Draft Report

Traffic Impact Study for the Marinda Heights Subdivision Project

in the

Town of Fairfax

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Executive Summary

The Marinda Heights Subdivision would allow for the creation of ten parcels to accommodate one single-family dwelling each; no secondary dwellings would be allowed. Additionally, a 6.5-acre public park would be created as part of the subdivision of land that would be gifted to the Town or another public agency. As required by the Town's policies, the scope of work for the traffic study was provided to and approved by the Town Council prior to initiating the analysis. Through this process the anticipated trip generation was set based on a higher rate than the industry standard, resulting in an estimate of 120 daily trips (12 per dwelling versus the standard of just less than ten per house), with nine of these trips expected to occur during the morning peak hour and 13 during the evening peak hour.

The study area includes seven intersections along Sir Francis Drake Boulevard, including those at Marinda Avenue and Pastori Avenue-Willow Avenue that would provide direct access to the developable parcels. The operational analysis indicates that the stop-controlled side-street approach of Marinda Avenue to Sir Francis Drake Boulevard is currently operating at LOS E, which is below the Town's adopted LOS D standard. Similarly, the Marin Avenue approach to Sir Francis Drake Boulevard is expected to operate at LOS E under projected Future volumes. All other approaches and intersections are projected to operate at LOS D or better under all scenarios evaluated. Upon adding project-generated trips to both existing and future volumes, the service levels are unchanged from conditions without the project, though delay increases by zero to 3.5 seconds as a result of the project.

Because the side-street approaches at the intersections of Sir Francis Drake Boulevard with Marin Avenue and Marinda Drive are operating at an unacceptable LOS E without the project, consideration was given to the need for improvements that would reduce delays by increasing capacity. Both intersections already have separate turn lanes and/or acceleration lanes, so the most feasible means of increasing capacity would be to install traffic signals. A review of the volumes, however, indicates that traffic signals are not warranted at either location. Based on these findings, as well as the fact that the service level remains the same with project trips added and neither intersection exhibits a safety concern, the impact appears to be less-than-significant so no improvements are recommended.

Given the somewhat "rural" nature of the project site, it has limited facilities for pedestrians or bicyclists, though the newly created park area will provide trails for recreational uses. Access to transit is available on Sir Francis Drake Boulevard, though it is more than a comfortable walking distance from the site to the bus stop.

The existing roadways providing access to the site, though narrow, can reasonably be expected to adequately accommodate the nominal increase in trips associated with the project. Sight lines along Marinda Drive are adequate for the speed of travel, and the addition of turn-arounds and extensions of Marinda Drive and Ridgeway Avenue will provide for adequate emergency access.

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Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed residential subdivision to be located at the existing terminus of Marinda Drive in the Town of Fairfax. The traffic study was completed in accordance with the criteria established by the Town, reflects the scope of work as approved by the Town Council, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide Town staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the Town's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments.

It is noted that the proposed project would be anticipated to generate fewer than 100 trips per day based on Institute of Transportation Engineer (ITE) rates alone, so a full traffic study would not normally be required under Town policies. However, because the proposed homes would range between 3,500 and 4,500 square feet, the Town's Traffic Engineer determined that these standard rates would likely understate the project's actual trip potential, so a full traffic impact analysis was completed. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed project includes a ten-lot subdivision to accommodate ten single-family dwellings, along with a 6.5-acre public trail/park to be created and gifted to the Town or other public agency. Access to the northern nine parcels would be via a private road to be built along the existing dirt road continuing from the end of Marinda Drive. Access to the southern parcel would be via Ridgeway Avenue where it first borders the project property and from there by private driveway. The location of the project site is shown in Figure 1.

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Traffic Impact Study for the Marinda Heights Subdivision Project

Figure 1 – Study Area and Existing Lane Configurations

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Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following seven intersections.

1. Sir Francis Drake Boulevard/Oak Manor Drive
2. Sir Francis Drake Boulevard/Oak Tree Lane
3. Sir Francis Drake Boulevard/Marin Road
4. Sir Francis Drake Boulevard/Marinda Drive
5. Sir Francis Drake Boulevard/Claus Drive
6. Sir Francis Drake Boulevard/Pacheco Avenue
7. Sir Francis Drake Boulevard/Pastori Avenue-Willow Avenue

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak period occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak period occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Additionally, the following roadways were evaluated in terms of geometrics and access for alternative modes:

1. Marinda Drive
2. All segments of Sir Francis Drake Boulevard between the study intersections

Study Intersections

It is noted that Sir Francis Drake Boulevard (SFDB) is oriented more north-south for intersections west of Bank Street and east-west for intersections to the east; however, to be consistent it was assumed that the roadway runs east-west throughout the entire study area.

Sir Francis Drake Boulevard/Oak Manor Drive is a signalized tee-intersection with a left-turn lane provided on the eastbound SFDB approach and a right-turn lane provided on the westbound approach. Marked crosswalks are present on the north and west legs.

Sir Francis Drake Boulevard/Oak Tree Lane is an unsignalized tee-intersection stop-controlled on the southbound Oak Tree Lane approach. Marked crosswalks are provided on the north and west legs.

Sir Francis Drake Boulevard/Marin Road is an unsignalized tee-intersection located approximately 130 feet south of Sir Francis Drake Boulevard/Oak Tree Lane. The intersection is stop-controlled on the northbound Marin Road approach and has a marked crosswalk on the south leg.

Sir Francis Drake Boulevard/Marinda Drive is an unsignalized tee-intersection stop-controlled on the southbound Marinda Drive approach. A left-turn lane is provided on the eastbound SFDB approach and there is a marked crosswalk on the north leg.

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Sir Francis Drake Boulevard/Claus Drive is a signalized four-way intersection with left-turn lanes and protected left-turn phasing provided on the eastbound and westbound SFDB approaches. Right-turn lanes are provided on the northbound and eastbound approaches and marked crosswalks are provided on the north and east legs.

Sir Francis Drake Boulevard/Pacheco Avenue is an unsignalized tee-intersection stop-controlled on the northbound Pacheco Avenue approach. A right-turn lane is provided on the eastbound approach and left-turn lanes are provided on the northbound and westbound approaches. There are no marked crosswalks at the intersection.

Sir Francis Drake Boulevard/Pastori Avenue-Willow Avenue is a signalized four-way intersection with the south leg of Pastori Avenue offset approximately 40 feet west of the Willow Avenue leg on the north side. Left-turn lanes are provided on the eastbound and westbound SFDB approaches and protected left-turn phasing is provided on all approaches. Marked crosswalks are present on the north, south, and east legs.

The locations of the study intersections along with the existing lane configurations and controls are shown in Figure 1.

Study Roadways

Marinda Drive is a residential road that winds its way east from Sir Francis Drake Boulevard to its existing terminus at 261 Marinda Drive. The roadway is approximately 0.35 miles in length and has a *prima facie* speed limit of 25 miles per hour (mph). The width of the roadway varies between 30 and 35 feet and has sufficient width to accommodate street parking along its entirety.

Sir Francis Drake Boulevard between Oak Manor Drive and Pastori Avenue-Willow Avenue is a two-lane arterial with a posted speed limit of 25 mph. Between Oak Manor Drive and Claus Drive the roadway runs diagonally northwest-southeast and between Claus Drive and Pastori Avenue-Willow Avenue the roadway is oriented east-west. The roadway has a 12-foot travel lane and 5-foot bicycle lane present in each direction.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is May 1, 2011 through April 30, 2016.

Calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2012 Collision Data on California State Highways*, California Department of Transportation (Caltrans). The average collision rates for intersections differ based on whether the intersection is controlled by a traffic signal, all-way stop signs, or is uncontrolled, as well as the number of approaches (three or four).

As presented in Table 1, all seven of the study intersections had collision rates lower than the statewide average which indicates the intersections are operating acceptably with regards to safety.

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Table 1 – Summary of Collision Rates			
Study Intersection	**Number of Collisions (2011-2016)**	**Calculated Collision Rate (c/mve)**	**Statewide Average Collision Rate (c/mve)**
1. Sir Francis Drake Blvd/Oak Manor Dr	1	0.04	0.21
2. Sir Francis Drake Blvd/Oak Tree Ln	0	0.00	0.18
3. Sir Francis Drake Blvd/Marin Rd	1	0.04	0.18
4. Sir Francis Drake Blvd/Marinda Dr	3	0.10	0.18
5. Sir Francis Drake Blvd/Claus Dr	6	0.20	0.27
5. Sir Francis Drake Blvd/Pacheco Ave	1	0.03	0.18
12. Sir Francis Drake Blvd/Pastori Ave-Willow Ave	8	0.25	0.27

Note: c/mve = collisions per million vehicles entering

The collision rate calculations for the study intersections are provided in Appendix A.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians on Sir Francis Drake Boulevard; however, sidewalk gaps can be found along Marinda Drive connecting to the project site which impact convenient and continuous access for pedestrians.

- **Marinda Drive** – Intermittent sidewalk coverage is provided with significant gaps on both sides of the street throughout its entirety. Sidewalks are provided along most developed property frontages, but not all. Curb ramps and crosswalks at side street approaches are non-existent.

- **Sir Francis Drake Boulevard** – Continuous sidewalks exist on both sides of the roadway between Oak Manor Drive and Olema Road and on the north side of the roadway between Olema Road and Willow Avenue-Pastori Avenue. Crosswalks are provided at side street approaches and lighting is provided by overhead streetlights.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.

- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.

- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.

Guidance for Class IV Bikeways is provided in *Design Information Bulletin Number 89: Class IV Bikeway Guidance (Separated Bikeways/Cycle Tracks)*, Caltrans, 2015.

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- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project study area, Class II bike lanes exist on Sir Francis Drake Boulevard between Oak Manor Drive and Claus Drive. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Town of Fairfax Bicycle and Pedestrian Plan 2016 Update*.

Table 2 – Bicycle Facility Summary

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Sir Francis Drake Blvd	II	1.48	Fairfax Town Limit	Claus Dr
Planned				
Broadway	II	0.15	Claus Dr	Pacheco Ave
Broadway	II	0.02	Bank St	Claus Dr

Source: *Town of Fairfax Bicycle and Pedestrian Plan 2016 Update*, Town of Fairfax, 2016

Transit Facilities

There is an existing bus stop on Sir Francis Drake Boulevard at Marinda Drive that is located approximately 0.4 miles from the project site. The stop is served by Marin Transit Routes 23, 68, 125, and 228 and by Golden Gate Transit Route 24. Marin Transit Route 23 provides service between Fairfax and southeast San Rafael seven days a week, Route 68 provides daily service between the San Rafael Transit Center and Tomales Bay, Route 125 provides weekday service between the San Rafael Transit Center and Lagunitas, and Route 228 provides daily service between north Fairfax and the San Rafael Transit Center as well as Larkspur Landing. Golden Gate Transit Route 24 provides weekday commute service between Fairfax and San Francisco.

Marin Access Paratransit, a door-to-door service operated by Whistlestop Wheels under contract to Marin Transit, is available for those who are unable to independently use the transit system due to a physical or mental disability. Marin Access Paratransit is designed to serve the needs of individuals with disabilities within the greater Marin County area and is available by appointment.

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Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. It is noted that Sir Francis Drake Boulevard/Oak Manor Drive was evaluated using the 2000 methodology as the signal phasing is not supported by the 2010 methodology.

The Levels of Service for the intersections with side street stop controls were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are currently controlled by a traffic signal were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. The Synchro network used for the analysis of the Victory Village Project was obtained from the Town's Traffic Engineer and used for this analysis.

The ranges of delay associated with the various levels of service are indicated in Table 3.

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Table 3 – Intersection Level of Service Criteria		
LOS	**Two-Way Stop-Controlled**	**Signalized**
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2000 and 2010

Traffic Operation Standards

Town of Fairfax

The Town considers LOS D to be the minimum level of operation at both signalized and unsignalized intersections, as contained in the *Town of Fairfax 2010-2030 General Plan*. The intersection of Sir Francis Drake Boulevard/Pacheco Avenue was identified in the General Plan as operating unacceptably at LOS E during the morning peak hour and LOS F during the p.m. peak hour. Policy C-3.4 states that major increases in street capacity should be avoided unless necessary to remedy severe traffic congestion and numerous policies reflect the Town's goal to reduce reliance on automobiles and increase use of alternative modes such as walking, bicycling and transit.

Since application of the LOS D standard to individual movements at unsignalized intersections may lead to recommendations which introduce capacity enhancements at the expense of alternative modes and in direct conflict with Policy C-3.4, mitigation measures such as a traffic signal, additional lanes, or revised right-of-way controls were only considered if operation on any single movement fell to LOS F, indicating an average delay in excess of 50 seconds. For movements with relatively small volumes of less than 25 vehicles per hour, LOS F may be considered acceptable. Situations where this may apply include intersections with side street volumes that are inadequate to meet warrants indicating need for signalization and where other types of mitigation, including all-way stop controls or additional lanes, are infeasible. Some examples of locations where application of an LOS standard may not provide desirable results include the minor intersections along Sir Francis Drake Boulevard. Although these side streets may experience delays indicative of LOS E or F conditions for short periods during the day, the volumes affected are so low that signalization or other capacity-adding improvements would not be recommended.

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Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data collected for the Victory Village traffic analysis was used for all intersections except for Sir Francis Drake Boulevard/Pacheco Avenue and Sir Francis Drake Boulevard/Willow Avenue-Pastori Avenue for which new counts were collected in January 2017 and December 2016, respectively.

Intersection Levels of Service

Under Existing Conditions, the study intersections are operating acceptably at LOS C or better overall during both peak hours. The existing traffic volumes are shown in Figure 2. A summary of the intersection service levels is contained in Table 4, and copies of the calculations for all evaluated scenarios are provided in Appendix B.

