio	0.67	0.67	0.51	0.51	0.23	0.23
v/c Ratio	0.67	0.38	1.03	0.11	0.06	0.11
Control Delay	31.3	7.0	49.1	6.0	28.0	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	7.0	49.1	6.0	28.0	10.6
LOS	C	A	D	A	C	B
Approach Delay		9.7	47.8		17.0	
Approach LOS		A	D		B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 89.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 34.2

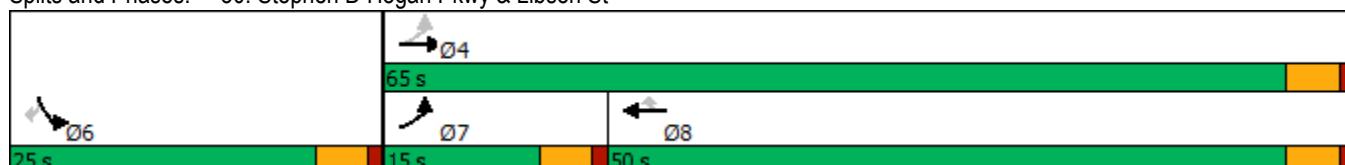
Intersection LOS: C

Intersection Capacity Utilization 67.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 30: Stephen D Hogan Pkwy & Libson St



HCM 6th Signalized Intersection Summary
30: Stephen D Hogan Pkwy & Libson St

Stafford Business Park
01/08/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↑	↑↑↑	↑↑↑	↑	↑	↑	
Traffic Volume (veh/h)	143	1120	2263	71	19	33	
Future Volume (veh/h)	143	1120	2263	71	19	33	
Initial Q (Q _b), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1530	1752	1752	1530	1530	1530	
Adj Flow Rate, veh/h	155	1217	2460	77	21	36	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	25	10	10	25	25	25	
Cap, veh/h	188	3128	2549	691	350	312	
Arrive On Green	0.07	0.65	0.53	0.53	0.24	0.24	
Sat Flow, veh/h	1457	4940	4940	1296	1457	1296	
Grp Volume(v), veh/h	155	1217	2460	77	21	36	
Grp Sat Flow(s), veh/h/ln	1457	1594	1594	1296	1457	1296	
Q Serve(g_s), s	3.8	10.1	42.2	2.5	0.9	1.9	
Cycle Q Clear(g_c), s	3.8	10.1	42.2	2.5	0.9	1.9	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	188	3128	2549	691	350	312	
V/C Ratio(X)	0.83	0.39	0.96	0.11	0.06	0.12	
Avail Cap(c_a), veh/h	268	3393	2552	692	350	312	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	19.9	6.8	19.1	9.9	25.0	25.3	
Incr Delay (d2), s/veh	13.2	0.1	10.9	0.1	0.3	0.8	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%), veh/ln	4.1	5.2	23.0	1.2	0.6	2.8	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d), s/veh	33.0	6.9	30.0	10.0	25.3	26.1	
LnGrp LOS	C	A	C	A	C	C	
Approach Vol, veh/h	1372	2537		57			
Approach Delay, s/veh	9.9	29.4		25.8			
Approach LOS	A	C		C			
Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+R _c), s			60.3		25.0	10.3	50.0
Change Period (Y+R _c), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			60.5		20.5	10.5	45.5
Max Q Clear Time (g_c+l1), s			12.1		3.9	5.8	44.2
Green Ext Time (p_c), s			12.3		0.1	0.2	1.3
Intersection Summary							
HCM 6th Ctrl Delay			22.6				
HCM 6th LOS			C				

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑	
Traffic Vol, veh/h	0	6	972	6	0	1242
Future Vol, veh/h	0	6	972	6	0	1242
Conflicting Peds, #/hr	0	0	0	0	0	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	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	0	7	1057	7	0	1350
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	532	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.3	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	4	-	-	-	-
Pot Cap-1 Maneuver	0	405	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	405	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	405	-		
HCM Lane V/C Ratio	-	-	0.016	-		
HCM Control Delay (s)	-	-	14	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0	-		

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	106	30	77	398	11	7	5	18	5	5	6
Future Vol, veh/h	20	106	30	77	398	11	7	5	18	5	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	25	10	10	10	10	25	10	25	10	25	25	25
Mvmt Flow	22	116	33	85	437	12	8	5	20	5	5	7

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	449	0	0	149	0	0	796	796	133	802	806	443
Stage 1	-	-	-	-	-	-	177	177	-	613	613	-
Stage 2	-	-	-	-	-	-	619	619	-	189	193	-
Critical Hdwy	4.35	-	-	4.2	-	-	7.2	6.75	6.3	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.29	-	-	3.59	4.225	3.39	3.725	4.225	3.525
Pot Cap-1 Maneuver	1000	-	-	1385	-	-	296	295	895	277	291	569
Stage 1	-	-	-	-	-	-	806	711	-	443	449	-
Stage 2	-	-	-	-	-	-	463	446	-	762	700	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1000	-	-	1385	-	-	265	264	895	245	261	569
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	264	-	245	261	-
Stage 1	-	-	-	-	-	-	787	694	-	432	412	-
Stage 2	-	-	-	-	-	-	415	409	-	722	683	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	1.1	1.2		13.5		16.9		
HCM LOS				B		C		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	458	1000	-	-	1385	-	-	319
HCM Lane V/C Ratio	0.072	0.022	-	-	0.061	-	-	0.055
HCM Control Delay (s)	13.5	8.7	0	-	7.8	0	-	16.9
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.2	-	-	0.2

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	5	14	13	5	6	50	106	54	20	300	25
Future Vol, veh/h	11	5	14	13	5	6	50	106	54	20	300	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	10	10	25	25	10	10	25	25	25	10	25	10
Mvmt Flow	12	5	15	14	5	7	55	116	59	22	330	27

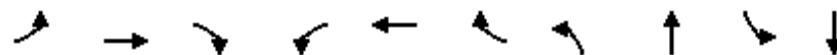
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	650	673	344	654	657	146	357	0	0	175	0	0
Stage 1	388	388	-	256	256	-	-	-	-	-	-	-
Stage 2	262	285	-	398	401	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.45	7.35	6.6	6.3	4.35	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.35	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.35	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.525	3.725	4.09	3.39	2.425	-	-	2.29	-	-
Pot Cap-1 Maneuver	371	367	649	350	375	880	1085	-	-	1354	-	-
Stage 1	620	595	-	700	681	-	-	-	-	-	-	-
Stage 2	726	661	-	584	587	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	343	339	649	318	347	880	1085	-	-	1354	-	-
Mov Cap-2 Maneuver	343	339	-	318	347	-	-	-	-	-	-	-
Stage 1	585	583	-	660	642	-	-	-	-	-	-	-
Stage 2	674	623	-	553	575	-	-	-	-	-	-	-

Approach	EB	WB			NB		SB	
HCM Control Delay, s	13.9	15			2		0.4	
HCM LOS	B	C						
<hr/>								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1085	-	-	439	386	1354	-	-
HCM Lane V/C Ratio	0.051	-	-	0.075	0.068	0.016	-	-
HCM Control Delay (s)	8.5	0	-	13.9	15	7.7	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Timings

5: Colfax Ave & Dunkirk St

07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑
Traffic Volume (vph)	105	1832	40	15	1997	48	15	5	59	5
Future Volume (vph)	105	1832	40	15	1997	48	15	5	59	5
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases			2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	13.0	29.0	29.0	10.0	29.0	29.0	10.0	26.0	10.0	31.0
Total Split (s)	12.0	65.0	65.0	12.0	65.0	65.0	12.0	31.0	12.0	31.0
Total Split (%)	10.0%	54.2%	54.2%	10.0%	54.2%	54.2%	10.0%	25.8%	10.0%	25.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	97.4	92.2	92.2	89.2	82.9	82.9	8.0	6.2	11.7	7.1
Actuated g/C Ratio	0.81	0.77	0.77	0.74	0.69	0.69	0.07	0.05	0.10	0.06
v/c Ratio	0.65	0.80	0.04	0.12	0.97	0.05	0.07	0.06	0.45	0.53
Control Delay	37.4	15.0	0.1	1.9	16.0	0.0	48.2	53.8	57.5	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	15.0	0.1	1.9	16.0	0.0	48.2	53.8	57.5	24.6
LOS	D	B	A	A	B	A	D	D	E	C
Approach Delay		15.9			15.5			49.5		38.7
Approach LOS		B			B			D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 53 (44%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 16.6

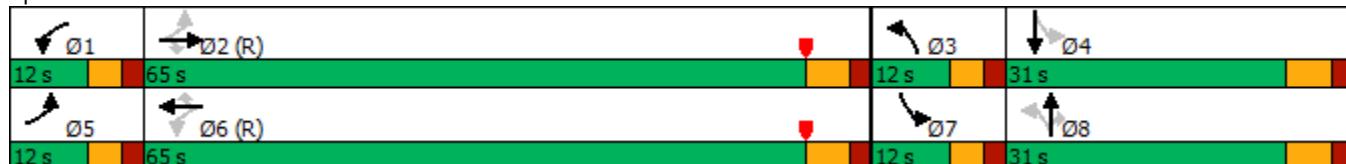
Intersection LOS: B

Intersection Capacity Utilization 85.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Colfax Ave & Dunkirk St



HCM 6th Signalized Intersection Summary

5: Colfax Ave & Dunkirk St

07/11/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	105	1832	40	15	1997	48	15	5	0	59	5	75
Future Volume (veh/h)	105	1832	40	15	1997	48	15	5	0	59	5	75
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No			No		No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	115	2013	0	16	2195	53	16	5	0	65	5	82
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	158	2350		140	2272	1013	221	71		198	7	107
Arrive On Green	0.04	0.71	0.00	0.02	0.91	0.91	0.02	0.04	0.00	0.05	0.08	0.08
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	86	1412
Grp Volume(v), veh/h	115	2013	0	16	2195	53	16	5	0	65	0	87
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	0	1498
Q Serve(g_s), s	2.5	54.0	0.0	0.3	59.4	0.4	0.6	0.3	0.0	4.4	0.0	6.8
Cycle Q Clear(g_c), s	2.5	54.0	0.0	0.3	59.4	0.4	0.6	0.3	0.0	4.4	0.0	6.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	158	2350		140	2272	1013	221	71		198	0	114
V/C Ratio(X)	0.73	0.86		0.11	0.97	0.05	0.07	0.07		0.33	0.00	0.76
Avail Cap(c_a), veh/h	187	2350		208	2272	1013	354	365		207	0	312
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.0	13.1	0.0	17.2	4.5	1.8	53.6	55.4	0.0	50.1	0.0	54.4
Incr Delay (d2), s/veh	10.1	4.3	0.0	0.3	12.5	0.1	0.1	0.3	0.0	0.7	0.0	7.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	4.8	24.1	0.0	0.3	10.9	0.3	0.4	0.3	0.0	3.4	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.0	17.4	0.0	17.5	16.9	1.9	53.7	55.7	0.0	50.8	0.0	62.0
LnGrp LOS	D	B		B	B	A	D	E		D	A	E
Approach Vol, veh/h	2128		A		2264			21	A		152	
Approach Delay, s/veh	18.6				16.6			54.1			57.2	
Approach LOS		B			B			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.1	90.7	7.1	15.1	9.9	87.9	11.3	10.9				
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0				
Max Green Setting (Gmax), s	7.0	59.0	7.0	25.0	7.0	59.0	7.0	25.0				
Max Q Clear Time (g_c+l1), s	2.3	56.0	2.6	8.8	4.5	61.4	6.4	2.3				
Green Ext Time (p_c), s	0.0	2.9	0.0	0.3	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 19.1

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Int Delay, s/veh 222.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑	↑
Traffic Vol, veh/h	145	1745	1930	54	68	130
Future Vol, veh/h	145	1745	1930	54	68	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	350	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	159	1918	2121	59	75	143

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	2180	0	-
Stage 1	-	-	-
Stage 2	-	-	1085
Critical Hdwy	4.3	-	-
Critical Hdwy Stg 1	-	-	6
Critical Hdwy Stg 2	-	-	6.2
Follow-up Hdwy	2.3	-	-
Pot Cap-1 Maneuver	215	-	-
Stage 1	-	-	~69
Stage 2	-	-	247
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	215	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	~18
Stage 2	-	-	247