Table 4 – Existing Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Sir Francis Drake Blvd/Oak Manor Dr	15.5	B	22.4	C
2. Sir Francis Drake Blvd/Oak Tree Ln	0.1	A	0.1	A
Southbound (Oak Tree Ln) Approach	*32.0*	*D*	*25.4*	*D*
3. Sir Francis Drake Blvd/Marin Rd	1.0	A	0.5	A
Northbound (Marin Rd) Approach	*34.7*	*D*	*23.1*	*C*
4. Sir Francis Drake Blvd/Marinda Dr	1.1	A	0.9	A
Southbound (Marinda Dr) Approach	***41.6***	***E***	***40.5***	***E***
5. Sir Francis Drake Blvd/Claus Dr	17.9	B	19.2	B
6. Sir Francis Drake Blvd/Pacheco Ave	2.6	A	3.7	A
Northbound (Pacheco Ave) Approach	*19.8*	*C*	*22.8*	*C*
7. Sir Francis Drake Blvd/Willow Ave-Pastori Ave	19.6	B	13.8	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** = unacceptable operation

It is noted that although the stop-controlled approach of Marinda Drive to Sir Francis Drake Boulevard is expected to operate unacceptably at LOS E during both peak hours. Because the affected volume of left-turning vehicles exceeds the threshold of 25 vehicles per hour, potential need for a traffic signal was considered, as detailed later in this report.

Future Conditions

Future volumes used in the Victory Village traffic analysis for the horizon year 2030 were used in this analysis at all study intersections except for Sir Francis Drake Boulevard/Pacheco Avenue and Sir Francis Drake Boulevard/ Willow Avenue-Pastori Avenue, as these two intersections were not included in the traffic analysis completed for the Victory Village project. Future volumes projected for use in the *Town of Fairfax 2010-2030 General Plan* for the horizon year 2030 were obtained from the Town's Consulting Traffic Engineer and used at these two intersections.

Under the anticipated Future volumes, the study intersections are expected to continue operating acceptably except for Sir Francis Drake Boulevard/Marin Road, which is expected to operate at LOS E during the morning peak

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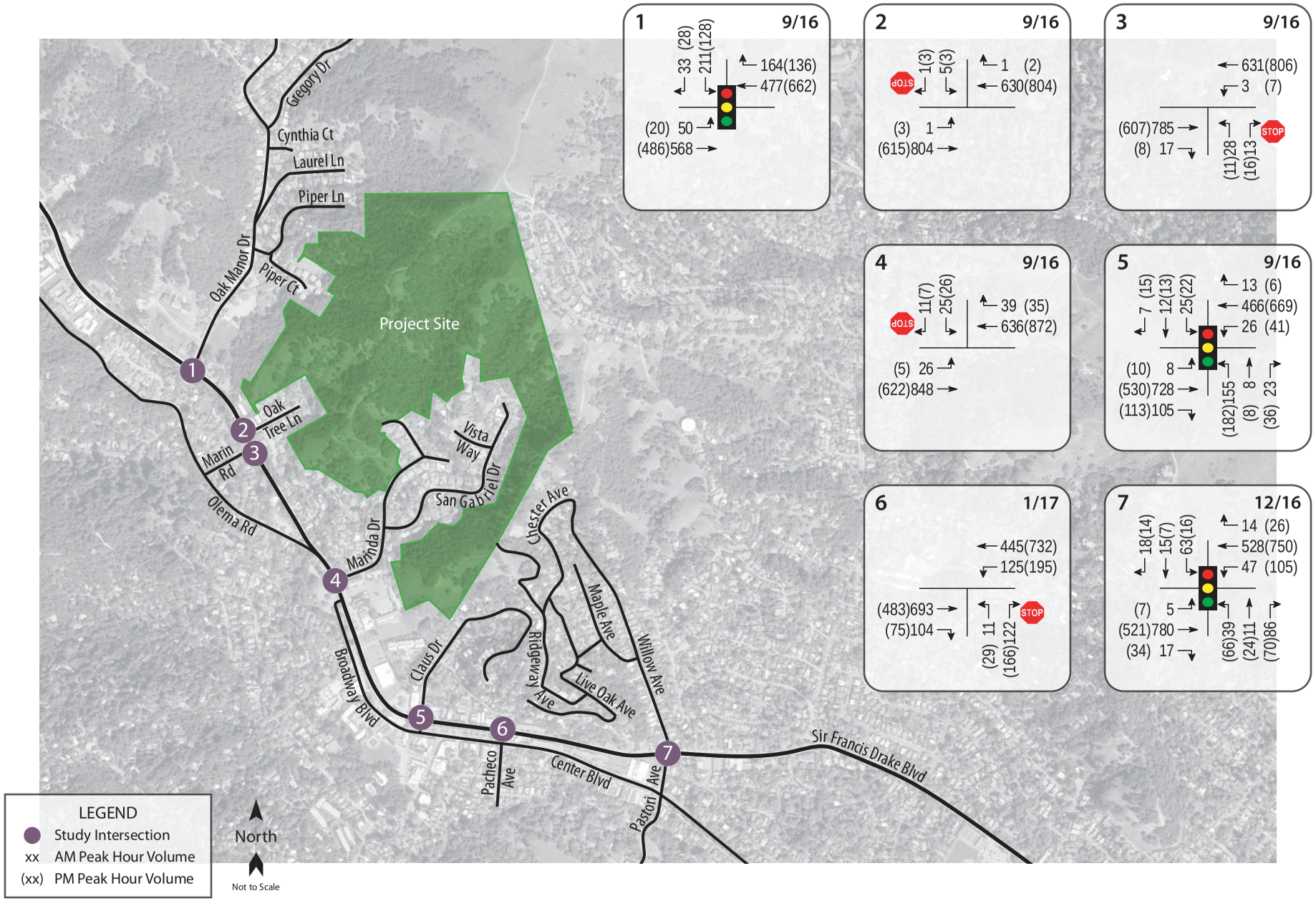

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Traffic Impact Study for the Marinda Heights Subdivision Project

Figure 2 – Existing Traffic Volumes

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hour, and Sir Francis Drake Boulevard/Marinda Drive, which is expected to continue operating at LOS E during both peak hours. The affected left-turn volumes at both locations exceed 25 vehicles per hour, so need for improvements was considered. Future operating conditions are summarized in Table 5, and Future volumes are shown in Figure 3.

Table 5 – Future Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	**LOS**	**Delay**	**LOS**
1. Sir Francis Drake Blvd/Oak Manor Dr	16.3	B	23.2	C
2. Sir Francis Drake Blvd/Oak Tree Ln	0.1	A	0.1	A
Southbound (Oak Tree Ln) Approach	*34.3*	*D*	*25.7*	*D*
3. Sir Francis Drake Blvd/Marin Rd	1.0	A	0.5	A
Northbound (Marin Rd) Approach	***37.6***	***E***	*23.6*	*C*
4. Sir Francis Drake Blvd/Marinda Dr	1.1	A	0.9	A
Southbound (Marinda Dr) Approach	***45.2***	***E***	***44.8***	***E***
5. Sir Francis Drake Blvd/Claus Dr	19.4	B	19.5	B
6. Sir Francis Drake Blvd/Pacheco Ave	3.2	A	3.8	A
Northbound (Pacheco Ave) Approach	*22.6*	*C*	*22.0*	*C*
7. Sir Francis Drake Blvd/Willow Ave-Pastori Ave	21.8	C	23.7	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** = unacceptable operation

Project Description

The proposed project includes a ten-lot subdivision to accommodate ten single-family dwellings, along with a 6.5-acre public trail/park to be created and gifted to the Town or other public agency. It is noted that the parcels would be deed restricted to a single dwelling. Access to the northern nine parcels would be via a private road to be built along the existing dirt road continuing from the end of Marinda Drive. The new all-weather roadway would have turnouts and fire hydrants installed at requisite intervals along its entirety. Access to the southern parcel would be via Ridgeway Avenue where it borders the project property and from there by an all-weather extension of the roadway. The extended roadway would end in a full-sized emergency access turnaround with a fire hydrant.

The proposed project site plan is shown in Figure 4.

Trip Generation

Through prior discussions with Mr. David Parisi, the Town's Consulting Traffic Engineer, it was determined that the proposed homes are likely to be fairly large, and therefore likely generate more trips than would be expected based on the standard trip generation rates published by the Institute of Transportation Engineers. In lieu of applying the standard rates, which would result in 95 daily trips, including eight during the morning peak hour and 10 during the evening peak hour, it was decided to increase the rate such that 120 daily trips would be assumed (12 per dwelling), including nine during the morning peak hour and 13 during the evening peak hour.

The expected trip generation potential for the proposed project is indicated in Table 6; these new trips represent the increase in traffic associated with the project compared to existing volumes.

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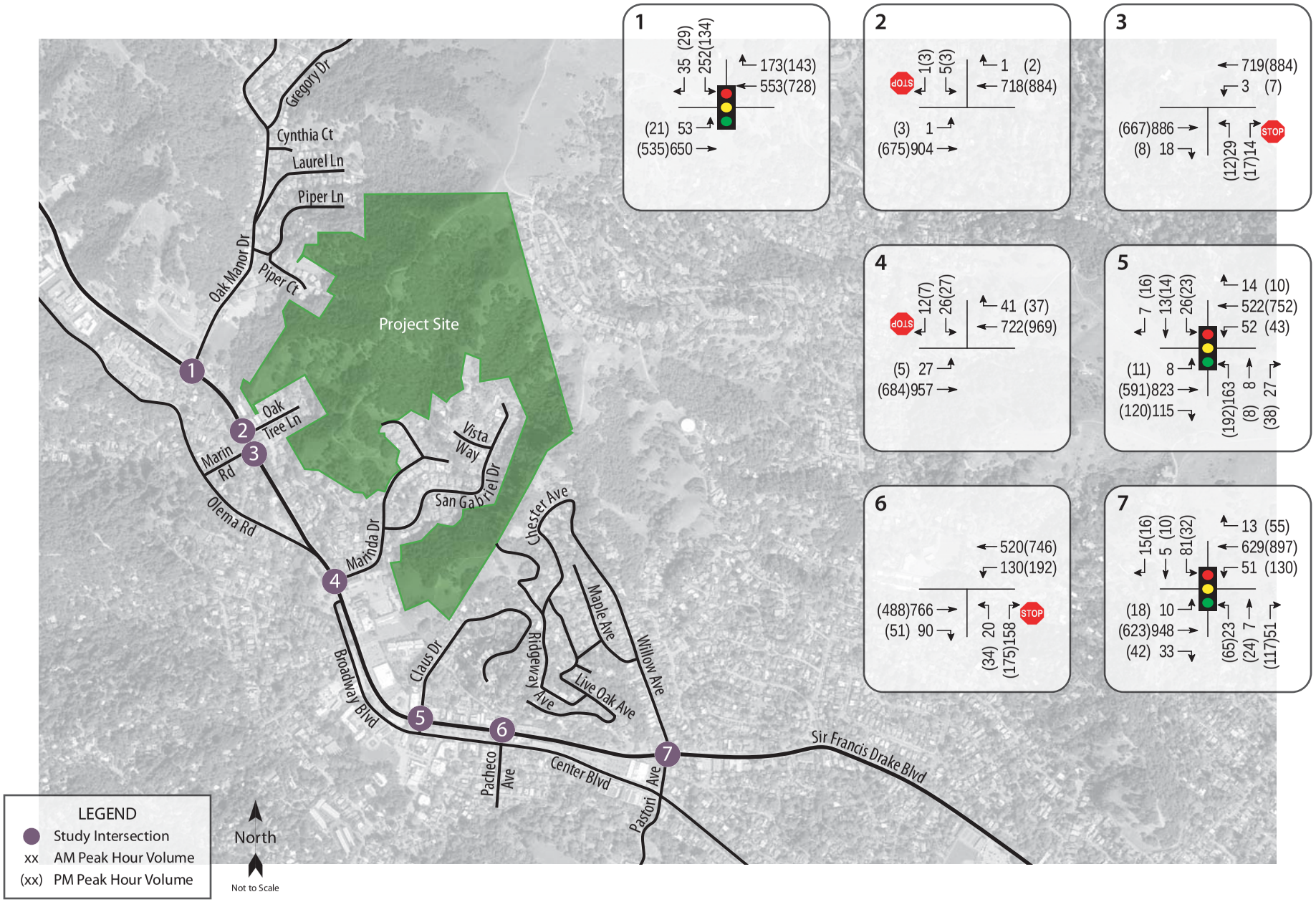

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Traffic Impact Study for the Marinda Heights Subdivision Project

Figure 3 – Future Traffic Volumes

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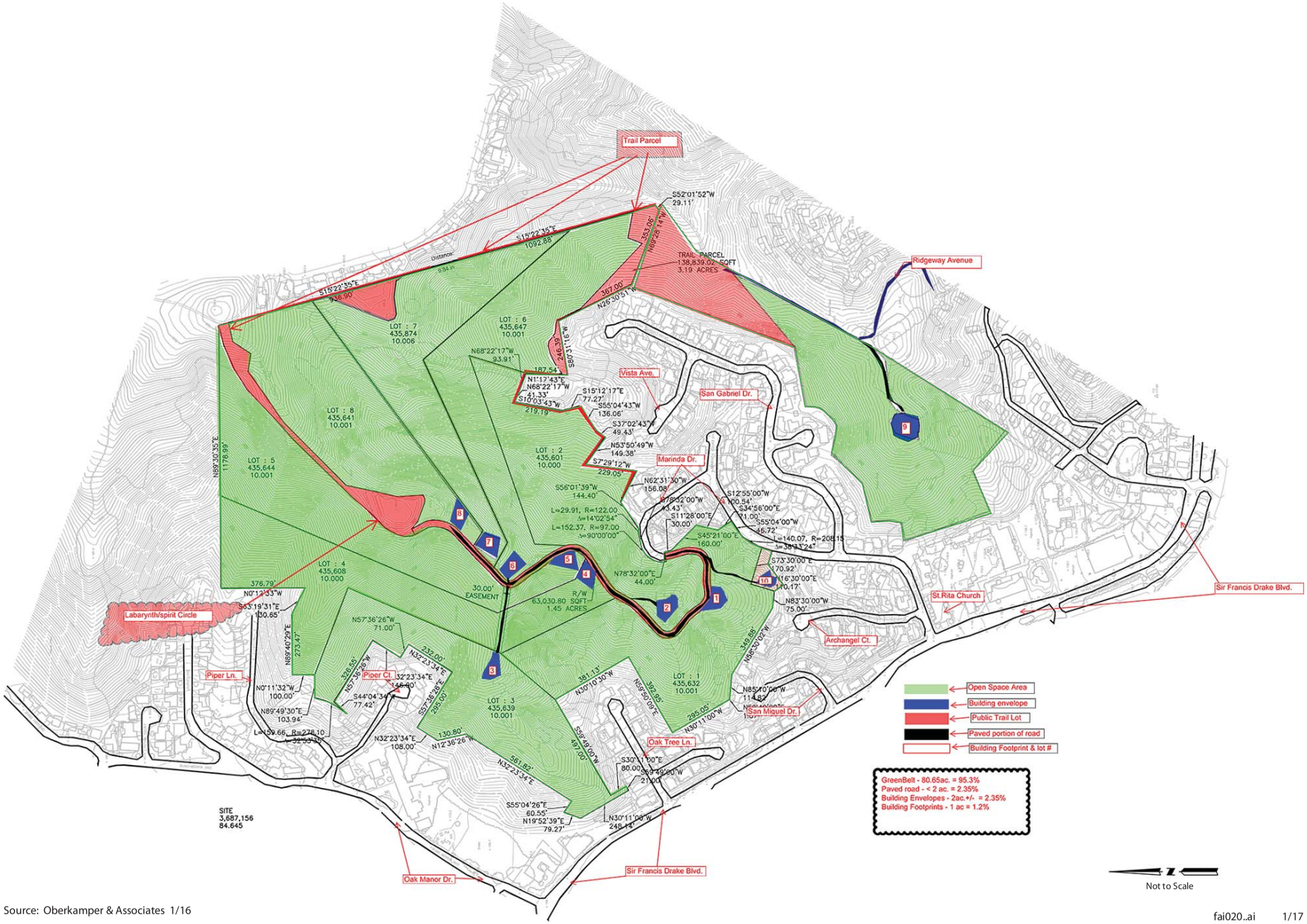

Source: Oberkamper & Associates 1/16

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Figure 4 – Site Plan

Table 6 – Trip Generation Summary											
Land Use	**Units**	**Daily**		**AM Peak Hour**				**PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**	**Rate**	**Trips**	**In**	**Out**
Proposed											
Single Family Detached Housing	10 du	12.00	120	0.90	9	3	6	1.08	13	9	4

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersections, observations of neighborhood travel patterns, and knowledge of traffic patterns in the area and surrounding region. It is likely that the majority of new trips associated with the proposed project would be commute trips via Sir Francis Drake Boulevard east of the project site. The applied distribution assumptions and resulting trips are shown in Table 7.

Table 7 – Trip Distribution Assumptions and Resulting Project-Added Trips				
Route	**Percent**	**Daily Trips**	**AM Trips**	**PM Trips**
Sir Francis Drake Blvd (East)	75%	90	7	10
Sir Francis Drake Blvd (West)	25%	30	2	3
TOTAL	**100%**	**120**	**9**	**13**

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating at the same levels of service during both peak hours. Project traffic volumes are shown in Figure 5, and the resulting levels of service are summarized in Table 8.

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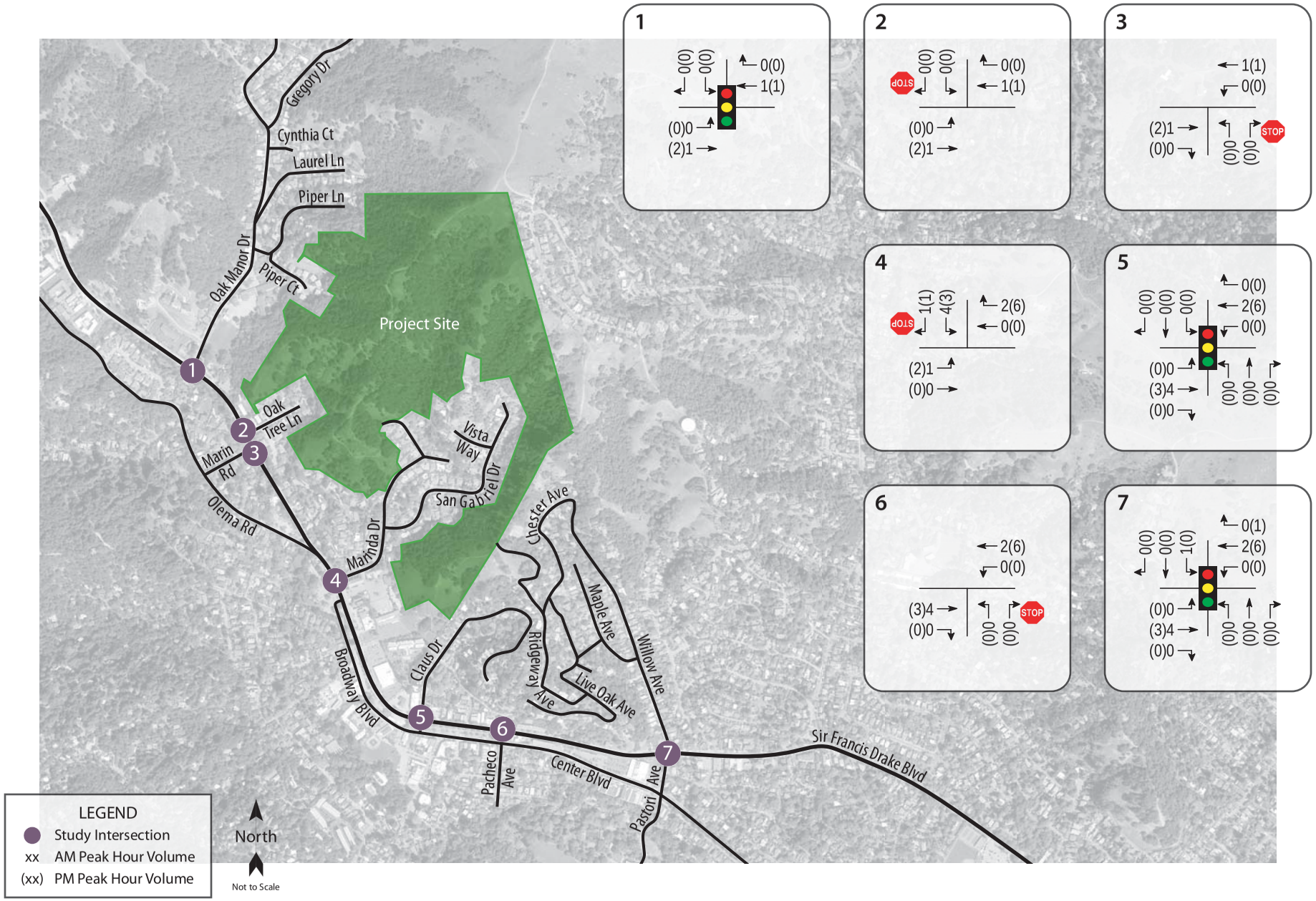

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Traffic Impact Study for the Marinda Heights Subdivision Project

Figure 5 – Project Traffic Volumes

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Table 8 – Existing and Existing plus Project Peak Hour Intersection Levels of Service								
Study Intersection ***Approach***	**Existing Conditions**				**Existing plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Sir Francis Drake Blvd/Oak Manor Dr	15.5	B	22.4	C	15.5	B	22.5	C
2. Sir Francis Drake Blvd/Oak Tree Ln	0.1	A	0.1	A	*0.1*	*A*	*0.1*	*A*
Southbound (Oak Tree Ln) Approach	*32.0*	*D*	*25.4*	*D*	*32.0*	*D*	*25.4*	*D*
3. Sir Francis Drake Blvd/Marin Rd	1.0	A	0.5	A	1.0	A	0.5	A
Northbound (Marin Rd) Approach	*34.7*	*D*	*23.1*	*C*	*34.7*	*D*	*23.2*	*C*
4. Sir Francis Drake Blvd/Marinda Dr	1.1	A	0.9	A	1.3	A	1.0	A
Southbound (Marinda Dr) Approach	***41.6***	***E***	***40.5***	***E***	***44.7***	***E***	***42.4***	***E***
5. Sir Francis Drake Blvd/Claus Dr	17.9	B	19.2	B	17.9	B	19.3	B
6. Sir Francis Drake Blvd/Pacheco Ave	2.6	A	3.7	A	2.6	A	3.7	A
Northbound (Pacheco Ave) Approach	*19.8*	*C*	*22.8*	*C*	*20.1*	*C*	*23.2*	*C*
7. Sir Francis Drake Blvd/Willow Ave-Pastori Ave	19.6	B	13.8	B	19.8	B	13.9	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** = unacceptable operation

Finding – The study intersections are expected to continue operating at the same levels of service upon the addition of project-generated traffic. While the added project traffic does not change the service level at Sir Francis Drake Boulevard/Marinda Drive, because it is already operating unacceptably the need for improvements to achieve LOS D operation were considered, as discussed later in this report.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, the study intersections are expected to continue operating at the same levels of service during both peak hours. The Future plus Project operating conditions are summarized in Table 9.

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Table 9 – Future and Future plus Project Peak Hour Intersection Levels of Service								
Study Intersection ***Approach***	**Future Conditions**				**Future plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Sir Francis Drake Blvd/Oak Manor Dr	16.3	B	23.2	C	16.3	B	23.3	C
2. Sir Francis Drake Blvd/Oak Tree Ln	0.1	A	0.1	A	0.1	A	0.1	A
Southbound (Oak Tree Ln) Approach	*34.3*	*D*	*25.7*	*D*	*34.5*	*D*	*31.3*	*D*
3. Sir Francis Drake Blvd/Marin Rd	1.0	A	0.5	A	1.0	A	0.5	A
Northbound (Marin Rd) Approach	***37.6***	***E***	*23.6*	*C*	***37.6***	***E***	*23.7*	*C*
4. Sir Francis Drake Blvd/Marinda Dr	1.1	A	0.9	A	1.3	A	1.1	A
Southbound (Marinda Dr) Approach	***45.2***	***E***	***44.8***	***E***	***48.7***	***E***	***46.6***	***E***
5. Sir Francis Drake Blvd/Claus Dr	19.4	B	19.5	B	19.5	B	19.5	B
6. Sir Francis Drake Blvd/Pacheco Ave	3.2	A	3.8	A	3.2	A	3.8	A
Northbound (Pacheco Ave) Approach	*22.6*	*C*	*22.0*	*C*	*23.2*	*C*	*22.3*	*C*
7. Sir Francis Drake Blvd/Willow Ave-Pastori Ave	21.8	C	23.7	C	22.2	C	24.0	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** = unacceptable operation

Finding – The study intersections will continue operating at the same service levels with project traffic added. Again, because unacceptable operation is experienced without the project, the need for improvements was evaluated.

Signal Warrant Analysis

A signal warrant analysis was performed to determine potential need for a traffic signal at Sir Francis Drake Boulevard/Marin Road and Sir Francis Drake Boulevard/Marinda Drive.

Chapter 4C of the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD) provides guidance on when a traffic signal should be considered. There are nine different warrants, or criteria, presented, as follows:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Volume
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

The CA-MUTCD cautions users against installing unwarranted traffic signals, as indicated in the following excerpts:

> *Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic signals even if one or more of the signal warrants has been satisfied.*

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Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of vehicular, bicycle, and pedestrian traffic.

For the purposes of this study, Warrant 3, the Peak Hour volume warrant, which determines the need for traffic control based on the highest volume hour of the day, was used as an initial indication of traffic control needs. The use of this signal warrant is common practice for planning studies. Other warrants, which are more generally applicable to existing traffic issues, require collection of traffic volumes for the highest four or eight hours of the day, review of the collision history, and evaluation of the system surrounding the location. It is noted that review of the collision data indicates that there are no safety issues that would warrant signalization.

Warrant 3 assesses potential need for a traffic control signal if the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:

   1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: four vehicle-hours for a one-lane approach; or five vehicle-hours for a two-lane approach, and
   2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
   3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

The Peak Hour Volume Signal Warrant was evaluated at Sir Francis Drake Boulevard/Marin Road and Sir Francis Drake Boulevard/Marinda Drive for each of the scenarios that resulted in unacceptable operation of the respective side street approaches. As shown in Table 10, neither of the intersections met the peak hour volume warrant under any of the evaluated scenarios.

Table 10 – Signal Warrant Analysis Summary

Study Intersection	AM Peak Hour				PM Peak Hour			
	E	E+P	F	F+P	E	E+P	F	F+P
3. Sir Francis Drake Blvd/Marin Rd	-	-	NO	NO	-	-	-	-
4. Sir Francis Drake Blvd/Marinda Dr	NO	NO	NO	NO	NO	NO	NO	NO

Notes: E = Existing conditions; E+P = Existing plus Project conditions; F = Future conditions; F+P = Future plus Project conditions; - = Scenario not evaluated since the intersection is projected to operate at LOS D or better

Copies of the signal warrant analysis sheets are provided in Appendix C.

Finding – A review of the Peak Hour Volume Warrant indicates that traffic signals are not warranted at either Sir Francis Drake Boulevard/Marin Road or Francis Drake Boulevard/Marinda Drive. Since signalization is not warranted either without or with project-added traffic, the LOS E operation is considered acceptable and the project's impact less-than-significant.

Alternative Modes

Pedestrian Facilities

Given the rural setting of the proposed subdivision and the vertical terrain of the surrounding area, it is unlikely that many residents would want to walk to or from the project site except for recreation purposes.

Finding – The intermittent sidewalk coverage on Marinda Drive is expected to be adequate for the minimal volume of pedestrian traffic expected to be generated by the project. Further, the project includes dedication of lands for public use that would provide additional recreational opportunities for pedestrians.