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	\$ 4532.7
HCM LOS		F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	215	-	-	-	3	207
HCM Lane V/C Ratio	0.741	-	-	-	24.908	0.69
HCM Control Delay (s)	58.2	-	-	\$ 13095	54	
HCM Lane LOS	F	-	-	-	F	F
HCM 95th %tile Q(veh)	5	-	-	-	11.4	4.3

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Timings

10: Colfax Ave & Himalaya St

07/11/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	200	1613	1799	119	123	185
Future Volume (vph)	200	1613	1799	119	123	185
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	24.0	23.0	23.0
Total Split (s)	21.0	95.0	74.0	74.0	25.0	25.0
Total Split (%)	17.5%	79.2%	61.7%	61.7%	20.8%	20.8%
Yellow Time (s)	3.0	4.0	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Min	C-Min	C-Min	None	None
Act Effect Green (s)	95.1	94.1	74.3	74.3	14.9	14.9
Actuated g/C Ratio	0.79	0.78	0.62	0.62	0.12	0.12
v/c Ratio	0.83	0.68	0.96	0.14	0.66	0.56
Control Delay	49.0	10.5	25.2	4.1	65.2	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	10.5	25.2	4.1	65.2	12.6
LOS	D	B	C	A	E	B
Approach Delay		14.8	23.9		33.6	
Approach LOS		B	C		C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 20.5

Intersection LOS: C

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

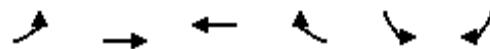
Splits and Phases: 10: Colfax Ave & Himalaya St



HCM 6th Signalized Intersection Summary

10: Colfax Ave & Himalaya St

07/11/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (veh/h)	200	1613	1799	119	123	185
Future Volume (veh/h)	200	1613	1799	119	123	185
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	217	1753	1955	129	134	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	283	2519	2177	971	253	225
Arrive On Green	0.08	1.00	1.00	1.00	0.15	0.15
Sat Flow, veh/h	1668	3416	3416	1485	1668	1485
Grp Volume(v), veh/h	217	1753	1955	129	134	201
Grp Sat Flow(s), veh/h/ln	1668	1664	1664	1485	1668	1485
Q Serve(g_s), s	5.0	0.0	0.0	0.0	8.9	15.9
Cycle Q Clear(g_c), s	5.0	0.0	0.0	0.0	8.9	15.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	283	2519	2177	971	253	225
V/C Ratio(X)	0.77	0.70	0.90	0.13	0.53	0.89
Avail Cap(c_a), veh/h	404	2519	2177	971	278	247
HCM Platoon Ratio	1.33	1.33	2.00	2.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	0.0	0.0	0.0	47.0	49.9
Incr Delay (d2), s/veh	5.4	1.6	6.4	0.3	1.7	29.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	3.1	1.0	3.5	0.1	6.9	20.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.7	1.6	6.4	0.3	48.7	79.2
LnGrp LOS	B	A	A	A	D	E
Approach Vol, veh/h	1970	2084		335		
Approach Delay, s/veh	3.1	6.0		67.0		
Approach LOS	A	A		E		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	96.8		23.2	12.3	84.5	
Change Period (Y+R _c), s	6.0		5.0	5.0	6.0	
Max Green Setting (Gmax), s	89.0		20.0	16.0	68.0	
Max Q Clear Time (g_c+l1), s	2.0		17.9	7.0	2.0	
Green Ext Time (p_c), s	23.9		0.3	0.4	29.8	
Intersection Summary						
HCM 6th Ctrl Delay		9.3				
HCM 6th LOS		A				

Timings

12: Picadilly Rd & Colfax Ave

07/11/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (vph)	1445	542	658	950	1029	960
Future Volume (vph)	1445	542	658	950	1029	960
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases						6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	10.0	10.0	24.0	24.0	24.0
Total Split (s)	60.0	32.0	32.0	60.0	28.0	60.0
Total Split (%)	50.0%	26.7%	26.7%	50.0%	23.3%	50.0%
Yellow Time (s)	4.0	3.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	5.0	5.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag		
Lead-Lag Optimize?	Yes	Yes		Yes		
Recall Mode	None	None	None	C-Min	C-Min	None
Act Effect Green (s)	54.0	86.9	26.9	54.0	22.1	82.1
Actuated g/C Ratio	0.45	0.72	0.22	0.45	0.18	0.68
v/c Ratio	0.71	0.52	0.94	0.46	1.21	0.97
Control Delay	21.0	4.1	58.6	24.3	147.6	40.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	4.1	58.6	24.3	147.6	40.8
LOS	C	A	E	C	F	D
Approach Delay	16.4			38.4	96.0	
Approach LOS	B			D	F	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 66 (55%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 51.1

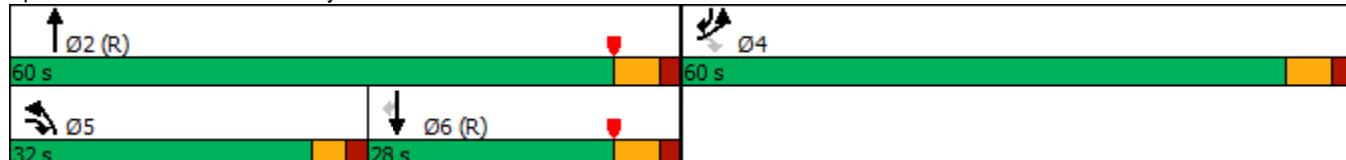
Intersection LOS: D

Intersection Capacity Utilization 87.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: Picadilly Rd & Colfax Ave



HCM 6th Signalized Intersection Summary

12: Picadilly Rd & Colfax Ave

07/11/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	1445	542	658	950	1029	960
Future Volume (veh/h)	1445	542	658	950	1029	960
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	1474	553	671	969	1050	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	1753	885	723	2522	1254	
Arrive On Green	0.37	0.37	0.07	0.17	0.26	0.00
Sat Flow, veh/h	4705	1485	3237	4940	4940	1485
Grp Volume(v), veh/h	1474	553	671	969	1050	0
Grp Sat Flow(s), veh/h/ln	1568	1485	1618	1594	1594	1485
Q Serve(g_s), s	34.3	28.8	24.7	21.5	24.9	0.0
Cycle Q Clear(g_c), s	34.3	28.8	24.7	21.5	24.9	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1753	885	723	2522	1254	
V/C Ratio(X)	0.84	0.62	0.93	0.38	0.84	
Avail Cap(c_a), veh/h	2117	1000	728	2522	1254	
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(l)	0.44	0.44	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	15.6	54.6	32.3	41.9	0.0
Incr Delay (d2), s/veh	1.2	0.4	18.0	0.4	6.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	16.5	31.5	18.3	14.2	15.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	35.6	16.0	72.6	32.8	48.6	0.0
LnGrp LOS	D	B	E	C	D	
Approach Vol, veh/h	2027			1640	1050	A
Approach Delay, s/veh	30.3			49.1	48.6	
Approach LOS	C			D	D	
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+R _c), s	69.3		50.7	31.8	37.5	
Change Period (Y+R _c), s	6.0		6.0	5.0	6.0	
Max Green Setting (Gmax), s	54.0		54.0	27.0	22.0	
Max Q Clear Time (g_c+l1), s	23.5		36.3	26.7	26.9	
Green Ext Time (p_c), s	7.1		8.4	0.1	0.0	
Intersection Summary						
HCM 6th Ctrl Delay		40.9				
HCM 6th LOS		D				
Notes						
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.						

Intersection

Int Delay, s/veh 3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↑			↑	↑	↑↑↑	↑	↑	↑↑↑	↑
Traffic Vol, veh/h	0	0	67	0	0	184	43	1424	62	59	1419	93
Future Vol, veh/h	0	0	67	0	0	184	43	1424	62	59	1419	93
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	0	-	-	0	150	-	150	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	73	0	0	200	47	1548	67	64	1542	101

Major/Minor	Minor2	Minor1		Major1		Major2	
Conflicting Flow All	-	-	771	-	-	774	1643
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.3	-	-	7.3	5.5
Critical Hdwy Stg 1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	4	-	-	4	3.2
Pot Cap-1 Maneuver	0	0	281	0	0	279	174
Stage 1	0	0	-	0	0	-	-
Stage 2	0	0	-	0	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	281	-	-	279	174
Mov Cap-2 Maneuver	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	22.2	44.9		0.9		1.3		
HCM LOS	C	E						
<hr/>								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	174	-	-	281	279	180	-	-
HCM Lane V/C Ratio	0.269	-	-	0.259	0.717	0.356	-	-
HCM Control Delay (s)	33.1	-	-	22.2	44.9	35.7	-	-
HCM Lane LOS	D	-	-	C	E	E	-	-
HCM 95th %tile Q(veh)	1	-	-	1	5	1.5	-	-

Timings

16: Picadilly Rd & 13th Ave/Realigned Colfax Ave

07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑	↑	↑	↑↑↑	↑	↑↑	↑↑↑	↑
Traffic Volume (vph)	325	215	80	541	62	600	30	604	430	770	634	82
Future Volume (vph)	325	215	80	541	62	600	30	604	430	770	634	82
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	1	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	23.0	23.0	24.0	24.0	23.0	10.0	24.0	24.0	23.0	24.0	24.0
Total Split (s)	22.0	25.0	25.0	31.0	34.0	31.0	12.0	33.0	31.0	31.0	52.0	52.0
Total Split (%)	18.3%	20.8%	20.8%	25.8%	28.3%	25.8%	10.0%	27.5%	25.8%	25.8%	43.3%	43.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Min	None	None	C-Min	C-Min						
Act Effect Green (s)	42.6	20.9	20.9	26.4	24.0	56.4	29.6	22.0	54.5	57.7	49.5	49.5
Actuated g/C Ratio	0.36	0.17	0.17	0.22	0.20	0.47	0.25	0.18	0.45	0.48	0.41	0.41
v/c Ratio	0.78	0.89	0.22	0.84	0.22	0.89	0.17	0.76	0.64	0.91	0.35	0.14
Control Delay	41.7	82.6	1.3	60.0	64.6	36.0	21.8	52.2	22.7	22.0	14.8	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	82.6	1.3	60.0	64.6	36.0	21.8	52.2	22.7	22.0	14.8	1.0
LOS	D	F	A	E	E	D	C	D	C	C	B	A
Approach Delay		50.7			48.2			39.4			17.8	
Approach LOS		D			D			D			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 36.1

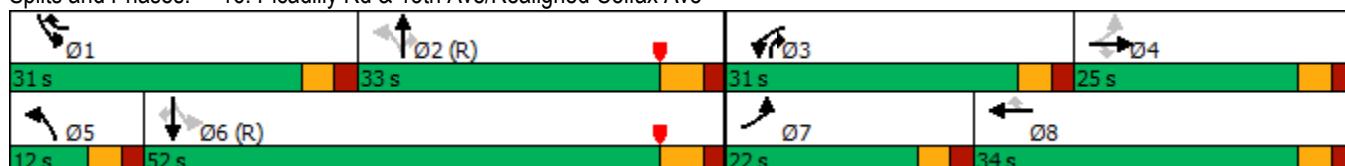
Intersection LOS: D

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 16: Picadilly Rd & 13th Ave/Realigned Colfax Ave



HCM 6th Signalized Intersection Summary
16: Picadilly Rd & 13th Ave/Realigned Colfax Ave

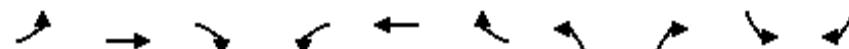
07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑	↑	↑	↑↑↑	↑	↑↑	↑↑↑	↑
Traffic Volume (veh/h)	325	215	80	541	62	600	30	604	430	770	634	82
Future Volume (veh/h)	325	215	80	541	62	600	30	604	430	770	634	82
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00			1.00	1.00		1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1752	1530	1752	1530	1752	1752	1752	1752	1530
Adj Flow Rate, veh/h	357	236	88	588	68	0	33	657	467	837	689	90
Peak Hour Factor	0.91	0.91	0.91	0.92	0.91	0.92	0.91	0.92	0.92	0.92	0.92	0.91
Percent Heavy Veh, %	25	25	25	10	25	10	25	10	10	10	10	25
Cap, veh/h	448	255	216	654	347		242	1197	672	906	2049	555
Arrive On Green	0.14	0.17	0.17	0.07	0.07	0.00	0.03	0.25	0.25	0.07	0.14	0.14
Sat Flow, veh/h	1457	1530	1296	3237	1530	1485	1457	4782	1485	3237	4782	1296
Grp Volume(v), veh/h	357	236	88	588	68	0	33	657	467	837	689	90
Grp Sat Flow(s), veh/h/ln	1457	1530	1296	1618	1530	1485	1457	1594	1485	1618	1594	1296
Q Serve(g_s), s	17.0	18.2	7.3	21.6	5.0	0.0	2.0	14.3	30.0	21.9	15.6	7.3
Cycle Q Clear(g_c), s	17.0	18.2	7.3	21.6	5.0	0.0	2.0	14.3	30.0	21.9	15.6	7.3
Prop In Lane	1.00			1.00			1.00	1.00		1.00		1.00
Lane Grp Cap(c), veh/h	448	255	216	654	347		242	1197	672	906	2049	555
V/C Ratio(X)	0.80	0.93	0.41	0.90	0.20		0.14	0.55	0.70	0.92	0.34	0.16
Avail Cap(c_a), veh/h	448	255	216	701	370		287	1197	672	940	2049	555
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(l)	1.00	1.00	1.00	0.53	0.53	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	49.3	44.7	54.8	45.2	0.0	32.0	39.1	26.3	32.3	36.1	32.6
Incr Delay (d2), s/veh	9.7	37.0	1.2	8.2	0.1	0.0	0.3	1.8	5.9	14.2	0.4	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	7.5	14.6	4.4	14.0	3.6	0.0	1.3	9.5	17.1	16.6	10.9	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.4	86.2	45.9	63.0	45.4	0.0	32.3	40.9	32.1	46.5	36.6	33.2
LnGrp LOS	D	F	D	E	D		C	D	C	D	D	C
Approach Vol, veh/h		681			656	A		1157		1616		
Approach Delay, s/veh		61.2			61.1			37.1		41.5		
Approach LOS		E			E			D		D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.7	36.0	29.3	25.0	8.3	57.4	22.0	32.3				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	26.0	27.0	26.0	20.0	7.0	46.0	17.0	29.0				
Max Q Clear Time (g_c+l1), s	23.9	32.0	23.6	20.2	4.0	17.6	19.0	7.0				
Green Ext Time (p_c), s	0.8	0.0	0.6	0.0	0.0	5.0	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay		46.7										
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.												

Timings

18: Libson St & Colfax Ave

07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	Ø4	Ø8
Lane Configurations	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑↑	↑↑	↑	↑
Traffic Volume (vph)	320	1402	71	85	1218	315	355	240	345	345		
Future Volume (vph)	320	1402	71	85	1218	315	355	240	345	345		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	pm+ov	pm+pt	pm+ov		
Protected Phases	5	2		1	6		3	1	7	5	4	8
Permitted Phases	2		2	6		6	8	8	4	4		
Detector Phase	5	2	2	1	6	6	3	1	7	5		
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	23.0	23.0	9.5	23.0	23.0	9.5	9.5	23.0	9.5	23.0	22.5
Total Split (s)	24.0	61.0	61.0	12.0	49.0	49.0	25.0	12.0	18.0	24.0	22.0	29.0
Total Split (%)	20.0%	50.8%	50.8%	10.0%	40.8%	40.8%	20.8%	10.0%	15.0%	20.0%	18%	24%
Yellow Time (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.5	3.5	4.0	3.0	4.0	3.5
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	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.5	5.0	5.0	4.5	4.5	5.0	4.0		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Act Effect Green (s)	92.0	65.1	65.1	80.0	58.1	58.1	19.5	21.4	19.0	28.9		
Actuated g/C Ratio	0.77	0.54	0.54	0.67	0.48	0.48	0.16	0.18	0.16	0.24		
v/c Ratio	0.38	0.86	0.10	0.15	0.83	0.41	0.86	0.84	0.75	0.87		
Control Delay	21.6	25.1	1.6	8.5	29.6	5.5	67.5	51.7	57.9	50.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	21.6	25.1	1.6	8.5	29.6	5.5	67.5	51.7	57.9	50.1		
LOS	C	C	A	A	C	A	E	D	E	D		
Approach Delay		23.5			23.8							
Approach LOS		C			C							

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 105 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 32.9

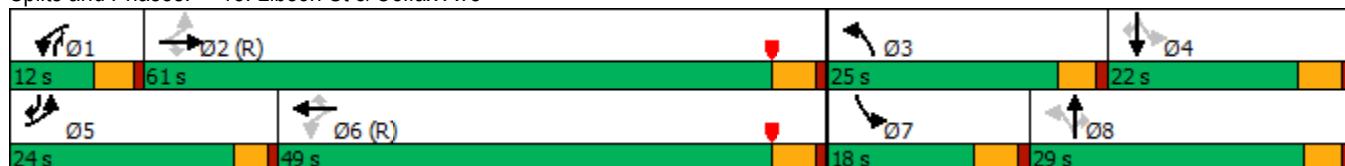
Intersection LOS: C

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Libson St & Colfax Ave



HCM 6th Signalized Intersection Summary

18: Libson St & Colfax Ave

07/11/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (veh/h)	320	1402	71	85	1218	315	355	0	240	345	0	345
Future Volume (veh/h)	320	1402	71	85	1218	315	355	0	240	345	0	345
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No			No		No	
Adj Sat Flow, veh/h/ln	1752	1752	1530	1530	1752	1752	1530	1530	1530	1752	1530	1752
Adj Flow Rate, veh/h	348	1524	78	93	1324	342	390	0	0	375	0	0
Peak Hour Factor	0.92	0.92	0.91	0.91	0.92	0.92	0.91	0.91	0.91	0.92	0.91	0.92
Percent Heavy Veh, %	10	10	25	25	10	10	25	25	25	10	25	10
Cap, veh/h	560	2292	893	571	2241	1000	558	1	471	1		
Arrive On Green	0.12	1.00	1.00	0.04	0.67	0.67	0.15	0.00	0.00	0.11	0.00	0.00
Sat Flow, veh/h	3237	3328	1296	2826	3328	1485	2826	1530	1296	3237	1530	1485
Grp Volume(v), veh/h	348	1524	78	93	1324	342	390	0	0	375	0	0
Grp Sat Flow(s), veh/h/ln	1618	1664	1296	1413	1664	1485	1413	1530	1296	1618	1530	1485
Q Serve(g_s), s	4.1	0.0	0.0	1.2	25.9	11.7	16.2	0.0	0.0	13.0	0.0	0.0
Cycle Q Clear(g_c), s	4.1	0.0	0.0	1.2	25.9	11.7	16.2	0.0	0.0	13.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	560	2292	893	571	2241	1000	558	1	471	1		
V/C Ratio(X)	0.62	0.66	0.09	0.16	0.59	0.34	0.70	0.00	0.80	0.00		
Avail Cap(c_a), veh/h	907	2292	893	635	2241	1000	603	312	471	217		
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.19	0.19	0.19	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.1	0.0	0.0	5.1	10.6	8.3	49.6	0.0	0.0	53.8	0.0	0.0
Incr Delay (d2), s/veh	1.1	1.5	0.2	0.0	0.2	0.2	3.3	0.0	0.0	9.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	2.8	0.9	0.1	0.5	10.2	5.0	10.0	0.0	0.0	10.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.2	1.5	0.2	5.1	10.9	8.5	52.9	0.0	0.0	63.1	0.0	0.0
LnGrp LOS	B	A	A	A	B	A	D	A	E	A		
Approach Vol, veh/h	1950				1759			390	A	375	A	
Approach Delay, s/veh	3.4				10.1			52.9		63.1		
Approach LOS	A				B			D		E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	87.6	23.1	0.0	11.1	85.8	18.0	5.1				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0	4.0	5.0	5.0	* 5				
Max Green Setting (Gmax), s	7.5	56.0	20.5	17.0	20.0	44.0	13.0	* 25				
Max Q Clear Time (g_c+l1), s	3.2	2.0	18.2	0.0	6.1	27.9	15.0	0.0				
Green Ext Time (p_c), s	0.1	17.0	0.4	0.0	1.0	9.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 15.3

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↑↑	↑↑	↗	
Traffic Vol, veh/h	1713	23	0	1918	0	80
Future Vol, veh/h	1713	23	0	1918	0	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	25	10	10	10	25
Mvmt Flow	1862	25	0	2085	0	87

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	7.4
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.55
Pot Cap-1 Maneuver	-	0	0
Stage 1	-	0	0
Stage 2	-	0	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	229
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach EB WB NB

HCM Control Delay, s 0 0 30

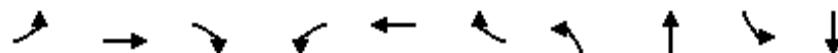
HCM LOS D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	229	-	-	-
HCM Lane V/C Ratio	0.38	-	-	-
HCM Control Delay (s)	30	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	1.7	-	-	-

Timings

24: Realigned Colfax Ave & Site Driveway #3

07/11/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	223	1165	27	8	1015	62	21	0	63	0
Future Volume (vph)	223	1165	27	8	1015	62	21	0	63	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases			4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	21.0	71.0	71.0	12.0	62.0	62.0	12.0	25.0	12.0	25.0
Total Split (%)	17.5%	59.2%	59.2%	10.0%	51.7%	51.7%	10.0%	20.8%	10.0%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes									
Recall Mode	None	C-Min	None	C-Min						
Act Effect Green (s)	73.2	71.1	71.1	56.4	50.6	50.6	31.8	26.0	37.1	30.5
Actuated g/C Ratio	0.61	0.59	0.59	0.47	0.42	0.42	0.26	0.22	0.31	0.25
v/c Ratio	0.71	0.65	0.03	0.04	0.80	0.10	0.08	0.02	0.18	0.31
Control Delay	37.0	15.1	0.0	8.1	34.6	0.3	35.9	0.0	35.7	1.3
Queue Delay	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	37.0	16.2	0.0	8.1	34.6	0.3	35.9	0.0	35.7	1.4
LOS	D	B	A	A	C	A	D	A	D	A
Approach Delay		19.2			32.4			26.6		10.7
Approach LOS		B			C			C		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 23.8

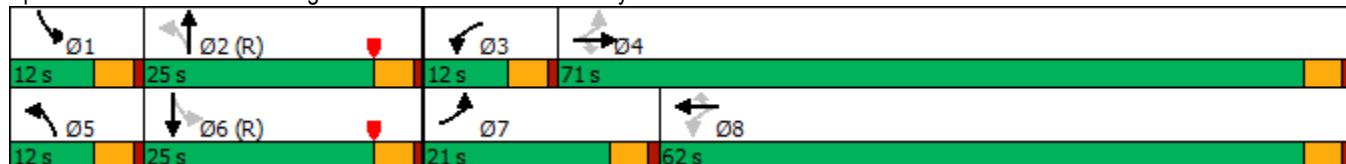
Intersection LOS: C

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 24: Realigned Colfax Ave & Site Driveway #3



HCM 6th Signalized Intersection Summary
24: Realigned Colfax Ave & Site Driveway #3