Bicycle Facilities

Existing bicycle facilities, including bike lanes on Sir Francis Drake Boulevard, together with shared use of minor streets, provide adequate access for bicyclists.

Finding – Bicycle facilities serving the project site are adequate.

Transit

The subdivision is not expected to generate many transit trips given that the nearest transit stop is located 0.4 miles from the project site, which is more than the preferred walking distance of 0.25 miles. However, should a project patron need to use transit, it would be possible to walk to the transit stop located on Sir Francis Drake Boulevard at Marinda Drive.

Finding – Transit facilities serving the project site are adequate for the anticipated demand.

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Access and Circulation

Site Access

Access to the northern nine parcels would be via an all-weather extension of Marinda Drive and private driveways. The new section of roadway would have turnouts and fire hydrants installed at requisite intervals along its entirety. Access to the southern parcel would be via Ridgeway Avenue where it borders the project property and from there by an all-weather extension of the roadway which would terminate in a full-sized emergency access turnaround with a fire hydrant.

As proposed in the site plan, on-site circulation and access would operate acceptably.

Sight Distance

At unsignalized intersections, a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic drivers to radically alter their speed.

Sight distances along Sir Francis Drake Boulevard at Marinda Drive were evaluated based on sight distance criteria contained in the *Highway Design Manual, 6th Edition* published by Caltrans. The recommended sight distance at intersections is based on corner sight distance with the approach travel speeds as the basis for determining the recommended sight distance.

For the posted 25-mph speed limit on Sir Francis Drake Boulevard, the recommended corner sight distance is 275 feet. Based on a review of the field conditions, sight distance at Marinda Drive extends passed Olema Road approximately 400 feet to the west, which satisfies requirements for approach speeds of 35 mph. To the east of Marinda Drive the available sight distance is greater than 500 feet, which satisfies requirements for approach speeds of 45 mph.

Finding – Sight distances along Sir Francis Drake Boulevard at Marinda Drive are adequate for speeds exceeding the posted speed limit.

Emergency Access

Although access to the southern parcel is via multiple narrow roads (Willow Avenue, Maple Avenue, Chester Avenue, and Ridgeway Avenue), any impact on emergency access due to trips associated with the addition of one home can reasonably be characterized as less-than-significant. Further, the project would provide all-weather extensions of existing roadways complete with fire truck turnarounds and full-sized fire hydrants. These developments are expected to improve emergency access and firefighting capabilities of the surrounding neighborhoods.

Finding – Emergency access is expected to operate acceptably.

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Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 120 new daily vehicle trips, including 9 trips during the morning peak hour and 13 trips during the evening peak hour.

- The study intersections are currently operating acceptably at LOS C or better during both peak hours except that the Marinda Drive approach to Sir Francis Drake Boulevard is operating at LOS E. Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating at the same levels of service during both peak hours.

- Under anticipated Future volumes, the study intersections are expected to continue operating at LOS C or better during both peak hours except that the intersection of Sir Francis Drake Boulevard/Marin Road is expected to operate at LOS E on the stop-controlled approach during the morning peak hour, and the Marinda Drive approach to Sir Francis Drake Boulevard is expected to operate at LOS E during both peaks. These service levels are expected to be unchanged upon the addition of project-generated traffic.

- Evaluation of the Peak Hour Volume Warrant indicates that traffic signals are not warranted at either Sir Francis Drake Boulevard/Marin Road or Sir Francis Drake Boulevard/Marinda Drive under any of the volume scenarios evaluated. Because increasing capacity by signalizing the intersections is unwarranted, and in keeping with the Town's policy to minimize such improvements, LOS E operation was determined to be acceptable at both of these locations.

- Pedestrian, bicycle, and transit facilities serving the project site are adequate for the anticipated demand.

- Sight distances along Sir Francis Drake Boulevard at Marinda Drive are adequate for the posted speed limit.

- The project would improve access for emergency response vehicles via the addition of turnarounds on the all-weather extensions of Marinda Drive and Ridgeway Avenue.

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Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Cameron Nye, EIT
Graphics/Editing/Formatting	Angela McCoy

References

2012 Collision Data on California State Highways, California Department of Transportation, 2012

Design Information Bulletin Number 89: Class IV Bikeway Guidance (Separated Bikeways/Cycle Tracks), California Department of Transportation, 2015

Golden Gate Transit, http://goldengatetransit.org/schedules/current/

Highway Capacity Manual, Transportation Research Board, 2000

Highway Capacity Manual, Transportation Research Board, 2010

Highway Design Manual, 6th Edition, California Department of Transportation, 2012

Marin Transit, http://www.marintransit.org/

Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2011-2016

Town of Fairfax 2010-2030 General Plan, Town of Fairfax, 2012

Town of Fairfax Bicycle and Pedestrian Plan 2016 Update, Town of Fairfax, 2016

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Appendix A

Collision Rate Calculations

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Intersection Collision Rate Calculations

Marinda Heights TIS

Intersection # 1: Sir Francis Drake Blvd & Oak Manor Dr

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 1
Number of Injuries: 1
Number of Fatalities: 0
ADT: 14600
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{14{,}600 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.04 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.21 c/mve**	**0.3%**	**42.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection # 2: Sir Francis Drave Blvd & Oak Tree Ln

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 14300
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{14{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.18 c/mve**	**0.7%**	**36.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

Marinda Heights TIS

Intersection # 3: Sir Francis Drake Blvd & Marin Rd

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 1
Number of Injuries: 1
Number of Fatalities: 0
ADT: 14600
Start Date: May 1, 2016
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{14{,}600 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.04 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.18 c/mve**	**0.7%**	**36.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection # 4: Sir Francis Drake Blvd & Marinda Dr

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 3
Number of Injuries: 3
Number of Fatalities: 0
ADT: 15700
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{15{,}700 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.10 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.18 c/mve**	**0.7%**	**36.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

Marinda Heights TIS

Intersection # 5: Sir Francis Drake Blvd & Claus Dr

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 6
Number of Injuries: 4
Number of Fatalities: 0
ADT: 16500
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{6 \times 1{,}000{,}000}{16{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.20 c/mve**	**0.0%**	**66.7%**
Statewide Average*	**0.27 c/mve**	**0.4%**	**41.9%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection # 6: Sir Francis Drake Blvd & Pacheco Ave

Date of Count: Wednesday, January 11, 2017

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 16800
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{16{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.03 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.18 c/mve**	**0.7%**	**36.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

Marinda Heights TIS

Intersection # 7: Sir Francis Drake Blvd & Willow Ave-Pastori Ave

Date of Count: Tuesday, November 01, 2016

Number of Collisions: 8
Number of Injuries: 5
Number of Fatalities: 0
ADT: 17800
Start Date: May 1, 2011
End Date: April 30, 2016
Number of Years: 5

Intersection Type: Offset
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{8 \times 1{,}000{,}000}{17{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.25 c/mve**	**0.0%**	**62.5%**
Statewide Average*	**0.27 c/mve**	**0.4%**	**41.9%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2012 Collision Data on California State Highways, Caltrans

Appendix B

Intersection Level of Service Calculations

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HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	568	477	164	211	33
Future Volume (vph)	50	568	477	164	211	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1753	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	617	518	178	229	36
RTOR Reduction (vph)	0	0	0	104	9	0
Lane Group Flow (vph)	54	617	518	74	256	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	496	
v/s Ratio Prot	0.03	c0.33	c0.28			
v/s Ratio Perm				0.05	c0.15	
v/c Ratio	0.33	0.57	0.67	0.11	0.52	
Uniform Delay, d1	25.5	7.8	14.1	10.7	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.5	2.2	4.5	0.3	3.8	
Delay (s)	31.0	9.9	18.7	11.1	21.8	
Level of Service	C	A	B	B	C	
Approach Delay (s)		11.6	16.7		21.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	486	662	136	128	28
Future Volume (vph)	20	486	662	136	128	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1746	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	528	720	148	139	30
RTOR Reduction (vph)	0	0	0	67	13	0
Lane Group Flow (vph)	22	528	720	82	156	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	494	
v/s Ratio Prot	0.01	c0.28	c0.39			
v/s Ratio Perm				0.05	c0.09	
v/c Ratio	0.14	0.49	0.93	0.12	0.32	
Uniform Delay, d1	25.1	7.3	16.6	10.8	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	1.6	18.9	0.4	1.7	
Delay (s)	26.8	8.8	35.5	11.1	18.6	
Level of Service	C	A	D	B	B	
Approach Delay (s)		9.5	31.4		18.6	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection							
Int Delay, s/veh	0.1						

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	804	630	1	5	1
Future Vol, veh/h	1	804	630	1	5	1
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	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	1	874	685	1	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	685	0	-	0	1561	685
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	876	-
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	908	-	-	-	123	448
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	908	-	-	-	123	448
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	406	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	908	-	-	-	140
HCM Lane V/C Ratio	0.001	-	-	-	0.047
HCM Control Delay (s)	9	0	-	-	32
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection							
Int Delay, s/veh	0.1						

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	615	804	2	3	3
Future Vol, veh/h	3	615	804	2	3	3
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	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	3	668	874	2	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	874	0	-	0	1549	874
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	675	-
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	772	-	-	-	125	349
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	506	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	772	-	-	-	124	349
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	772	-	-	-	183
HCM Lane V/C Ratio	0.004	-	-	-	0.036
HCM Control Delay (s)	9.7	0	-	-	25.4
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	785	17	3	631	28	13
Future Vol, veh/h	785	17	3	631	28	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	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	853	18	3	686	30	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	872	0	1555	863
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	692	-
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	-	-	773	-	124	354
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	497	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	773	-	123	354
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	494	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	34.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	123	354	-	-	773	-
HCM Lane V/C Ratio	0.247	0.04	-	-	0.004	-
HCM Control Delay (s)	43.6	15.6	-	-	9.7	0
HCM Lane LOS	E	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	607	8	7	806	11	16
Future Vol, veh/h	607	8	7	806	11	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	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	660	9	8	876	12	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	668	0	1555	664
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	891	-
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	-	-	922	-	124	461
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	401	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	922	-	122	461
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	394	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	23.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	122	461	-	-	922	-
HCM Lane V/C Ratio	0.098	0.038	-	-	0.008	-
HCM Control Delay (s)	37.7	13.1	-	-	8.9	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	26	848	636	39	25	11
Future Vol, veh/h	26	848	636	39	25	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	45	-	-	-	0	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	28	922	691	42	27	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	734	0	-	0	1690	712
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	978	-
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	871	-	-	-	103	432
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	871	-	-	-	100	432
Mov Cap-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	352	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	41.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	871	-	-	-	100	432
HCM Lane V/C Ratio	0.032	-	-	-	0.272	0.028
HCM Control Delay (s)	9.3	-	-	-	53.9	13.6
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	622	872	35	26	7
Future Vol, veh/h	5	622	872	35	26	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	662	928	37	28	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	965	0	-	0	1618	946
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	672	-
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	714	-	-	-	114	317
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	508	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	714	-	-	-	113	317
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	504	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	40.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	714	-	-	-	113	317
HCM Lane V/C Ratio	0.007	-	-	-	0.245	0.023
HCM Control Delay (s)	10.1	-	-	-	46.9	16.6
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	0.9	0.1

HCM 2010 Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	728	105	26	466	13	155	8	23	25	12	7
Future Volume (veh/h)	8	728	105	26	466	13	155	8	23	25	12	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	766	111	27	491	14	163	8	24	26	13	7
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1071	31	314	16	36	229	110	50
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1802	51	1201	81	180	833	548	248
Grp Volume(v), veh/h	8	766	111	27	0	505	195	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1854	1462	0	0	1629	0	0
Q Serve(g_s), s	0.4	25.5	2.8	1.3	0.0	13.7	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	25.5	2.8	1.3	0.0	13.7	10.9	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	0.84		0.12	0.57		0.15
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1102	366	0	0	388	0	0
V/C Ratio(X)	0.08	0.69	0.12	0.27	0.00	0.46	0.53	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1102	366	0	0	388	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.3	12.6	8.0	40.8	0.0	10.2	33.0	0.0	0.0	29.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	3.6	0.3	6.8	0.0	1.4	5.5	0.0	0.0	0.6	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(50%),veh/ln	0.2	14.1	1.3	0.8	0.0	7.3	5.0	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	41.9	16.1	8.2	47.5	0.0	11.5	38.4	0.0	0.0	30.2	0.0	0.0
LnGrp LOS	D	B	A	D		B	D			C		
Approach Vol, veh/h		885			532			195			46	
Approach Delay, s/veh		15.4			13.4			38.4			30.2	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		12.9	3.3	27.5		3.9	2.4	15.7
Green Ext Time (p_c), s		0.6	0.0	7.6		1.2	0.0	13.1

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
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1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	530	113	41	669	6	182	8	36	22	13	15
Future Volume (veh/h)	10	530	113	41	669	6	182	8	36	22	13	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	11	564	120	44	712	6	194	9	38	23	14	16
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1096	9	308	11	46	180	110	101
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1844	16	1178	55	231	613	551	503
Grp Volume(v), veh/h	11	564	120	44	0	718	241	0	0	53	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1860	1464	0	0	1666	0	0
Q Serve(g_s), s	0.5	15.9	3.0	2.2	0.0	22.9	11.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	15.9	3.0	2.2	0.0	22.9	14.0	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.80		0.16	0.43		0.30
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1106	365	0	0	391	0	0
V/C Ratio(X)	0.11	0.51	0.13	0.45	0.00	0.65	0.66	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1106	365	0	0	391	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.4	10.6	8.0	41.2	0.0	12.1	34.2	0.0	0.0	29.7	0.0	0.0
Incr Delay (d2), s/veh	2.3	1.7	0.3	13.9	0.0	3.0	9.1	0.0	0.0	0.7	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(50%),veh/ln	0.3	8.5	1.4	1.4	0.0	12.5	6.6	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	42.7	12.3	8.3	55.1	0.0	15.0	43.2	0.0	0.0	30.4	0.0	0.0
LnGrp LOS	D	B	A	E		B	D			C		
Approach Vol, veh/h		695			762			241			53	
Approach Delay, s/veh		12.1			17.3			43.2			30.4	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		16.0	4.2	17.9		4.2	2.5	24.9
Green Ext Time (p_c), s		0.3	0.0	10.7		1.5	0.0	11.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	693	104	125	445	11	122
Future Vol, veh/h	693	104	125	445	11	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	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	753	113	136	484	12	133

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	753	0	1508	753
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	755	-
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	-	-	857	-	133	410
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	464	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	857	-	112	410
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	390	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	112	410	-	-	857	-
HCM Lane V/C Ratio	0.107	0.323	-	-	0.159	-
HCM Control Delay (s)	40.9	17.9	-	-	10	-
HCM Lane LOS	E	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	1.4	-	-	0.6	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	483	75	195	732	29	166
Future Vol, veh/h	483	75	195	732	29	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	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	508	79	205	771	31	175

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	508	0	1689	508
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	1181	-
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	-	-	1057	-	103	565
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	291	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1057	-	83	565
Mov Cap-2 Maneuver	-	-	-	-	83	-
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	235	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	22.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	83	565	-	-	1057	-
HCM Lane V/C Ratio	0.368	0.309	-	-	0.194	-
HCM Control Delay (s)	71.7	14.2	-	-	9.2	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	1.4	1.3	-	-	0.7	-

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	780	17	47	528	14	39	11	86	63	15	18
Future Volume (veh/h)	5	780	17	47	528	14	39	11	86	63	15	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	821	18	49	556	15	41	12	91	66	16	19
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	947	21	76	1007	27	145	64	251	311	77	71
Arrive On Green	0.01	0.52	0.52	0.04	0.56	0.56	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1774	1816	40	1774	1805	49	324	253	992	911	304	282
Grp Volume(v), veh/h	5	0	839	49	0	571	144	0	0	101	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1856	1774	0	1854	1570	0	0	1497	0	0
Q Serve(g_s), s	0.2	0.0	29.2	2.0	0.0	14.5	0.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	29.2	2.0	0.0	14.5	5.2	0.0	0.0	3.4	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.28		0.63	0.65		0.19
Lane Grp Cap(c), veh/h	12	0	967	76	0	1034	460	0	0	459	0	0
V/C Ratio(X)	0.43	0.00	0.87	0.64	0.00	0.55	0.31	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	122	0	1067	127	0	1071	460	0	0	459	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	15.5	34.8	0.0	10.4	22.6	0.0	0.0	21.9	0.0	0.0
Incr Delay (d2), s/veh	22.7	0.0	7.2	8.7	0.0	0.6	1.8	0.0	0.0	1.1	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(50%),veh/ln	0.2	0.0	16.6	1.2	0.0	7.5	2.6	0.0	0.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	59.3	0.0	22.7	43.6	0.0	11.0	24.3	0.0	0.0	23.0	0.0	0.0
LnGrp LOS	E		C	D		B	C			C		
Approach Vol, veh/h		844			620			144			101	
Approach Delay, s/veh		22.9			13.6			24.3			23.0	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.2	7.7	43.0		23.2	5.0	45.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.7	5.3	42.5		18.7	5.1	42.7
Max Q Clear Time (g_c+I1), s		7.2	4.0	31.2		5.4	2.2	16.5
Green Ext Time (p_c), s		1.1	0.0	7.3		1.2	0.0	12.6

Intersection Summary	
HCM 2010 Ctrl Delay	19.6
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	521	34	105	750	26	66	24	70	16	7	14
Future Volume (veh/h)	7	521	34	105	750	26	66	24	70	16	7	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	566	37	114	815	28	72	26	76	17	8	15
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
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	19	874	57	147	1034	36	179	57	108	176	88	100
Arrive On Green	0.01	0.51	0.51	0.08	0.58	0.58	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	1730	113	1774	1790	62	523	357	682	501	551	632
Grp Volume(v), veh/h	8	0	603	114	0	843	174	0	0	40	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1843	1774	0	1852	1561	0	0	1684	0	0
Q Serve(g_s), s	0.2	0.0	12.8	3.4	0.0	18.8	4.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	12.8	3.4	0.0	18.8	5.5	0.0	0.0	1.1	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.03	0.41		0.44	0.42		0.37
Lane Grp Cap(c), veh/h	19	0	931	147	0	1069	344	0	0	364	0	0
V/C Ratio(X)	0.43	0.00	0.65	0.78	0.00	0.79	0.51	0.00	0.00	0.11	0.00	0.00
Avail Cap(c_a), veh/h	170	0	1214	250	0	1303	642	0	0	654	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.2	0.0	9.7	24.0	0.0	8.7	21.1	0.0	0.0	19.3	0.0	0.0
Incr Delay (d2), s/veh	14.9	0.0	0.8	8.5	0.0	2.7	1.2	0.0	0.0	0.1	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(50%),veh/ln	0.2	0.0	6.6	2.0	0.0	10.2	2.5	0.0	0.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	41.1	0.0	10.5	32.5	0.0	11.5	22.3	0.0	0.0	19.4	0.0	0.0
LnGrp LOS	D		B	C		B	C			B		
Approach Vol, veh/h		611			957			174			40	
Approach Delay, s/veh		10.9			14.0			22.3			19.4	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		13.0	8.9	31.4		13.0	5.1	35.3
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.9	7.5	35.1		18.9	5.1	37.5
Max Q Clear Time (g_c+I1), s		7.5	5.4	14.8		3.1	2.2	20.8
Green Ext Time (p_c), s		0.9	0.1	11.3		1.1	0.0	9.9

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	53	650	553	173	252	35
Future Volume (vph)	53	650	553	173	252	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1755	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	650	553	173	252	35
RTOR Reduction (vph)	0	0	0	101	9	0
Lane Group Flow (vph)	53	650	553	72	278	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	497	
v/s Ratio Prot	0.03	c0.35	c0.30			
v/s Ratio Perm				0.05	c0.16	
v/c Ratio	0.33	0.60	0.71	0.11	0.56	
Uniform Delay, d1	25.5	8.0	14.5	10.7	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	2.4	5.5	0.3	4.5	
Delay (s)	30.8	10.4	20.0	11.0	22.8	
Level of Service	C	B	C	B	C	
Approach Delay (s)		12.0	17.9		22.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	535	728	143	134	29
Future Volume (vph)	21	535	728	143	134	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1746	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1746	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	535	728	143	134	29
RTOR Reduction (vph)	0	0	0	64	13	0
Lane Group Flow (vph)	21	535	728	79	150	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	494	
v/s Ratio Prot	0.01	c0.29	c0.39			
v/s Ratio Perm				0.05	c0.09	
v/c Ratio	0.13	0.49	0.94	0.12	0.30	
Uniform Delay, d1	25.0	7.3	16.8	10.7	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	1.6	20.3	0.4	1.6	
Delay (s)	26.7	8.9	37.1	11.1	18.4	
Level of Service	C	A	D	B	B	
Approach Delay (s)		9.6	32.8		18.4	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	904	718	1	5	1
Future Vol, veh/h	1	904	718	1	5	1
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	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	904	718	1	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	718	0	-	0	1624	718
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	906	-
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	883	-	-	-	113	429
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	394	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	883	-	-	-	113	429
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	34.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	883	-	-	-	129
HCM Lane V/C Ratio	0.001	-	-	-	0.047
HCM Control Delay (s)	9.1	0	-	-	34.3
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	675	884	2	3	3
Future Vol, veh/h	3	675	884	2	3	3
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	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	675	884	2	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	884	0	-	0	1565	884
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	681	-
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	765	-	-	-	123	344
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	503	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	765	-	-	-	122	344
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	500	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	765	-	-	-	180
HCM Lane V/C Ratio	0.004	-	-	-	0.033
HCM Control Delay (s)	9.7	0	-	-	25.7
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	886	18	3	719	29	14
Future Vol, veh/h	886	18	3	719	29	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	886	18	3	719	29	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	904	0	1620	895
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	725	-
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	-	-	752	-	113	339
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	479	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	752	-	112	339
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	476	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	37.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	112	339	-	-	752	-
HCM Lane V/C Ratio	0.259	0.041	-	-	0.004	-
HCM Control Delay (s)	48	16.1	-	-	9.8	0
HCM Lane LOS	E	C	-	-	A	A
HCM 95th %tile Q(veh)	1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	667	8	7	884	12	17
Future Vol, veh/h	667	8	7	884	12	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	667	8	7	884	12	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	675	0	1569	671
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	898	-
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	-	-	916	-	122	456
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	398	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	916	-	120	456
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	392	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	23.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	120	456	-	-	916	-
HCM Lane V/C Ratio	0.1	0.037	-	-	0.008	-
HCM Control Delay (s)	38.3	13.2	-	-	9	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	957	722	41	26	12
Future Vol, veh/h	27	957	722	41	26	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	957	722	41	26	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	763	0	-	0	1754	743
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	1011	-
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	850	-	-	-	94	415
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	352	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	850	-	-	-	91	415
Mov Cap-2 Maneuver	-	-	-	-	91	-
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	341	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	45.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	850	-	-	-	91	415
HCM Lane V/C Ratio	0.032	-	-	-	0.286	0.029
HCM Control Delay (s)	9.4	-	-	-	59.7	13.9
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	684	969	37	27	7
Future Vol, veh/h	5	684	969	37	27	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	684	969	37	27	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1006	0	-	0	1682	988
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	694	-
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	689	-	-	-	104	300
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	496	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	689	-	-	-	103	300
Mov Cap-2 Maneuver	-	-	-	-	103	-
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	492	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	44.8
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	689	-	-	-	103	300
HCM Lane V/C Ratio	0.007	-	-	-	0.262	0.023
HCM Control Delay (s)	10.3	-	-	-	51.9	17.3
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0	-	-	-	1	0.1

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	823	115	52	522	14	163	8	27	26	13	7
Future Volume (veh/h)	8	823	115	52	522	14	163	8	27	26	13	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	823	115	52	522	14	163	8	27	26	13	7
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1073	29	310	16	40	228	109	49
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1806	48	1185	80	200	829	546	247
Grp Volume(v), veh/h	8	823	115	52	0	536	198	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1854	1464	0	0	1622	0	0
Q Serve(g_s), s	0.4	28.9	2.9	2.6	0.0	14.8	9.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	28.9	2.9	2.6	0.0	14.8	11.0	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	0.82		0.14	0.57		0.15
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1102	366	0	0	387	0	0
V/C Ratio(X)	0.08	0.74	0.12	0.53	0.00	0.49	0.54	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1102	366	0	0	387	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.3	13.3	8.0	41.4	0.0	10.4	33.0	0.0	0.0	29.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	4.5	0.3	18.7	0.0	1.5	5.7	0.0	0.0	0.6	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(50%),veh/ln	0.2	16.0	1.3	1.8	0.0	7.9	5.1	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	41.9	17.8	8.2	60.1	0.0	11.9	38.7	0.0	0.0	30.2	0.0	0.0
LnGrp LOS	D	B	A	E		B	D			C		
Approach Vol, veh/h		946			588			198			46	
Approach Delay, s/veh		16.8			16.2			38.7			30.2	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		13.0	4.6	30.9		3.9	2.4	16.8
Green Ext Time (p_c), s		0.6	0.0	6.5		1.2	0.0	14.5

Intersection Summary	
HCM 2010 Ctrl Delay	19.4
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	591	120	43	752	10	192	8	38	23	14	16
Future Volume (veh/h)	11	591	120	43	752	10	192	8	38	23	14	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	11	591	120	43	752	10	192	8	38	23	14	16
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1090	14	308	10	47	180	110	101
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1834	24	1180	49	234	612	551	503
Grp Volume(v), veh/h	11	591	120	43	0	762	238	0	0	53	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1858	1463	0	0	1666	0	0
Q Serve(g_s), s	0.5	17.0	3.0	2.1	0.0	25.4	11.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	17.0	3.0	2.1	0.0	25.4	13.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.81		0.16	0.43		0.30
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1105	365	0	0	391	0	0
V/C Ratio(X)	0.11	0.53	0.13	0.44	0.00	0.69	0.65	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1105	365	0	0	391	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.4	10.8	8.0	41.1	0.0	12.5	34.1	0.0	0.0	29.7	0.0	0.0
Incr Delay (d2), s/veh	2.3	1.8	0.3	13.4	0.0	3.5	8.8	0.0	0.0	0.7	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(50%),veh/ln	0.3	9.1	1.4	1.4	0.0	14.0	6.5	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	42.7	12.7	8.3	54.6	0.0	16.1	42.9	0.0	0.0	30.4	0.0	0.0
LnGrp LOS	D	B	A	D		B	D			C		
Approach Vol, veh/h		722			805			238			53	
Approach Delay, s/veh		12.4			18.1			42.9			30.4	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		15.8	4.1	19.0		4.2	2.5	27.4
Green Ext Time (p_c), s		0.4	0.0	11.1		1.5	0.0	12.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	766	90	130	520	20	158
Future Vol, veh/h	766	90	130	520	20	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	766	90	130	520	20	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	766	0	1546	766
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	780	-
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	-	-	847	-	126	403
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	452	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	847	-	107	403
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	22.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	107	403	-	-	847	-
HCM Lane V/C Ratio	0.187	0.392	-	-	0.153	-
HCM Control Delay (s)	46.2	19.6	-	-	10	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	0.7	1.8	-	-	0.5	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	488	51	192	746	34	175
Future Vol, veh/h	488	51	192	746	34	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	488	51	192	746	34	175

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	488	0	1618	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	1130	-
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	-	-	1075	-	114	580
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	308	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1075	-	94	580
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	253	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	22
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	94	580	-	-	1075	-
HCM Lane V/C Ratio	0.362	0.302	-	-	0.179	-
HCM Control Delay (s)	63.6	13.9	-	-	9.1	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	1.4	1.3	-	-	0.6	-