07/11/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	223	1165	27	8	1015	62	21	0	7	63	0	167
Future Volume (veh/h)	223	1165	27	8	1015	62	21	0	7	63	0	167
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No	No		No
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	242	1266	29	9	1103	67	23	0	8	68	0	182
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	277	1614	720	233	1295	578	366	0	467	536	0	493
Arrive On Green	0.21	0.97	0.97	0.01	0.39	0.39	0.02	0.00	0.31	0.04	0.00	0.33
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	242	1266	29	9	1103	67	23	0	8	68	0	182
Grp Sat Flow(s), veh/h/ln	1668	1664	1485	1668	1664	1485	1668	0	1485	1668	0	1485
Q Serve(g_s), s	10.5	5.8	0.1	0.4	36.3	3.5	1.1	0.0	0.4	3.3	0.0	11.2
Cycle Q Clear(g_c), s	10.5	5.8	0.1	0.4	36.3	3.5	1.1	0.0	0.4	3.3	0.0	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	1614	720	233	1295	578	366	0	467	536	0	493
V/C Ratio(X)	0.88	0.78	0.04	0.04	0.85	0.12	0.06	0.00	0.02	0.13	0.00	0.37
Avail Cap(c_a), veh/h	328	1844	823	319	1595	711	433	0	467	574	0	493
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.46	0.46	0.46	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	1.0	0.9	21.7	33.5	23.5	27.1	0.0	28.3	26.1	0.0	30.5
Incr Delay (d2), s/veh	10.4	0.9	0.0	0.1	3.9	0.1	0.1	0.0	0.1	0.1	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	6.3	1.4	0.0	0.3	21.5	2.2	0.8	0.0	0.3	2.4	0.0	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.1	2.0	1.0	21.8	37.4	23.5	27.2	0.0	28.4	26.2	0.0	32.6
LnGrp LOS	C	A	A	C	D	C	C	A	C	C	A	C
Approach Vol, veh/h	1537				1179				31			250
Approach Delay, s/veh	6.9				36.5				27.5			30.9
Approach LOS	A				D				C			C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R _c), s	9.3	42.3	5.8	62.7	7.2	44.4	17.3	51.2				
Change Period (Y+R _c), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	20.5	7.5	66.5	7.5	20.5	16.5	57.5				
Max Q Clear Time (g_c+l1), s	5.3	2.4	2.4	7.8	3.1	13.2	12.5	38.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	14.3	0.0	0.6	0.3	8.3				
Intersection Summary												
HCM 6th Ctrl Delay				20.7								
HCM 6th LOS				C								

Intersection

Intersection Delay, s/veh 19.3

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	127	4	54	34	264	1	235	109	77	70	8
Future Vol, veh/h	30	127	4	54	34	264	1	235	109	77	70	8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	33	140	4	59	37	290	1	258	120	85	77	9
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0
Approach												
Opposing Approach	WB			WB			NB			SB		
Opposing Lanes	1			1			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			1			1		
HCM Control Delay	14.1			21			23			12.4		
HCM LOS	B			C			C			B		

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	19%	15%	100%	0%
Vol Thru, %	68%	79%	10%	0%	90%
Vol Right, %	32%	2%	75%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	345	161	352	77	78
LT Vol	1	30	54	77	0
Through Vol	235	127	34	0	70
RT Vol	109	4	264	0	8
Lane Flow Rate	379	177	387	85	86
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.69	0.351	0.669	0.192	0.18
Departure Headway (Hd)	6.552	7.151	6.229	8.152	7.565
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	550	502	580	439	473
Service Time	4.601	5.214	4.278	5.914	5.327
HCM Lane V/C Ratio	0.689	0.353	0.667	0.194	0.182
HCM Control Delay	23	14.1	21	12.9	12
HCM Lane LOS	C	B	C	B	B
HCM 95th-tile Q	5.3	1.6	5	0.7	0.6

HCS7 Roundabouts Report

General Information				Site Information																		
Analyst	PJD				Intersection				13th Ave/Libson St													
Agency or Co.	FHU				E/W Street Name				13th Ave													
Date Performed	1/9/2019				N/S Street Name				Libson St													
Analysis Year	2040				Analysis Time Period (hrs)				0.25													
Time Analyzed	PM Peak Hour LT Total				Peak Hour Factor				0.92													
Project Description					Jurisdiction				City of Aurora													
Volume Adjustments and Site Characteristics																						
Approach	EB				WB				NB				SB									
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R						
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0						
Lane Assignment			LTR				LTR				LTR					LTR						
Volume (V), veh/h	0	30	127	4	0	54	34	264	0	1	235	109	0	77	70	8						
Percent Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25						
Flow Rate (v_{pce}), pc/h	0	41	173	5	0	73	46	359	0	1	319	148	0	105	95	11						
Right-Turn Bypass	None				None				None				None			None						
Conflicting Lanes	1				1				1				1			1						
Pedestrians Crossing, p/h	0				0				0				0			0						
Critical and Follow-Up Headway Adjustment																						
Approach			EB				WB				NB				SB							
Lane		Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass						
Critical Headway (s)		4.9763				4.9763				4.9763				4.9763								
Follow-Up Headway (s)		2.6087				2.6087				2.6087				2.6087								
Flow Computations, Capacity and v/c Ratios																						
Approach			EB				WB				NB				SB							
Lane		Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass						
Entry Flow (v_e), pc/h		219.00				478.00				468.00				211.00								
Entry Volume veh/h		175.20				382.40				374.40				168.80								
Circulating Flow (v_c), pc/h		273				361				319				120								
Exiting Flow (v_{ex}), pc/h		426				58				719				173								
Capacity (c_{pce}), pc/h		1044.59				954.91				996.71				1221.02								
Capacity (c), veh/h		835.67				763.93				797.37				976.81								
v/c Ratio (x)		0.21				0.50				0.47				0.17								
Delay and Level of Service																						
Approach			EB				WB				NB				SB							
Lane		Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass						
Lane Control Delay (d), s/veh		6.5				11.8				10.8				5.3								
Lane LOS		A				B				B				A								
95% Queue, veh		0.8				2.8				2.5				0.6								
Approach Delay, s/veh		6.5				11.8				10.8				5.3								
Approach LOS		A				B				B				A								
Intersection Delay, s/veh LOS		9.6												A								

Intersection

Int Delay, s/veh 74.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Vol, veh/h	38	2341	1342	19	70	140
Future Vol, veh/h	38	2341	1342	19	70	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	150	150	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	10	10	25	25	25
Mvmt Flow	41	2545	1459	21	76	152

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1480	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.6	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.45	-	-
Pot Cap-1 Maneuver	352	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	352	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	\$ 1405.7
HCM LOS		F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	352	-	-	-	9	317
HCM Lane V/C Ratio	0.117	-	-	-	8.454	0.48
HCM Control Delay (s)	16.6	-	-	\$ 4164.2	26.4	
HCM Lane LOS	C	-	-	-	F	D
HCM 95th %tile Q(veh)	0.4	-	-	-	11	2.5

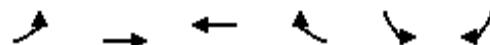
Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Timings

30: Stephen D. Hogan Pkwy & Libson St

04/19/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Traffic Volume (vph)	37	2341	1342	18	70	139
Future Volume (vph)	37	2341	1342	18	70	139
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	12.0	65.0	53.0	53.0	25.0	25.0
Total Split (%)	13.3%	72.2%	58.9%	58.9%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effect Green (s)	60.6	60.6	54.2	54.2	9.5	9.5
Actuated g/C Ratio	0.77	0.77	0.69	0.69	0.12	0.12
v/c Ratio	0.17	1.01	0.65	0.02	0.44	0.53
Control Delay	4.3	32.8	10.5	3.8	40.3	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	32.8	10.5	3.8	40.3	12.9
LOS	A	C	B	A	D	B
Approach Delay		32.4	10.5		22.1	
Approach LOS		C	B		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 79.1

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 24.3

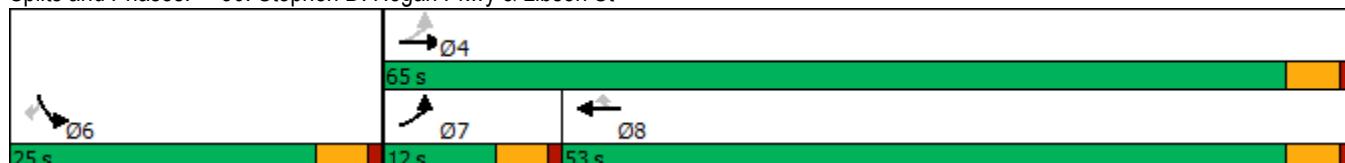
Intersection LOS: C

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

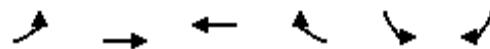
Splits and Phases: 30: Stephen D. Hogan Pkwy & Libson St



HCM 6th Signalized Intersection Summary

30: Stephen D. Hogan Pkwy & Libson St

04/19/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑	
Traffic Volume (veh/h)	37	2341	1342	18	70	139	
Future Volume (veh/h)	37	2341	1342	18	70	139	
Initial Q (Q _b), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1530	1752	1752	1530	1530	1530	
Adj Flow Rate, veh/h	40	2545	1459	20	76	151	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	25	10	10	25	25	25	
Cap, veh/h	254	2482	2175	847	209	186	
Arrive On Green	0.04	0.75	0.65	0.65	0.14	0.14	
Sat Flow, veh/h	1457	3416	3416	1296	1457	1296	
Grp Volume(v), veh/h	40	2545	1459	20	76	151	
Grp Sat Flow(s), veh/h/ln	1457	1664	1664	1296	1457	1296	
Q Serve(g_s), s	0.7	60.5	21.9	0.4	3.8	9.2	
Cycle Q Clear(g_c), s	0.7	60.5	21.9	0.4	3.8	9.2	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	254	2482	2175	847	209	186	
V/C Ratio(X)	0.16	1.03	0.67	0.02	0.36	0.81	
Avail Cap(c_a), veh/h	335	2482	2175	847	368	327	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	7.5	10.3	8.7	4.9	31.4	33.7	
Incr Delay (d2), s/veh	0.3	24.9	0.8	0.0	1.1	8.2	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%), veh/ln	0.4	31.0	10.9	0.2	2.5	0.8	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d), s/veh	7.8	35.2	9.5	5.0	32.5	41.9	
LnGrp LOS	A	F	A	A	C	D	
Approach Vol, veh/h	2585	1479		227			
Approach Delay, s/veh	34.8	9.4		38.7			
Approach LOS	C	A		D			
Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+R _c), s			65.0		16.1	7.5	57.5
Change Period (Y+R _c), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			60.5		20.5	7.5	48.5
Max Q Clear Time (g_c+l1), s			62.5		11.2	2.7	23.9
Green Ext Time (p_c), s			0.0		0.5	0.0	13.0
Intersection Summary							
HCM 6th Ctrl Delay			26.3				
HCM 6th LOS			C				

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	1043	12	0	1255
Future Vol, veh/h	0	21	1043	12	0	1255
Conflicting Peds, #/hr	0	0	0	0	0	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	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	0	23	1134	13	0	1364

Major/Minor **Minor1** **Major1** **Major2**

Conflicting Flow All	-	574	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.3	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	4	-	-	-	-
Pot Cap-1 Maneuver	0	380	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	380	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach **WB** **NB** **SB**

HCM Control Delay, s	15.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	380	-
HCM Lane V/C Ratio	-	-	0.06	-
HCM Control Delay (s)	-	-	15.1	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	395	8	20	135	5	30	5	76	10	5	20
Future Vol, veh/h	6	395	8	20	135	5	30	5	76	10	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	434	9	22	148	5	33	5	84	11	5	22
Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	153	0	0	443	0	0	661	650	439	692	652	151
Stage 1	-	-	-	-	-	-	453	453	-	195	195	-
Stage 2	-	-	-	-	-	-	208	197	-	497	457	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1299	-	-	1005	-	-	346	360	572	329	359	838
Stage 1	-	-	-	-	-	-	544	533	-	757	698	-
Stage 2	-	-	-	-	-	-	744	697	-	514	531	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1299	-	-	1005	-	-	325	349	572	271	348	838
Mov Cap-2 Maneuver	-	-	-	-	-	-	325	349	-	271	348	-
Stage 1	-	-	-	-	-	-	540	529	-	752	681	-
Stage 2	-	-	-	-	-	-	701	680	-	431	527	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0.1		1.1		15.5		13.4					
HCM LOS					C		B					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	463	1299	-	-	1005	-	-	466				
HCM Lane V/C Ratio	0.263	0.005	-	-	0.022	-	-	0.083				
HCM Control Delay (s)	15.5	7.8	0	-	8.7	0	-	13.4				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.3				

Intersection															
Int Delay, s/veh	4.3														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+			
Traffic Vol, veh/h	47	5	54	52	5	21	20	316	14	5	165	11			
Future Vol, veh/h	47	5	54	52	5	21	20	316	14	5	165	11			
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0			
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free			
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None			
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-			
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-			
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-			
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91			
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25			
Mvmt Flow	52	5	59	57	5	23	22	347	15	5	181	12			
Major/Minor	Minor2	Minor1			Major1			Major2							
Conflicting Flow All	610	603	187	628	602	355	193	0	0	362	0	0			
Stage 1	197	197	-	399	399	-	-	-	-	-	-	-			
Stage 2	413	406	-	229	203	-	-	-	-	-	-	-			
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-			
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-			
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-			
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-			
Pot Cap-1 Maneuver	375	384	799	365	384	640	1254	-	-	1080	-	-			
Stage 1	755	697	-	584	564	-	-	-	-	-	-	-			
Stage 2	573	560	-	725	692	-	-	-	-	-	-	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	350	374	799	327	374	640	1254	-	-	1080	-	-			
Mov Cap-2 Maneuver	350	374	-	327	374	-	-	-	-	-	-	-			
Stage 1	738	694	-	571	552	-	-	-	-	-	-	-			
Stage 2	535	548	-	663	689	-	-	-	-	-	-	-			
Approach	EB			WB			NB			SB					
HCM Control Delay, s	14.6			17.2			0.5			0.2					
HCM LOS	B			C											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR							
Capacity (veh/h)	1254	-	-	492	380	1080	-	-							
HCM Lane V/C Ratio	0.018	-	-	0.237	0.226	0.005	-	-							
HCM Control Delay (s)	7.9	0	-	14.6	17.2	8.3	0	-							
HCM Lane LOS	A	A	-	B	C	A	A	-							
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.9	0	-	-							

APPENDIX H. SIGNAL WARRANTS

WARRANT 2: Colfax Ave/I-70 Frontage Rd
Existing Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 3: Colfax Ave/I-70 Frontage Rd
Existing Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 2: Colfax Avenue/Lisbon Street
Short Term Total Traffic (Scenarios 1-3) Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 3: Colfax Avenue/Lisbon Street
Short-Term Total Traffic (Scenarios 1-3) Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 2: Picadilly Road/Realigned Colfax Avenue
Short Term Total Traffic (Scenarios 3) Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 3: Picadilly Road/Realigned Colfax Avenue
Short-Term Total Traffic (Scenarios 3) Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 2: Colfax Avenue/Himalaya Street
Long Term Background Traffic Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 3: Colfax Avenue/Himalaya Street
Long-Term Background Traffic Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 2: Colfax Avenue/Lisbon Street
Long Term Background Traffic Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

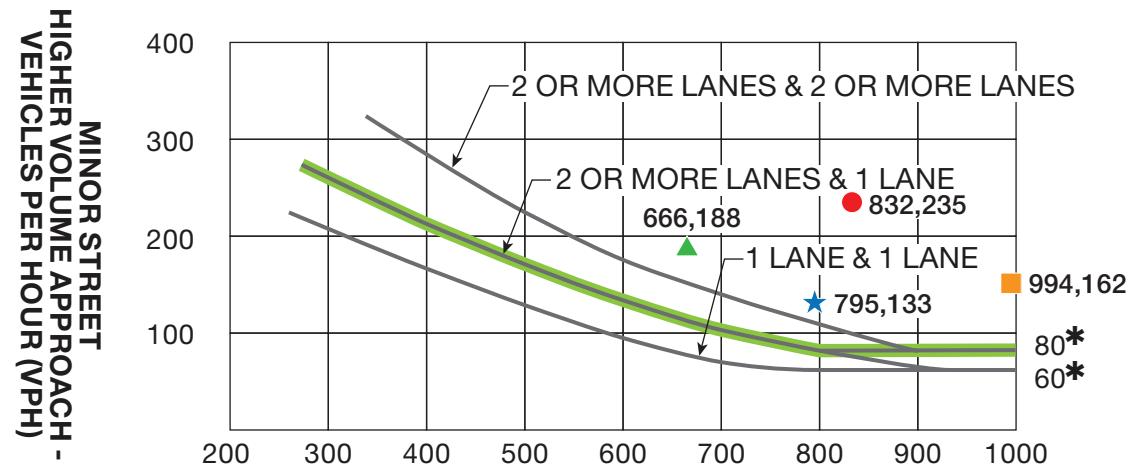
WARRANT 3: Colfax Avenue/Lisbon Street
Long-Term Background Traffic Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)

WARRANT 2: Colfax Avenue/Site Driveway #3
Long Term Total Traffic Four-Hour Vehicular Volume

WARRANT 3: Colfax Avenue/Site Driveway #3
Long Term Total Traffic Peak Hour

WARRANT 2: Stephen D. Hogan Parkway/Lisbon Street
Long Term Total Traffic Four-Hour Vehicular Volume

WARRANT 3: Stephen D. Hogan Parkway/Lisbon Street
Long-Term Total Traffic Peak Hour



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

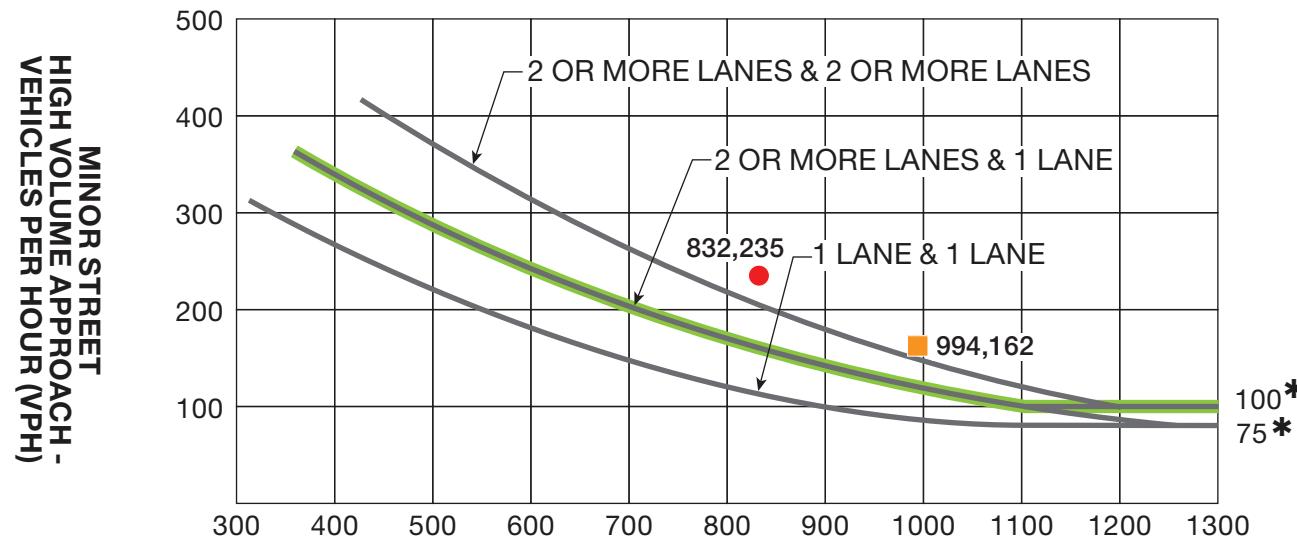
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 80% AM Peak Hour
- ★ = 80% PM Peak Hour

WARRANT 2

Colfax Ave/I-70 Frontage Rd
Existing Four-Hour Vehicular Volume (70% Factor)
 (Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

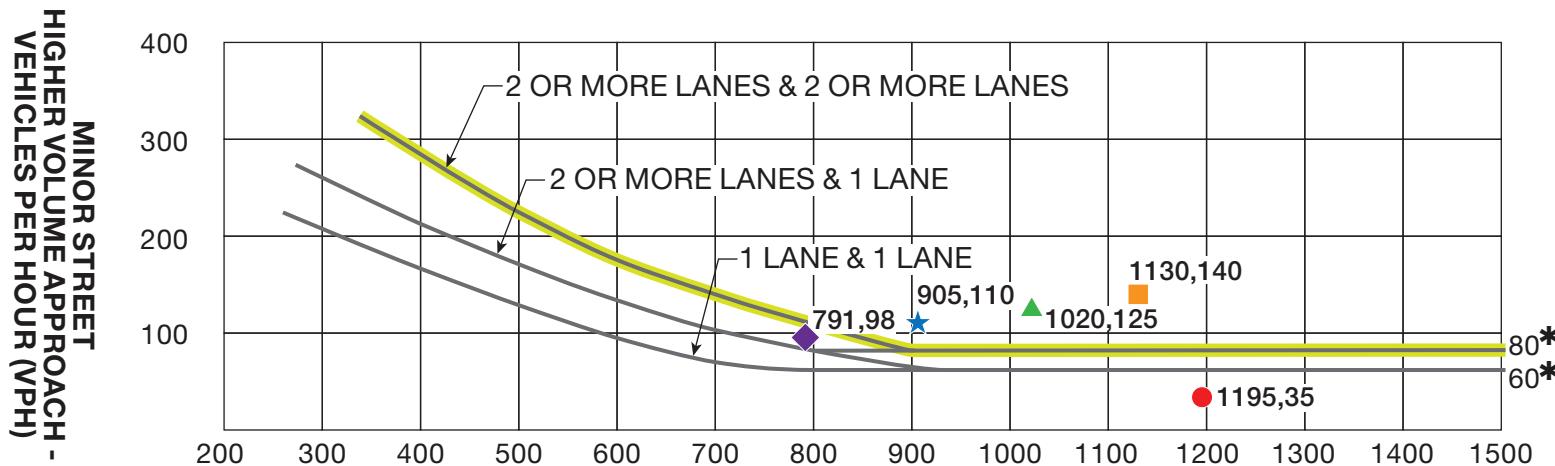
LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**Colfax Ave/I-70 Frontage Rd
Existing Peak Hour (70% Factor)**

(Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

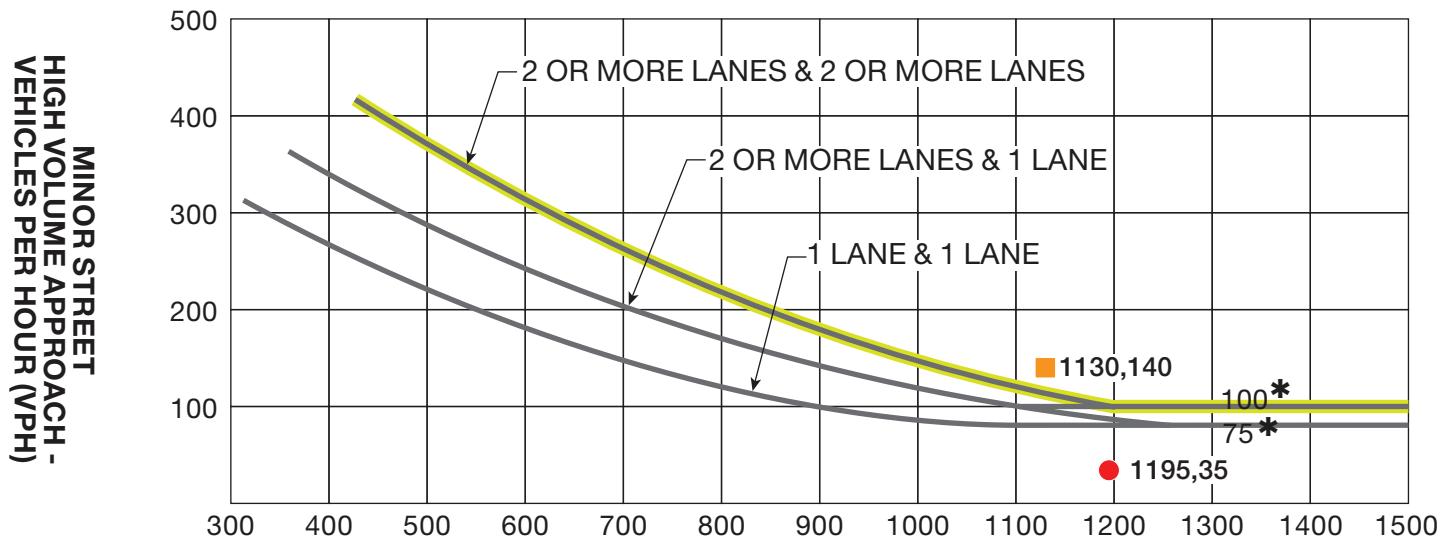
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 90% of PM Peak Hour
- ★ = 80% of PM Peak Hour
- ◆ = 70% of PM Peak Hour

WARRANT 2

US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario I
Four-Hour Vehicular Volume (70% Factor)
 (Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