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	948	33	51	629	13	23	7	51	81	5	15
Future Volume (veh/h)	10	948	33	51	629	13	23	7	51	81	5	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	10	948	33	51	629	13	23	7	51	81	5	15
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	369	1005	35	149	1021	21	170	76	297	435	32	64
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	784	1789	62	571	1819	38	329	254	992	1117	108	214
Grp Volume(v), veh/h	10	0	981	51	0	642	81	0	0	101	0	0
Grp Sat Flow(s),veh/h/ln	784	0	1852	571	0	1856	1575	0	0	1439	0	0
Q Serve(g_s), s	0.6	0.0	32.1	4.4	0.0	15.1	0.0	0.0	0.0	0.5	0.0	0.0
Cycle Q Clear(g_c), s	15.6	0.0	32.1	36.5	0.0	15.1	2.3	0.0	0.0	2.8	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.28		0.63	0.80		0.15
Lane Grp Cap(c), veh/h	369	0	1040	149	0	1042	544	0	0	531	0	0
V/C Ratio(X)	0.03	0.00	0.94	0.34	0.00	0.62	0.15	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	369	0	1040	149	0	1042	544	0	0	531	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.8	0.0	13.3	30.8	0.0	9.6	16.7	0.0	0.0	16.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	16.1	1.3	0.0	1.1	0.6	0.0	0.0	0.8	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(50%),veh/ln	0.1	0.0	20.7	1.0	0.0	8.0	1.1	0.0	0.0	1.5	0.0	0.0
LnGrp Delay(d),s/veh	14.8	0.0	29.4	32.2	0.0	10.6	17.3	0.0	0.0	17.7	0.0	0.0
LnGrp LOS	B		C	C		B	B			B		
Approach Vol, veh/h		991			693			81			101	
Approach Delay, s/veh		29.3			12.2			17.3			17.7	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.0		41.0		24.0		41.0
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.5		36.5		19.5		36.5
Max Q Clear Time (g_c+I1), s		4.3		34.1		4.8		38.5
Green Ext Time (p_c), s		0.9		2.1		0.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	623	42	130	897	55	65	24	117	32	10	16
Future Volume (veh/h)	18	623	42	130	897	55	65	24	117	32	10	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	18	623	42	130	897	55	65	24	117	32	10	16
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	889	60	163	1019	62	144	69	205	226	75	89
Arrive On Green	0.02	0.52	0.52	0.09	0.59	0.59	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1726	116	1774	1737	107	377	302	893	688	326	386
Grp Volume(v), veh/h	18	0	665	130	0	952	206	0	0	58	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1842	1774	0	1844	1573	0	0	1400	0	0
Q Serve(g_s), s	0.8	0.0	22.6	5.9	0.0	36.4	5.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	22.6	5.9	0.0	36.4	9.3	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.06	0.32		0.57	0.55		0.28
Lane Grp Cap(c), veh/h	36	0	949	163	0	1081	418	0	0	389	0	0
V/C Ratio(X)	0.50	0.00	0.70	0.80	0.00	0.88	0.49	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	110	0	1071	209	0	1175	418	0	0	389	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.9	0.0	15.2	36.7	0.0	14.6	28.0	0.0	0.0	25.3	0.0	0.0
Incr Delay (d2), s/veh	10.0	0.0	1.8	15.3	0.0	7.6	4.1	0.0	0.0	0.8	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(50%),veh/ln	0.5	0.0	11.9	3.6	0.0	20.5	4.6	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	50.0	0.0	16.9	52.0	0.0	22.1	32.1	0.0	0.0	26.1	0.0	0.0
LnGrp LOS	D		B	D		C	C			C		
Approach Vol, veh/h		683			1082			206			58	
Approach Delay, s/veh		17.8			25.7			32.1			26.1	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.4	12.1	46.9		23.4	6.2	52.8
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.9	9.7	47.9		18.9	5.1	52.5
Max Q Clear Time (g_c+I1), s		11.3	7.9	24.6		4.3	2.8	38.4
Green Ext Time (p_c), s		0.9	0.1	14.2		1.4	0.0	9.9

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	569	478	164	211	33
Future Volume (vph)	50	569	478	164	211	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1753	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	618	520	178	229	36
RTOR Reduction (vph)	0	0	0	104	9	0
Lane Group Flow (vph)	54	618	520	74	256	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	496	
v/s Ratio Prot	0.03	c0.33	c0.28			
v/s Ratio Perm				0.05	c0.15	
v/c Ratio	0.33	0.57	0.67	0.11	0.52	
Uniform Delay, d1	25.5	7.8	14.2	10.7	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.5	2.2	4.6	0.3	3.8	
Delay (s)	31.0	10.0	18.7	11.1	21.8	
Level of Service	C	A	B	B	C	
Approach Delay (s)		11.7	16.8		21.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	488	663	136	128	28
Future Volume (vph)	20	488	663	136	128	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1746	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	530	721	148	139	30
RTOR Reduction (vph)	0	0	0	67	13	0
Lane Group Flow (vph)	22	530	721	82	156	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	494	
v/s Ratio Prot	0.01	c0.28	c0.39			
v/s Ratio Perm				0.05	c0.09	
v/c Ratio	0.14	0.49	0.93	0.12	0.32	
Uniform Delay, d1	25.1	7.3	16.7	10.8	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	1.6	19.0	0.4	1.7	
Delay (s)	26.8	8.9	35.7	11.1	18.6	
Level of Service	C	A	D	B	B	
Approach Delay (s)		9.6	31.5		18.6	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	805	631	1	5	1
Future Vol, veh/h	1	805	631	1	5	1
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	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	1	875	686	1	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	686	0	-	0	1563	686
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	877	-
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	908	-	-	-	123	447
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	908	-	-	-	123	447
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	406	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	908	-	-	-	140
HCM Lane V/C Ratio	0.001	-	-	-	0.047
HCM Control Delay (s)	9	0	-	-	32
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	617	805	2	3	3
Future Vol, veh/h	3	617	805	2	3	3
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	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	3	671	875	2	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	875	0	-	0	1552	875
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	677	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	771	-	-	-	125	349
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	505	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	771	-	-	-	124	349
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	771	-	-	-	183
HCM Lane V/C Ratio	0.004	-	-	-	0.036
HCM Control Delay (s)	9.7	0	-	-	25.4
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	786	17	3	632	28	13
Future Vol, veh/h	786	17	3	632	28	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	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	854	18	3	687	30	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	873	0	1557	864
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	693	-
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	-	-	773	-	124	354
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	496	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	773	-	123	354
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	493	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	34.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	123	354	-	-	773	-
HCM Lane V/C Ratio	0.247	0.04	-	-	0.004	-
HCM Control Delay (s)	43.6	15.6	-	-	9.7	0
HCM Lane LOS	E	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	609	8	7	807	11	16
Future Vol, veh/h	609	8	7	807	11	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	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	662	9	8	877	12	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	671	0	1558	666
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	892	-
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	-	-	919	-	124	459
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	400	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	919	-	122	459
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	122	459	-	-	919	-
HCM Lane V/C Ratio	0.098	0.038	-	-	0.008	-
HCM Control Delay (s)	37.7	13.2	-	-	8.9	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	848	636	41	29	12
Future Vol, veh/h	27	848	636	41	29	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	45	-	-	-	0	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	29	922	691	45	32	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	736	0	-	0	1694	714
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	980	-
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	870	-	-	-	102	431
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	870	-	-	-	99	431
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	352	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	44.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	870	-	-	-	99	431
HCM Lane V/C Ratio	0.034	-	-	-	0.318	0.03
HCM Control Delay (s)	9.3	-	-	-	57.5	13.6
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	622	872	41	29	8
Future Vol, veh/h	7	622	872	41	29	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	662	928	44	31	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	971	0	-	0	1626	949
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	677	-
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	710	-	-	-	112	316
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	505	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	710	-	-	-	111	316
Mov Cap-2 Maneuver	-	-	-	-	111	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	500	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	42.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	710	-	-	-	111	316
HCM Lane V/C Ratio	0.01	-	-	-	0.278	0.027
HCM Control Delay (s)	10.1	-	-	-	49.5	16.7
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	1	0.1

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	732	105	26	468	13	155	8	23	25	12	7
Future Volume (veh/h)	8	732	105	26	468	13	155	8	23	25	12	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	771	111	27	493	14	163	8	24	26	13	7
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1072	30	314	16	36	229	110	50
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1803	51	1201	81	180	833	548	248
Grp Volume(v), veh/h	8	771	111	27	0	507	195	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1854	1462	0	0	1629	0	0
Q Serve(g_s), s	0.4	25.8	2.8	1.3	0.0	13.7	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	25.8	2.8	1.3	0.0	13.7	10.9	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	0.84		0.12	0.57		0.15
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1102	366	0	0	388	0	0
V/C Ratio(X)	0.08	0.70	0.12	0.27	0.00	0.46	0.53	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1102	366	0	0	388	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.3	12.6	8.0	40.8	0.0	10.2	33.0	0.0	0.0	29.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	3.6	0.3	6.8	0.0	1.4	5.5	0.0	0.0	0.6	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(50%),veh/ln	0.2	14.2	1.3	0.8	0.0	7.3	5.0	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	41.9	16.3	8.2	47.5	0.0	11.6	38.4	0.0	0.0	30.2	0.0	0.0
LnGrp LOS	D	B	A	D		B	D			C		
Approach Vol, veh/h		890			534			195			46	
Approach Delay, s/veh		15.5			13.4			38.4			30.2	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		12.9	3.3	27.8		3.9	2.4	15.7
Green Ext Time (p_c), s		0.6	0.0	7.5		1.2	0.0	13.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	533	113	41	675	6	182	8	36	22	13	15
Future Volume (veh/h)	10	533	113	41	675	6	182	8	36	22	13	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	11	567	120	44	718	6	194	9	38	23	14	16
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1097	9	308	11	46	180	110	101
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1845	15	1178	55	231	613	551	503
Grp Volume(v), veh/h	11	567	120	44	0	724	241	0	0	53	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1860	1464	0	0	1666	0	0
Q Serve(g_s), s	0.5	16.0	3.0	2.2	0.0	23.3	11.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	16.0	3.0	2.2	0.0	23.3	14.0	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.80		0.16	0.43		0.30
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1106	365	0	0	391	0	0
V/C Ratio(X)	0.11	0.51	0.13	0.45	0.00	0.65	0.66	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1106	365	0	0	391	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.4	10.6	8.0	41.2	0.0	12.1	34.2	0.0	0.0	29.7	0.0	0.0
Incr Delay (d2), s/veh	2.3	1.7	0.3	13.9	0.0	3.0	9.1	0.0	0.0	0.7	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(50%),veh/ln	0.3	8.7	1.4	1.4	0.0	12.8	6.6	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	42.7	12.3	8.3	55.1	0.0	15.1	43.2	0.0	0.0	30.4	0.0	0.0
LnGrp LOS	D	B	A	E		B	D			C		
Approach Vol, veh/h		698			768			241			53	
Approach Delay, s/veh		12.1			17.4			43.2			30.4	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		16.0	4.2	18.0		4.2	2.5	25.3
Green Ext Time (p_c), s		0.3	0.0	10.7		1.5	0.0	12.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	697	104	125	447	11	122
Future Vol, veh/h	697	104	125	447	11	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	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	758	113	136	486	12	133

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	758	0	1516	758
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	758	-
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	-	-	853	-	131	407
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	463	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	853	-	110	407
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	389	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	20.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	110	407	-	-	853	-
HCM Lane V/C Ratio	0.109	0.326	-	-	0.159	-
HCM Control Delay (s)	41.7	18.1	-	-	10	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	0.4	1.4	-	-	0.6	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	486	75	195	738	29	166
Future Vol, veh/h	486	75	195	738	29	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	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	512	79	205	777	31	175

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	512	0	1699	512
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	1187	-
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	-	-	1053	-	101	562
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	290	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1053	-	81	562
Mov Cap-2 Maneuver	-	-	-	-	81	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	234	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	81	562	-	-	1053	-
HCM Lane V/C Ratio	0.377	0.311	-	-	0.195	-
HCM Control Delay (s)	74.1	14.3	-	-	9.2	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	1.5	1.3	-	-	0.7	-