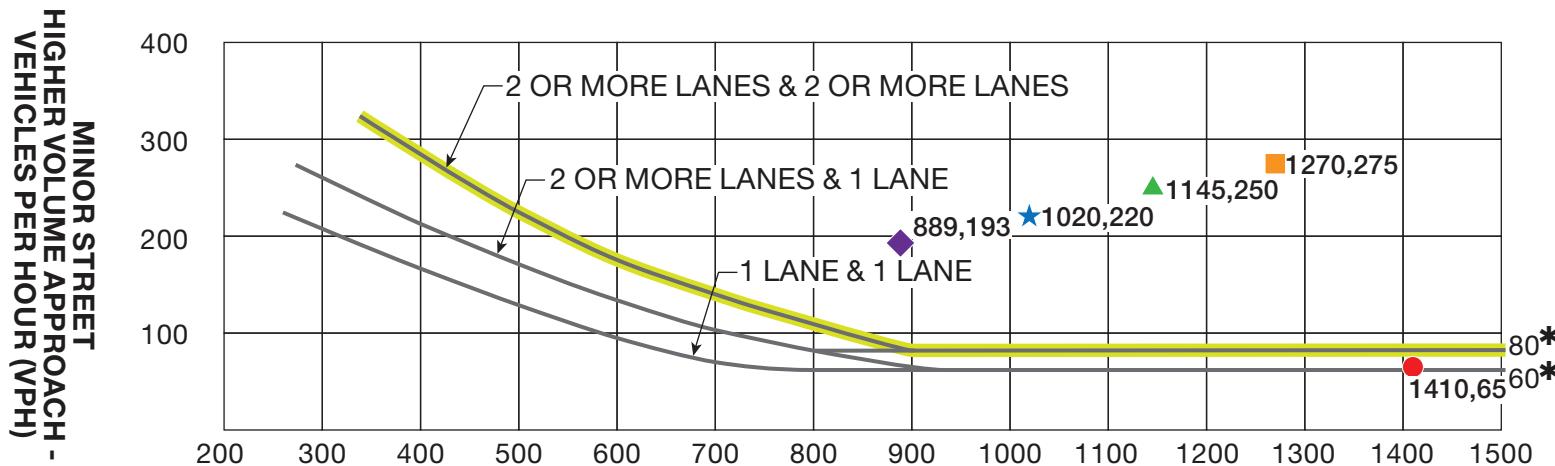
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario I
Short-Term Peak Hour (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



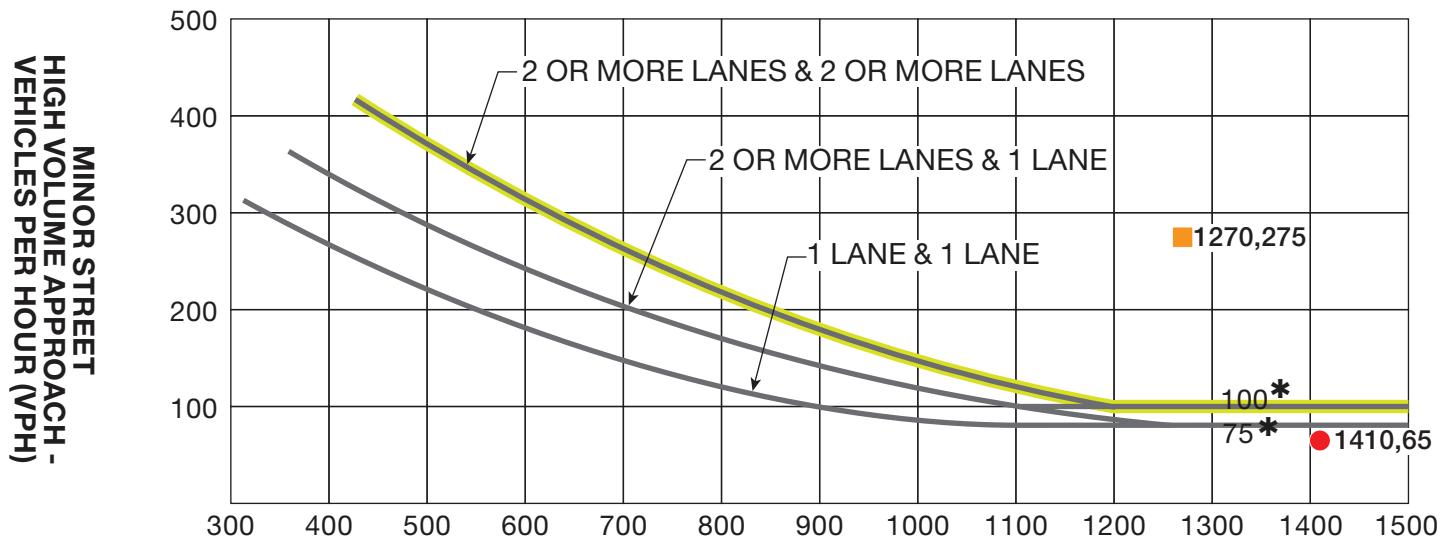
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 90% of PM Peak Hour
- ★ = 80% of PM Peak Hour
- ◆ = 70% of PM Peak Hour

WARRANT 2

US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario 2
Four-Hour Vehicular Volume (70% Factor)
 (Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

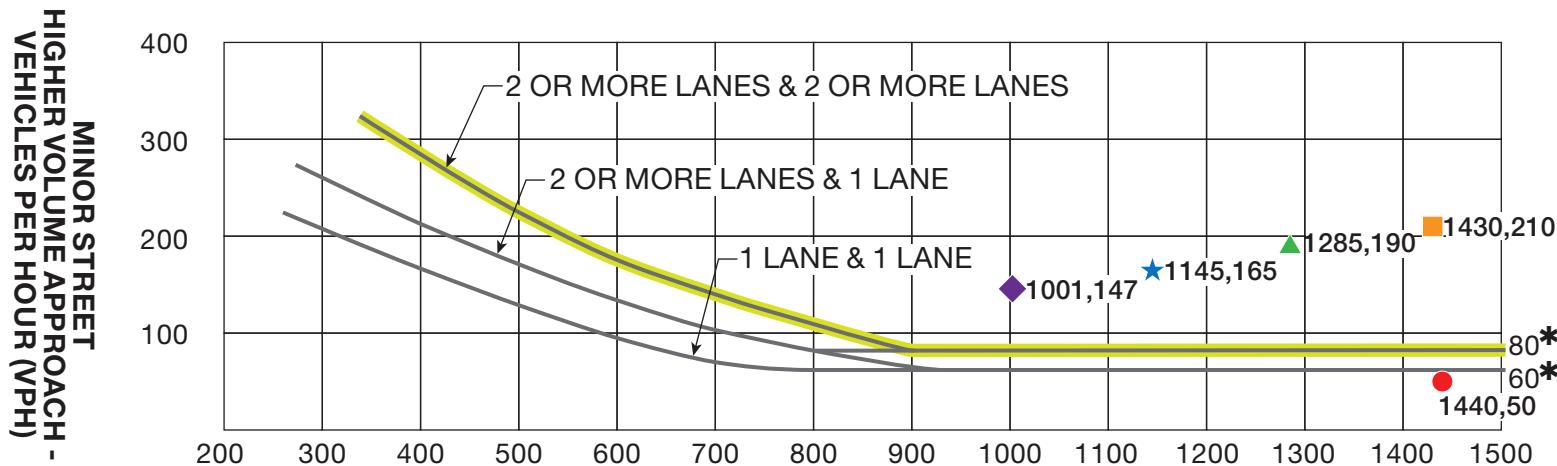
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario 2
Short-Term Peak Hour (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

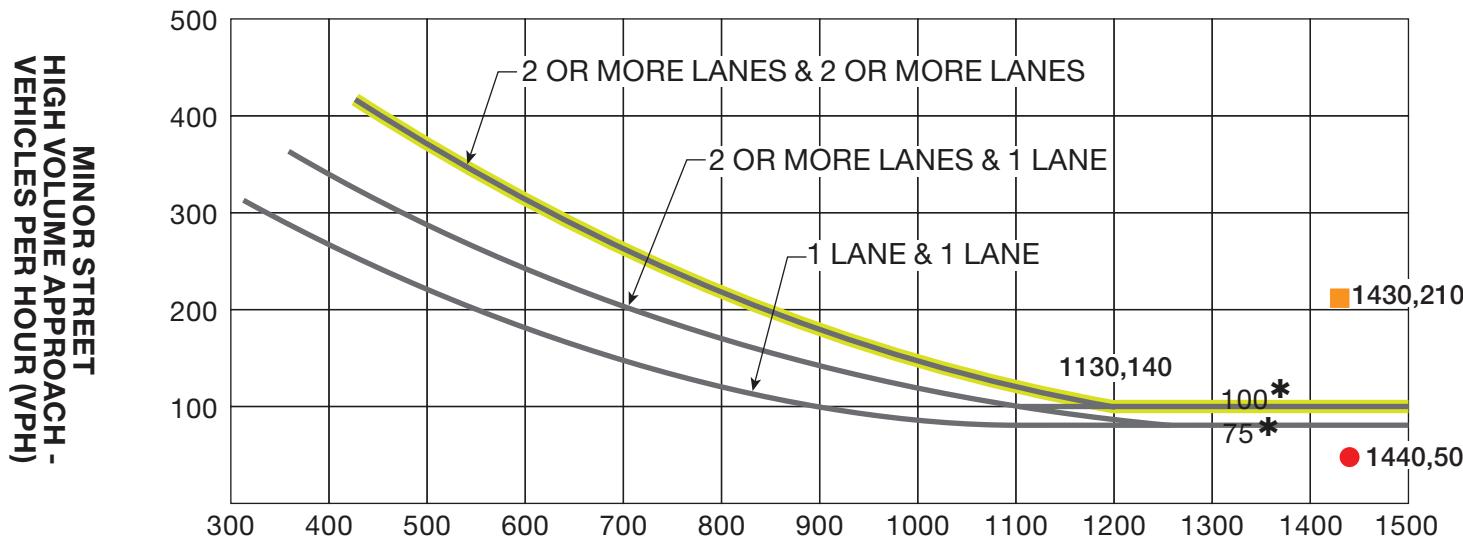
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 90% of PM Peak Hour
- ★ = 80% of PM Peak Hour
- ◆ = 70% of PM Peak Hour

WARRANT 2

**US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario 3
Four-Hour Vehicular Volume (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

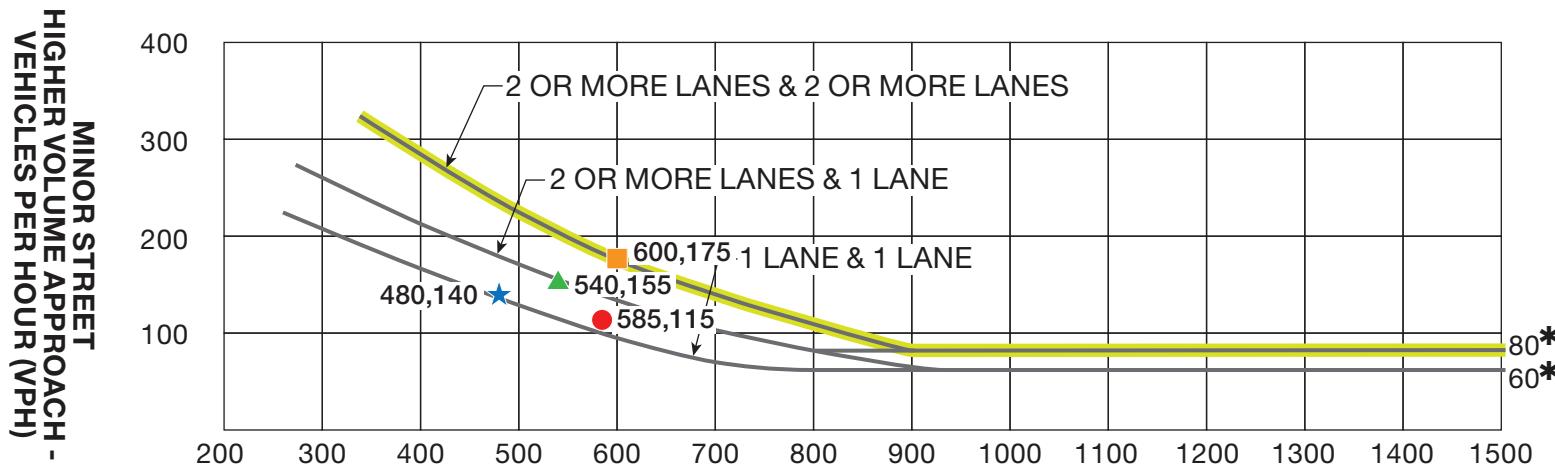
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**US 40/Colfax Ave. & Lisbon St. Short-Term Total Traffic Scenario 3
Short-Term Peak Hour (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

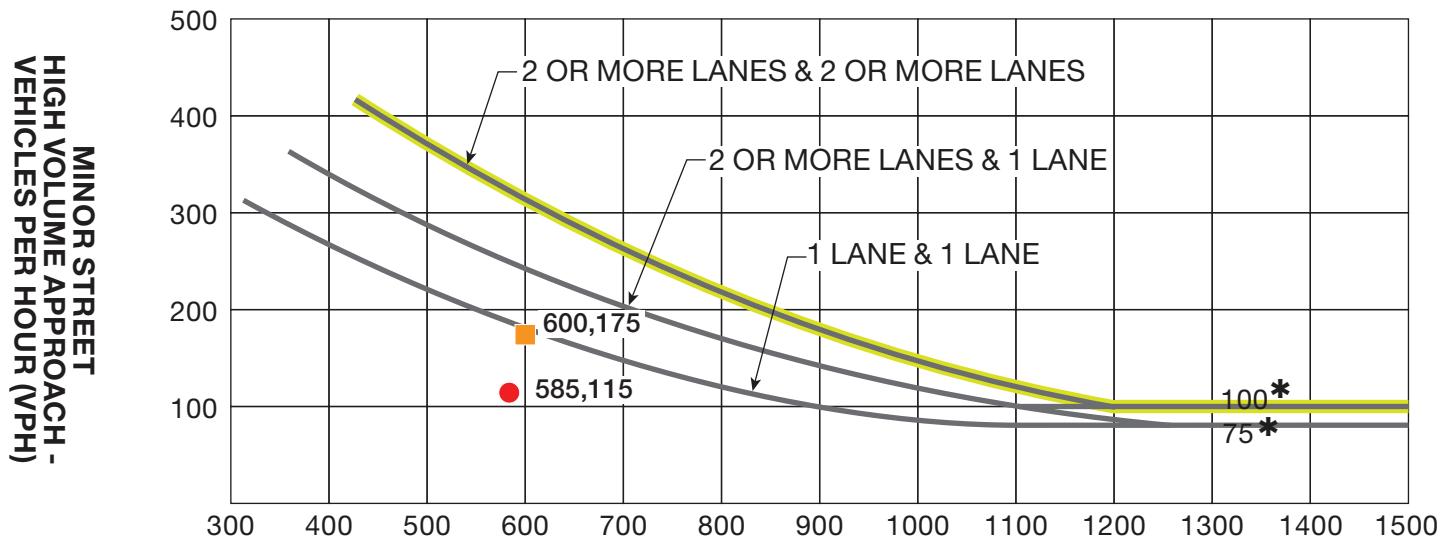
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 90% of PM Peak Hour
- ★ = 80% of PM Peak Hour

WARRANT 2

**Realigned Colfax Ave. & Picadilly Rd. Short-Term Total Traffic Scenario 3
Four-Hour Vehicular Volume (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



MAJOR STREET - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

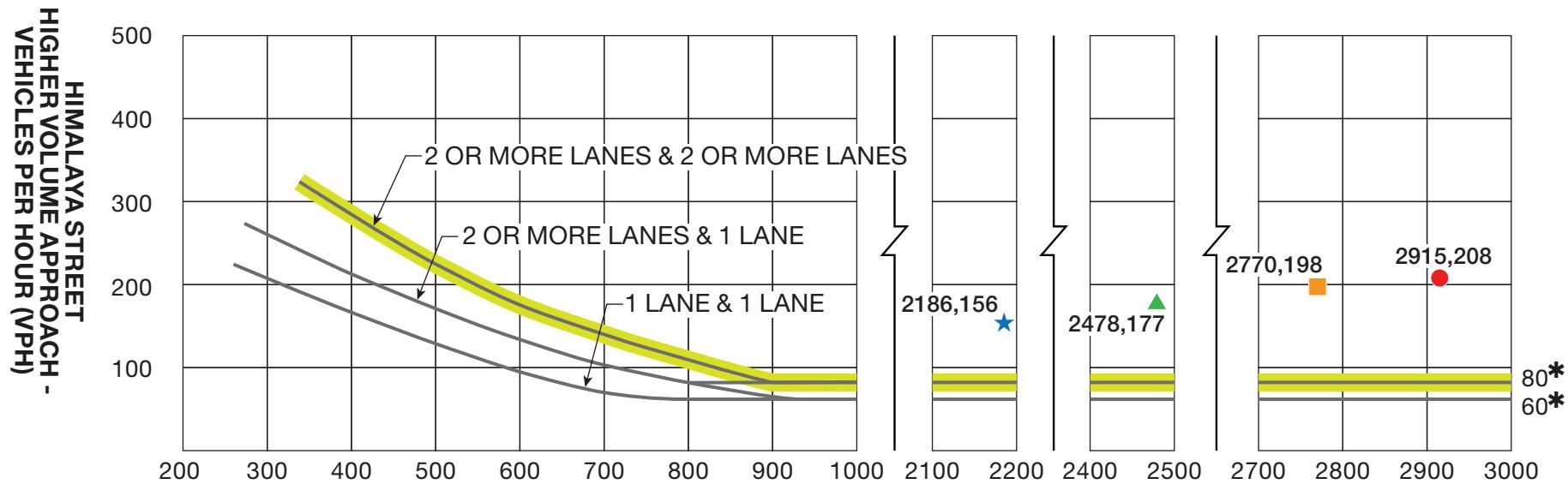
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**Realigned Colfax Ave. & Picadilly Rd. Short-Term Total Traffic Scenario 3
Short-Term Peak Hour (70% Factor)**
(Community Less than 10,000 Population or Above 40 mph On Major Street)



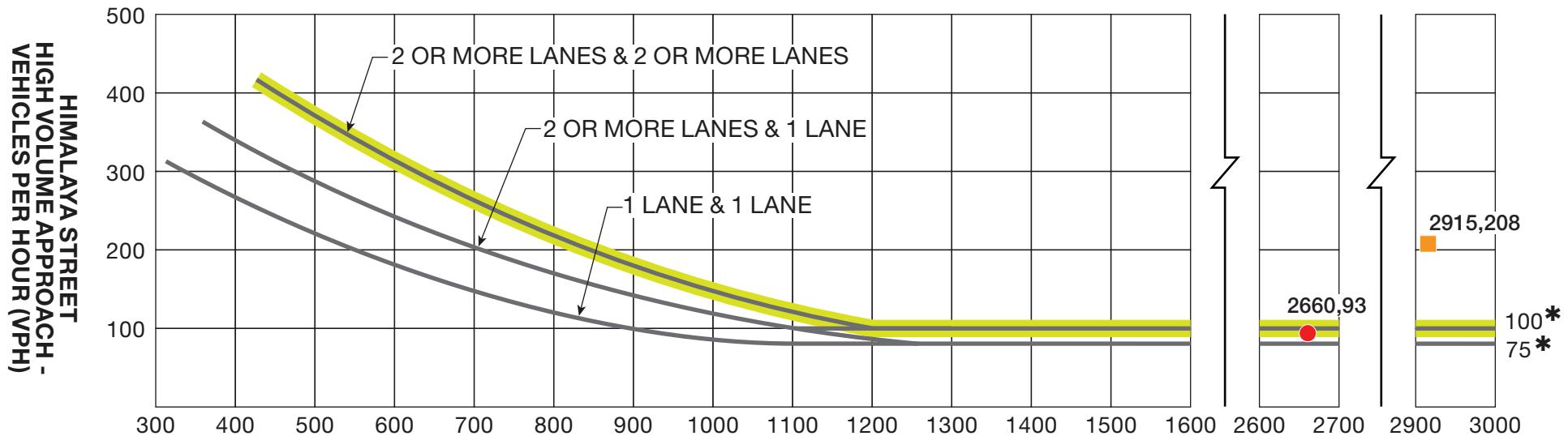
* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = PM Peak Hour
- = 90% PM Peak Hour
- ▲ = 85% PM Peak Hour
- ★ = 75% PM Peak Hour

WARRANT 2

Colfax Avenue/Himalaya Street
Long Term Background Traffic Four-Hour Vehicular Volume (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)



COLFAX AVENUE - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

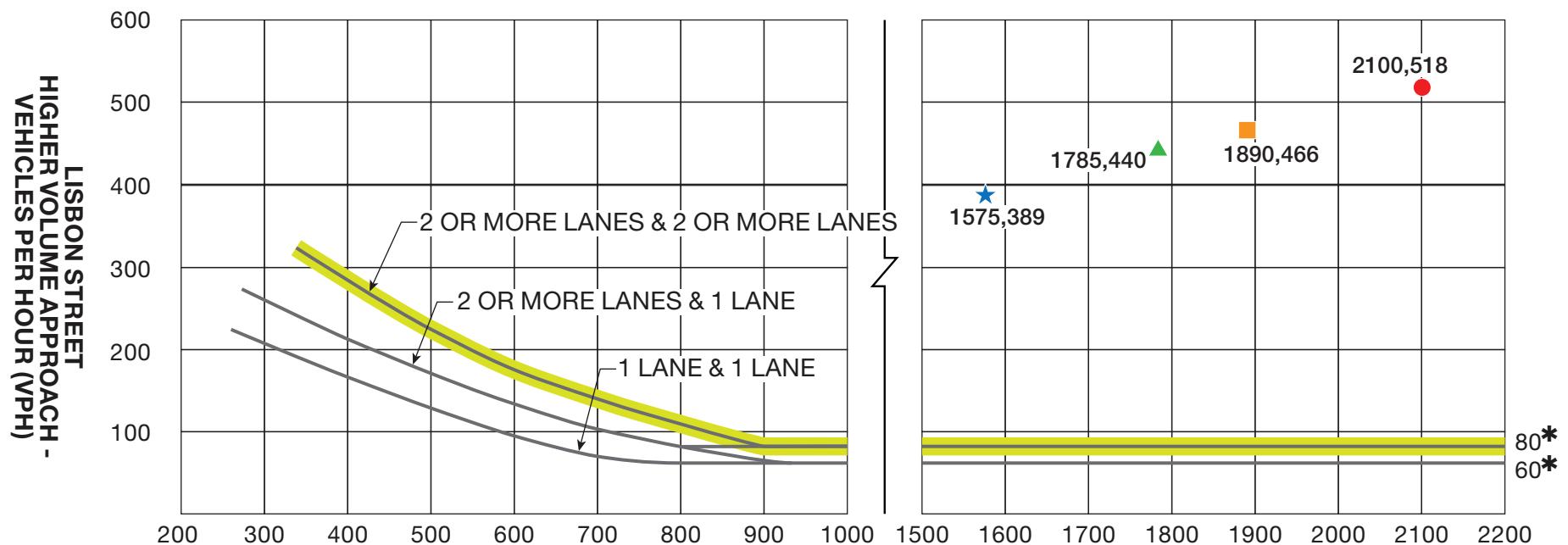
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