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	784	17	47	530	14	39	11	86	64	15	18
Future Volume (veh/h)	5	784	17	47	530	14	39	11	86	64	15	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	5	825	18	49	558	15	41	12	91	67	16	19
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	949	21	76	1009	27	144	64	251	312	76	70
Arrive On Green	0.01	0.52	0.52	0.04	0.56	0.56	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1774	1816	40	1774	1806	49	324	253	992	915	301	278
Grp Volume(v), veh/h	5	0	843	49	0	573	144	0	0	102	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1856	1774	0	1854	1570	0	0	1494	0	0
Q Serve(g_s), s	0.2	0.0	29.4	2.0	0.0	14.6	0.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	29.4	2.0	0.0	14.6	5.2	0.0	0.0	3.5	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.28		0.63	0.66		0.19
Lane Grp Cap(c), veh/h	12	0	969	76	0	1036	459	0	0	458	0	0
V/C Ratio(X)	0.43	0.00	0.87	0.64	0.00	0.55	0.31	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	122	0	1065	127	0	1069	459	0	0	458	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	15.5	34.9	0.0	10.4	22.6	0.0	0.0	22.0	0.0	0.0
Incr Delay (d2), s/veh	22.8	0.0	7.4	8.8	0.0	0.6	1.8	0.0	0.0	1.1	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(50%),veh/ln	0.2	0.0	17.0	1.2	0.0	7.5	2.6	0.0	0.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	59.4	0.0	22.9	43.7	0.0	11.0	24.4	0.0	0.0	23.1	0.0	0.0
LnGrp LOS	E		C	D		B	C			C		
Approach Vol, veh/h		848			622			144			102	
Approach Delay, s/veh		23.1			13.6			24.4			23.1	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.2	7.7	43.2		23.2	5.0	45.9
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.7	5.3	42.5		18.7	5.1	42.7
Max Q Clear Time (g_c+I1), s		7.2	4.0	31.4		5.5	2.2	16.6
Green Ext Time (p_c), s		1.1	0.0	7.2		1.2	0.0	12.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.8
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	524	34	105	756	27	65	24	70	16	7	14
Future Volume (veh/h)	7	524	34	105	756	27	65	24	70	16	7	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	570	37	114	822	29	71	26	76	17	8	15
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
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	19	878	57	147	1037	37	176	57	108	175	87	100
Arrive On Green	0.01	0.51	0.51	0.08	0.58	0.58	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	1731	112	1774	1789	63	518	358	686	501	552	632
Grp Volume(v), veh/h	8	0	607	114	0	851	173	0	0	40	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1843	1774	0	1852	1562	0	0	1684	0	0
Q Serve(g_s), s	0.2	0.0	13.0	3.4	0.0	19.2	4.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	13.0	3.4	0.0	19.2	5.5	0.0	0.0	1.1	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.03	0.41		0.44	0.42		0.37
Lane Grp Cap(c), veh/h	19	0	935	147	0	1073	341	0	0	362	0	0
V/C Ratio(X)	0.43	0.00	0.65	0.78	0.00	0.79	0.51	0.00	0.00	0.11	0.00	0.00
Avail Cap(c_a), veh/h	169	0	1207	248	0	1296	639	0	0	651	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	26.3	0.0	9.7	24.1	0.0	8.8	21.3	0.0	0.0	19.4	0.0	0.0
Incr Delay (d2), s/veh	14.9	0.0	0.8	8.5	0.0	2.9	1.2	0.0	0.0	0.1	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(50%),veh/ln	0.2	0.0	6.6	2.0	0.0	10.3	2.5	0.0	0.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	41.3	0.0	10.5	32.6	0.0	11.6	22.4	0.0	0.0	19.6	0.0	0.0
LnGrp LOS	D		B	C		B	C			B		
Approach Vol, veh/h		615			965			173			40	
Approach Delay, s/veh		10.9			14.1			22.4			19.6	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		13.0	8.9	31.7		13.0	5.1	35.6
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.9	7.5	35.1		18.9	5.1	37.5
Max Q Clear Time (g_c+I1), s		7.5	5.4	15.0		3.1	2.2	21.2
Green Ext Time (p_c), s		0.9	0.0	11.3		1.1	0.0	9.9

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	53	651	554	173	252	35
Future Volume (vph)	53	651	554	173	252	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1755	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	651	554	173	252	35
RTOR Reduction (vph)	0	0	0	101	9	0
Lane Group Flow (vph)	53	651	554	72	278	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	497	
v/s Ratio Prot	0.03	c0.35	c0.30			
v/s Ratio Perm				0.05	c0.16	
v/c Ratio	0.33	0.60	0.71	0.11	0.56	
Uniform Delay, d1	25.5	8.0	14.5	10.7	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	2.4	5.5	0.3	4.5	
Delay (s)	30.8	10.5	20.1	11.0	22.8	
Level of Service	C	B	C	B	C	
Approach Delay (s)		12.0	17.9		22.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Sir Francis Drake Blvd & Oak Manor Dr

1/19/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	537	729	143	134	29
Future Volume (vph)	21	537	729	143	134	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	1863	1863	1583	1746	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	1863	1863	1583	1746	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	537	729	143	134	29
RTOR Reduction (vph)	0	0	0	64	13	0
Lane Group Flow (vph)	21	537	729	79	150	0
Turn Type	Prot	NA	NA	Perm	Perm	
Protected Phases	7	4	8			
Permitted Phases				8	6	
Actuated Green, G (s)	5.5	35.0	25.0	25.0	17.0	
Effective Green, g (s)	5.5	35.0	25.0	25.0	17.0	
Actuated g/C Ratio	0.09	0.58	0.42	0.42	0.28	
Clearance Time (s)	4.5	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	162	1086	776	659	494	
v/s Ratio Prot	0.01	c0.29	c0.39			
v/s Ratio Perm				0.05	c0.09	
v/c Ratio	0.13	0.49	0.94	0.12	0.30	
Uniform Delay, d1	25.0	7.3	16.8	10.7	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	1.6	20.5	0.4	1.6	
Delay (s)	26.7	8.9	37.3	11.1	18.4	
Level of Service	C	A	D	B	B	
Approach Delay (s)		9.6	33.0		18.4	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	905	719	1	5	1
Future Vol, veh/h	1	905	719	1	5	1
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	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	905	719	1	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	719	0	-	0	1626	719
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	907	-
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	882	-	-	-	112	428
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	394	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	882	-	-	-	112	428
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	34.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	882	-	-	-	128
HCM Lane V/C Ratio	0.001	-	-	-	0.047
HCM Control Delay (s)	9.1	0	-	-	34.5
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	677	885	2	3	3
Future Vol, veh/h	3	677	885	2	3	3
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	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	677	885	2	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	885	0	-	0	1568	885
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	683	-
Critical Hdwy	4.12	-	-	-	7.12	6.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	765	-	-	-	90	344
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	439	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	765	-	-	-	90	344
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	338	-
Stage 2	-	-	-	-	436	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	31.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	765	-	-	-	143
HCM Lane V/C Ratio	0.004	-	-	-	0.042
HCM Control Delay (s)	9.7	0	-	-	31.3
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	887	18	3	720	29	14
Future Vol, veh/h	887	18	3	720	29	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	887	18	3	720	29	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	905	0	1622	896
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	726	-
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	-	-	752	-	113	339
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	479	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	752	-	112	339
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	476	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	37.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	112	339	-	-	752	-
HCM Lane V/C Ratio	0.259	0.041	-	-	0.004	-
HCM Control Delay (s)	48	16.1	-	-	9.8	0
HCM Lane LOS	E	C	-	-	A	A
HCM 95th %tile Q(veh)	1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	669	8	7	885	12	17
Future Vol, veh/h	669	8	7	885	12	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	669	8	7	885	12	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	677	0	1572	673
Stage 1	-	-	-	-	673	-
Stage 2	-	-	-	-	899	-
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	-	-	915	-	121	455
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	915	-	119	455
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	391	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	23.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	119	455	-	-	915	-
HCM Lane V/C Ratio	0.101	0.037	-	-	0.008	-
HCM Control Delay (s)	38.6	13.2	-	-	9	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	957	722	43	30	13
Future Vol, veh/h	28	957	722	43	30	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	957	722	43	30	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	765	0	-	0	1757	744
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	1013	-
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	848	-	-	-	93	415
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	351	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	848	-	-	-	90	415
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	48.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	848	-	-	-	90	415
HCM Lane V/C Ratio	0.033	-	-	-	0.333	0.031
HCM Control Delay (s)	9.4	-	-	-	63.8	14
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	684	969	43	30	8
Future Vol, veh/h	7	684	969	43	30	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	45	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	684	969	43	30	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1012	0	-	0	1689	991
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	698	-
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	685	-	-	-	103	299
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	494	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	685	-	-	-	102	299
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	489	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	46.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	685	-	-	-	102	299
HCM Lane V/C Ratio	0.01	-	-	-	0.294	0.027
HCM Control Delay (s)	10.3	-	-	-	54.4	17.4
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0	-	-	-	1.1	0.1

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	827	115	52	524	14	163	8	27	26	13	7
Future Volume (veh/h)	8	827	115	52	524	14	163	8	27	26	13	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	8	827	115	52	524	14	163	8	27	26	13	7
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1074	29	310	16	40	228	109	49
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1806	48	1185	80	200	829	546	247
Grp Volume(v), veh/h	8	827	115	52	0	538	198	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1854	1464	0	0	1622	0	0
Q Serve(g_s), s	0.4	29.1	2.9	2.6	0.0	14.9	9.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	29.1	2.9	2.6	0.0	14.9	11.0	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	0.82		0.14	0.57		0.15
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1102	366	0	0	387	0	0
V/C Ratio(X)	0.08	0.75	0.12	0.53	0.00	0.49	0.54	0.00	0.00	0.12	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1102	366	0	0	387	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.3	13.3	8.0	41.4	0.0	10.4	33.0	0.0	0.0	29.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	4.6	0.3	18.7	0.0	1.5	5.7	0.0	0.0	0.6	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(50%),veh/ln	0.2	16.1	1.3	1.8	0.0	8.1	5.1	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	41.9	17.9	8.2	60.1	0.0	12.0	38.7	0.0	0.0	30.2	0.0	0.0
LnGrp LOS	D	B	A	E		B	D			C		
Approach Vol, veh/h		950			590			198			46	
Approach Delay, s/veh		17.0			16.2			38.7			30.2	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		13.0	4.6	31.1		3.9	2.4	16.9
Green Ext Time (p_c), s		0.6	0.0	6.3		1.2	0.0	14.6

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

HCM 2010 Signalized Intersection Summary
5: Claus Dr & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	594	120	43	758	10	192	8	38	23	14	16
Future Volume (veh/h)	11	594	120	43	758	10	192	8	38	23	14	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	11	594	120	43	758	10	192	8	38	23	14	16
Adj No. of Lanes	1	1	1	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	1107	941	99	1090	14	308	10	47	180	110	101
Arrive On Green	0.06	0.59	0.59	0.06	0.59	0.59	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	1774	1834	24	1180	49	234	612	551	503
Grp Volume(v), veh/h	11	594	120	43	0	768	238	0	0	53	0	0
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1858	1463	0	0	1666	0	0
Q Serve(g_s), s	0.5	17.1	3.0	2.1	0.0	25.7	11.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	17.1	3.0	2.1	0.0	25.7	13.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.81		0.16	0.43		0.30
Lane Grp Cap(c), veh/h	99	1107	941	99	0	1105	365	0	0	391	0	0
V/C Ratio(X)	0.11	0.54	0.13	0.44	0.00	0.70	0.65	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	99	1107	941	99	0	1105	365	0	0	391	0	0
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(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.4	10.9	8.0	41.1	0.0	12.6	34.1	0.0	0.0	29.7	0.0	0.0
Incr Delay (d2), s/veh	2.3	1.9	0.3	13.4	0.0	3.6	8.8	0.0	0.0	0.7	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(50%),veh/ln	0.3	9.3	1.4	1.4	0.0	14.1	6.5	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	42.7	12.7	8.3	54.6	0.0	16.2	42.9	0.0	0.0	30.4	0.0	0.0
LnGrp LOS	D	B	A	D		B	D			C		
Approach Vol, veh/h		725			811			238			53	
Approach Delay, s/veh		12.4			18.3			42.9			30.4	
Approach LOS		B			B			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.5	9.5	58.0		22.5	9.5	58.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	5.0	40.5		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s		15.8	4.1	19.1		4.2	2.5	27.7
Green Ext Time (p_c), s		0.4	0.0	11.2		1.5	0.0	12.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	780	90	130	522	20	158
Future Vol, veh/h	780	90	130	522	20	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	780	90	130	522	20	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	780	0	1562	780
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	782	-
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	-	-	837	-	123	395
Stage 1	-	-	-	-	452	-
Stage 2	-	-	-	-	451	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	837	-	104	395
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	452	-
Stage 2	-	-	-	-	381	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	104	395	-	-	837	-
HCM Lane V/C Ratio	0.192	0.4	-	-	0.155	-
HCM Control Delay (s)	47.7	20.1	-	-	10.1	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	0.7	1.9	-	-	0.5	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	491	51	192	752	34	175
Future Vol, veh/h	491	51	192	752	34	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	70	-	40	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	491	51	192	752	34	175

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	491	0	1627	491
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	1136	-
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	-	-	1072	-	112	578
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	306	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1072	-	92	578
Mov Cap-2 Maneuver	-	-	-	-	92	-
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	251	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	22.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	92	578	-	-	1072	-
HCM Lane V/C Ratio	0.37	0.303	-	-	0.179	-
HCM Control Delay (s)	65.5	13.9	-	-	9.1	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	1.5	1.3	-	-	0.7	-

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	952	33	51	631	13	23	7	51	82	5	15
Future Volume (veh/h)	10	952	33	51	631	13	23	7	51	82	5	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	10	952	33	51	631	13	23	7	51	82	5	15
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	368	1005	35	147	1021	21	170	76	297	436	32	63
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	783	1790	62	569	1819	37	329	254	992	1120	107	212
Grp Volume(v), veh/h	10	0	985	51	0	644	81	0	0	102	0	0
Grp Sat Flow(s),veh/h/ln	783	0	1852	569	0	1856	1575	0	0	1438	0	0
Q Serve(g_s), s	0.6	0.0	32.4	4.1	0.0	15.1	0.0	0.0	0.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	15.7	0.0	32.4	36.5	0.0	15.1	2.3	0.0	0.0	2.9	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.28		0.63	0.80		0.15
Lane Grp Cap(c), veh/h	368	0	1040	147	0	1042	544	0	0	531	0	0
V/C Ratio(X)	0.03	0.00	0.95	0.35	0.00	0.62	0.15	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	368	0	1040	147	0	1042	544	0	0	531	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.8	0.0	13.3	31.0	0.0	9.6	16.7	0.0	0.0	16.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	16.7	1.4	0.0	1.1	0.6	0.0	0.0	0.8	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(50%),veh/ln	0.1	0.0	21.0	1.0	0.0	8.0	1.1	0.0	0.0	1.5	0.0	0.0
LnGrp Delay(d),s/veh	14.9	0.0	30.1	32.5	0.0	10.7	17.3	0.0	0.0	17.7	0.0	0.0
LnGrp LOS	B		C	C		B	B			B		
Approach Vol, veh/h		995			695			81			102	
Approach Delay, s/veh		29.9			12.3			17.3			17.7	
Approach LOS		C			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.0		41.0		24.0		41.0
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.5		36.5		19.5		36.5
Max Q Clear Time (g_c+I1), s		4.3		34.4		4.9		38.5
Green Ext Time (p_c), s		0.9		1.9		0.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

HCM 2010 Signalized Intersection Summary
7: Pastori Ave/Willow Ave & Sir Francis Drake Blvd