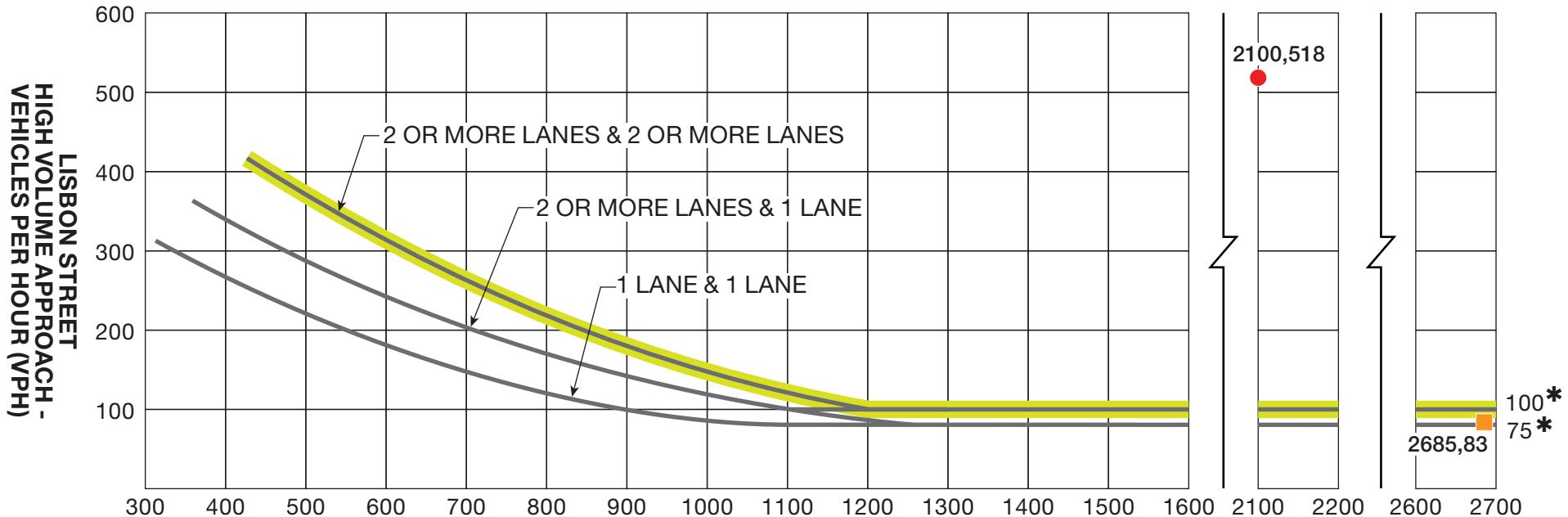
WARRANT 3

**Colfax Avenue/Himalaya Street
Long-Term Background Traffic Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)**



LEGEND

- = PM Peak Hour
- = 90% PM Peak Hour
- ▲ = 85% PM Peak Hour
- ★ = 75% PM Peak Hour



**COLFAX AVENUE - TOTAL OF BOTH APPROACHES -
VEHICLES PER HOUR (VPH)**

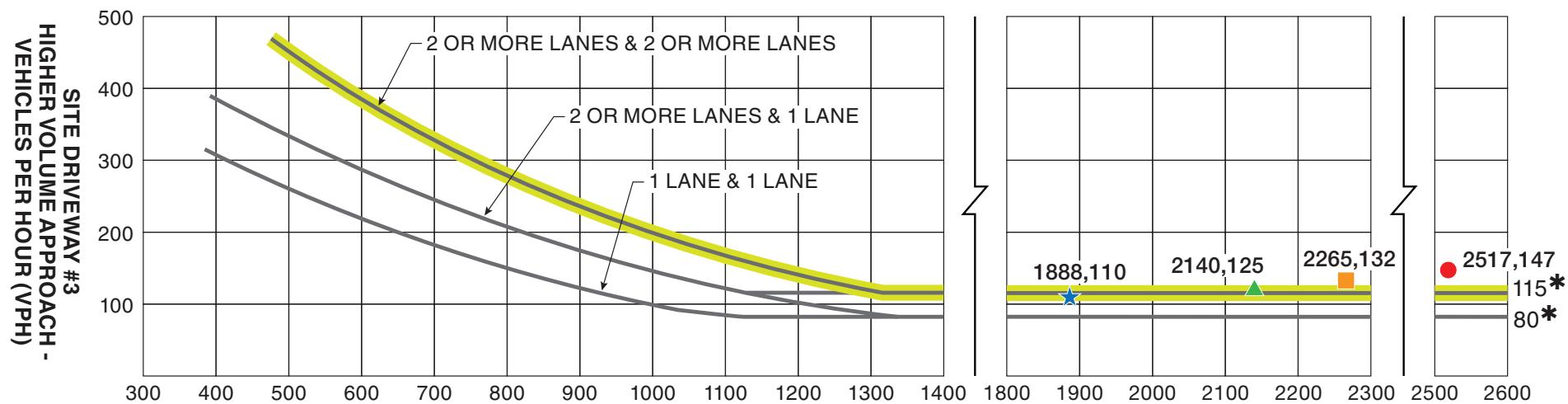
* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

WARRANT 3

**Colfax Avenue/Lisbon Street
Long Term Background Traffic Peak Hour (70% Factor)
(Community Less than 10,000 Population or Above 40 mph On Major Street)**

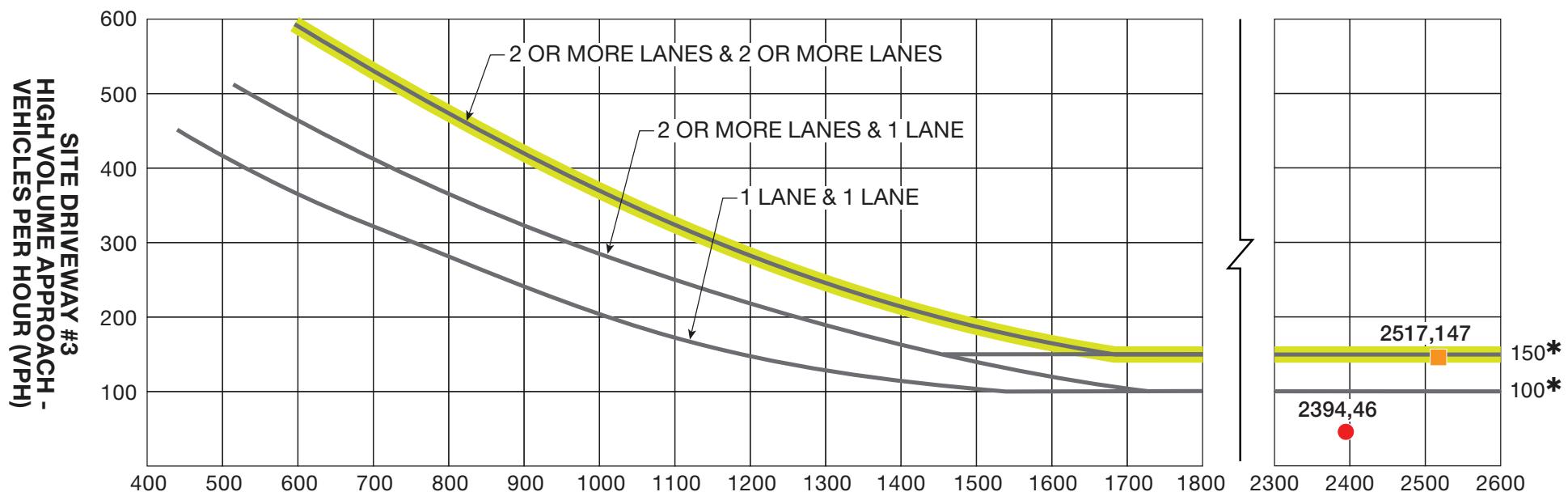


COLFAX AVENUE - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

* Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = PM Peak Hour
- = 90% PM Peak Hour
- ▲ = 85% PM Peak Hour
- ★ = 75% PM Peak Hour

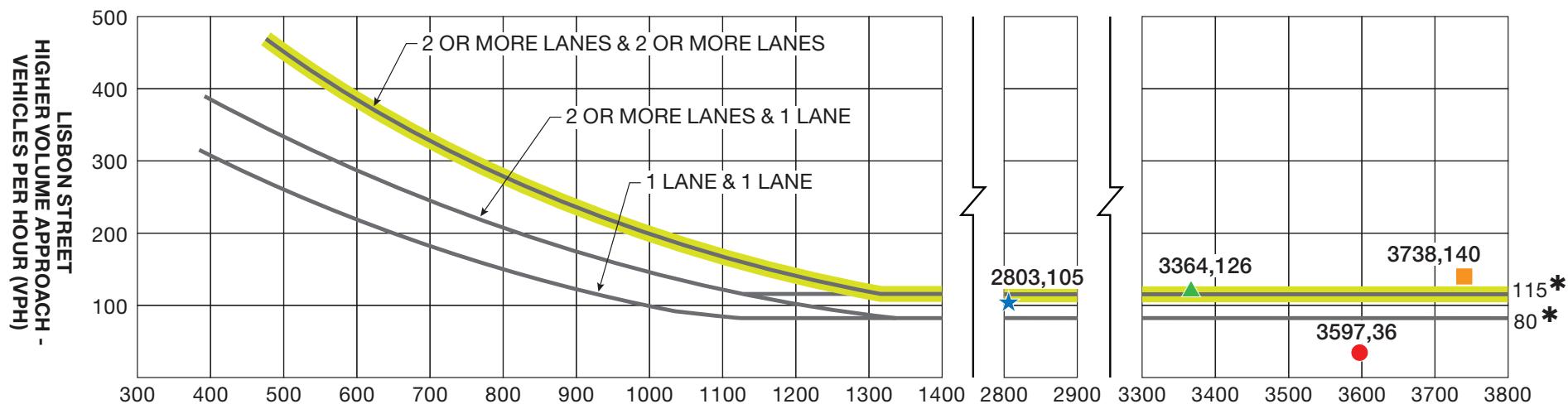


REALIGNED COLFAX AVENUE - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour

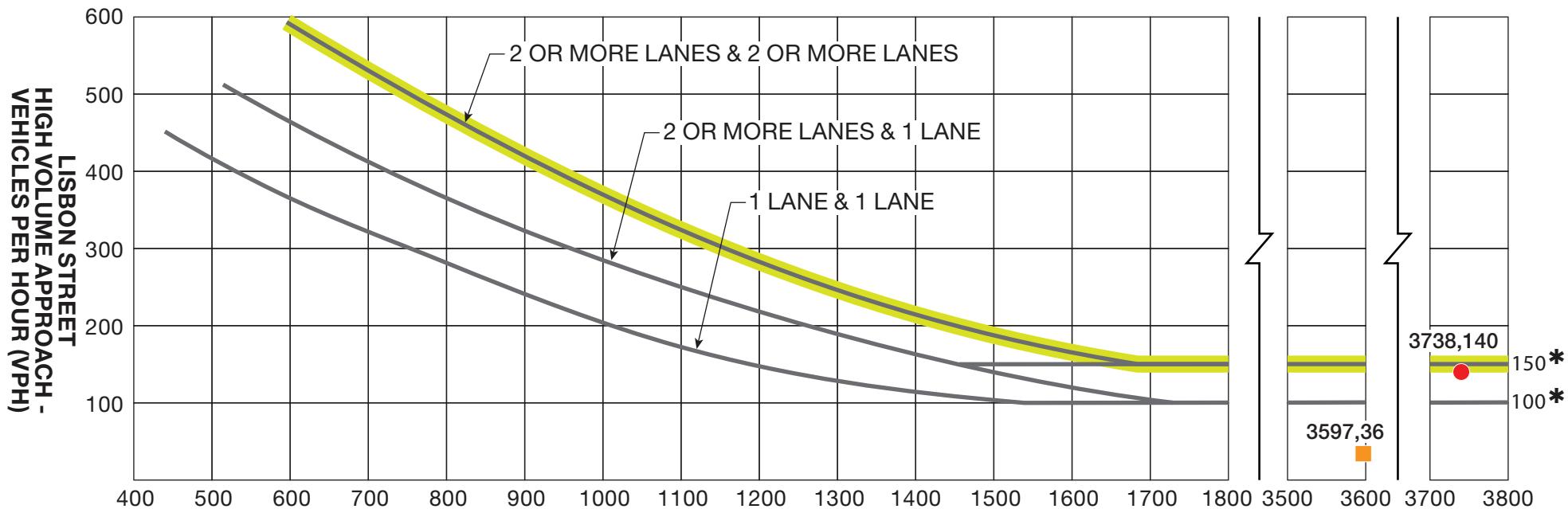


STEPHEN D. HOGAN PARKWAY - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

* Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = AM Peak Hour
- = PM Peak Hour
- ▲ = 90% PM Peak Hour
- ★ = 75% PM Peak Hour



STEPHEN D. HOGAN PARKWAY - TOTAL OF BOTH APPROACHES - VEHICLES PER HOUR (VPH)

* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

LEGEND

- = PM Peak Hour
- = AM Peak Hour

APPENDIX I. PROGRESSION ANALYSIS