1/19/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	626	42	130	903	56	65	24	117	32	10	16
Future Volume (veh/h)	18	626	42	130	903	56	65	24	117	32	10	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), 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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	18	626	42	130	903	56	65	24	117	32	10	16
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	892	60	163	1021	63	143	69	204	225	74	88
Arrive On Green	0.02	0.52	0.52	0.09	0.59	0.59	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1726	116	1774	1736	108	377	302	893	687	325	386
Grp Volume(v), veh/h	18	0	668	130	0	959	206	0	0	58	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1842	1774	0	1844	1573	0	0	1398	0	0
Q Serve(g_s), s	0.8	0.0	22.7	5.9	0.0	37.0	5.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	22.7	5.9	0.0	37.0	9.4	0.0	0.0	2.4	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.06	0.32		0.57	0.55		0.28
Lane Grp Cap(c), veh/h	36	0	952	163	0	1084	417	0	0	387	0	0
V/C Ratio(X)	0.50	0.00	0.70	0.80	0.00	0.88	0.49	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	109	0	1067	208	0	1170	417	0	0	387	0	0
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(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.1	0.0	15.2	36.8	0.0	14.6	28.1	0.0	0.0	25.5	0.0	0.0
Incr Delay (d2), s/veh	10.1	0.0	1.8	15.4	0.0	7.9	4.2	0.0	0.0	0.8	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(50%),veh/ln	0.5	0.0	12.0	3.6	0.0	20.8	4.7	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	50.2	0.0	17.0	52.3	0.0	22.6	32.3	0.0	0.0	26.3	0.0	0.0
LnGrp LOS	D		B	D		C	C			C		
Approach Vol, veh/h		686			1089			206			58	
Approach Delay, s/veh		17.9			26.1			32.3			26.3	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.4	12.1	47.2		23.4	6.2	53.1
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.9	9.7	47.9		18.9	5.1	52.5
Max Q Clear Time (g_c+I1), s		11.4	7.9	24.7		4.4	2.8	39.0
Green Ext Time (p_c), s		0.9	0.1	14.3		1.4	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Appendix C

Signal Warrant Analysis Sheets

DRAFT

Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	Victory Village Data
Scenario:	AM Existing

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.42 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 36 vph

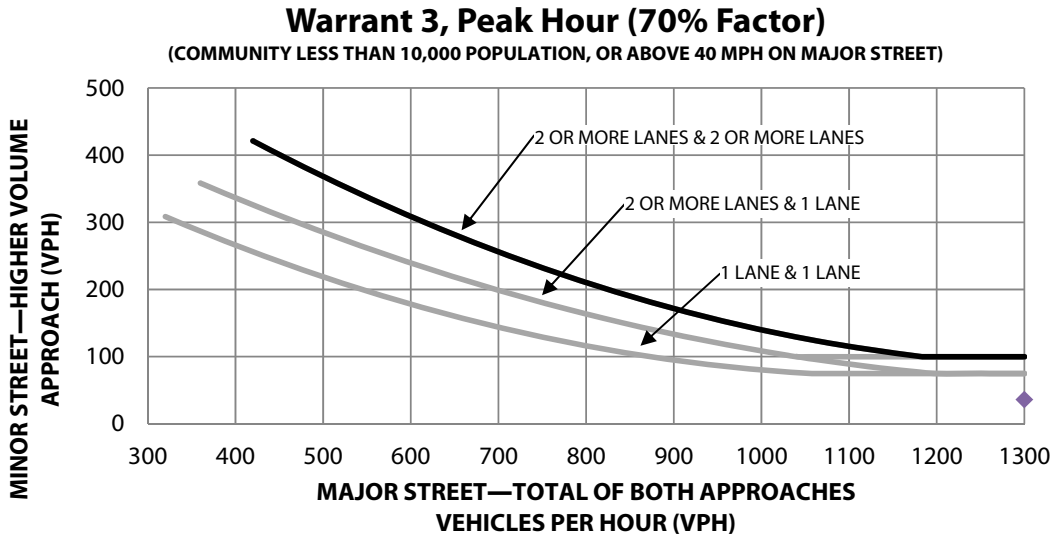
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1585 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	Victory Village Data
Scenario:	PM Existing

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.37 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 33 vph

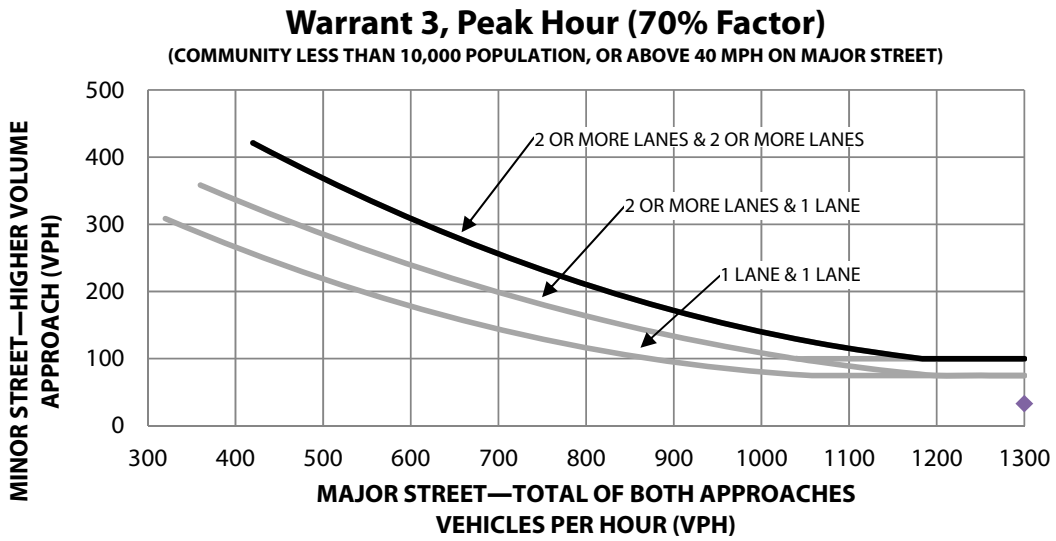
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1567 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	Victory Village Data
Scenario:	AM Existing + Project

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.51 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 41 vph

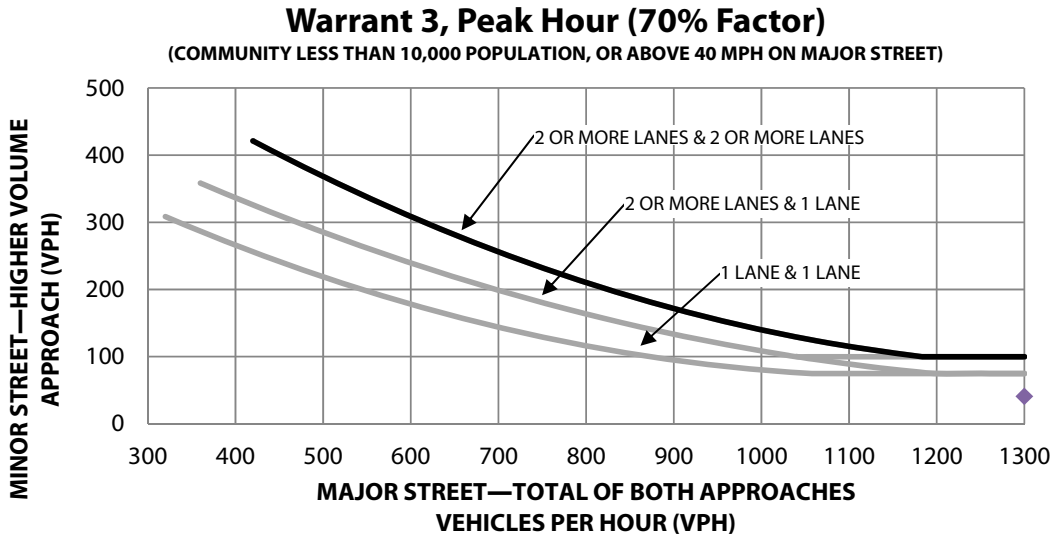
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1593 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	Victory Village Data
Scenario:	PM Existing + Project

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.44 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 37 vph

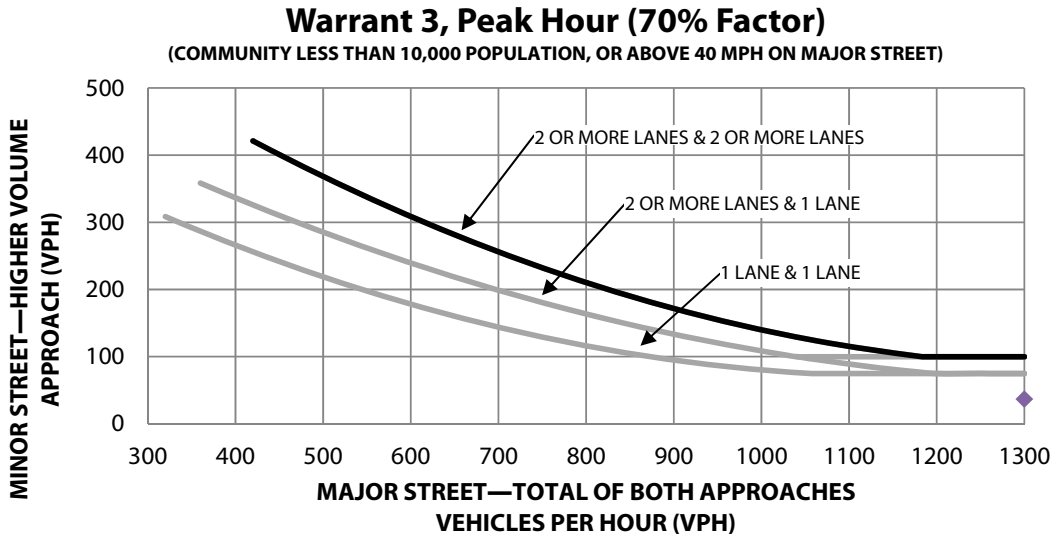
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1579 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	General Plan Data
Scenario:	AM Future

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.48 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 38 vph

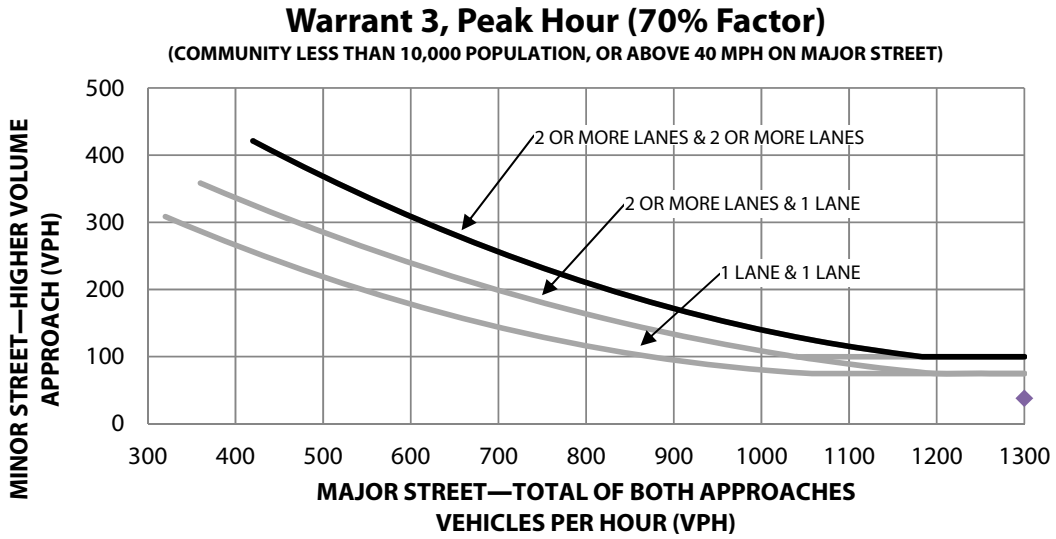
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1785 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	General Plan Data
Scenario:	PM Future

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.42 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 34 vph

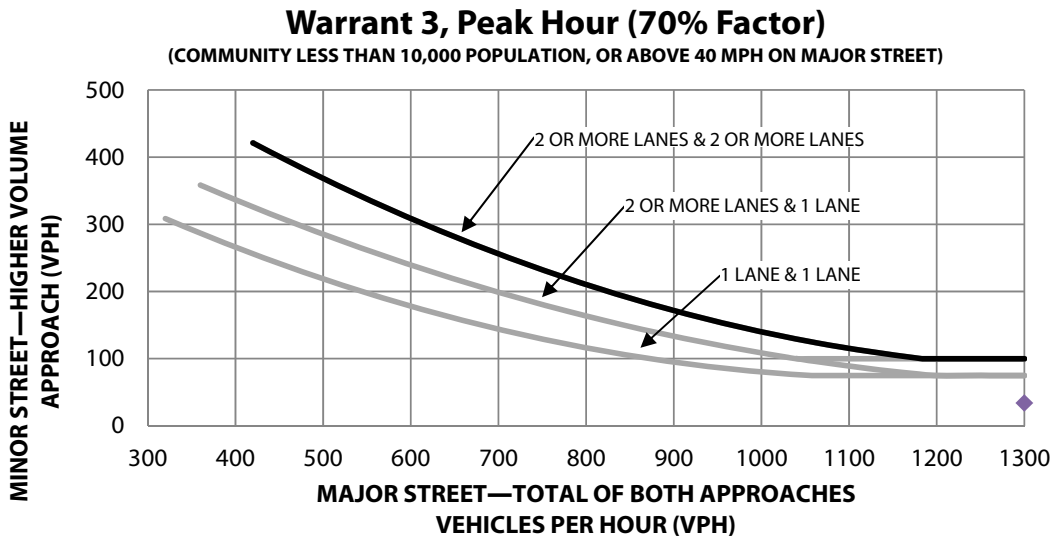
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1729 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	General Plan Data
Scenario:	AM Future + Project

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.58 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 43 vph

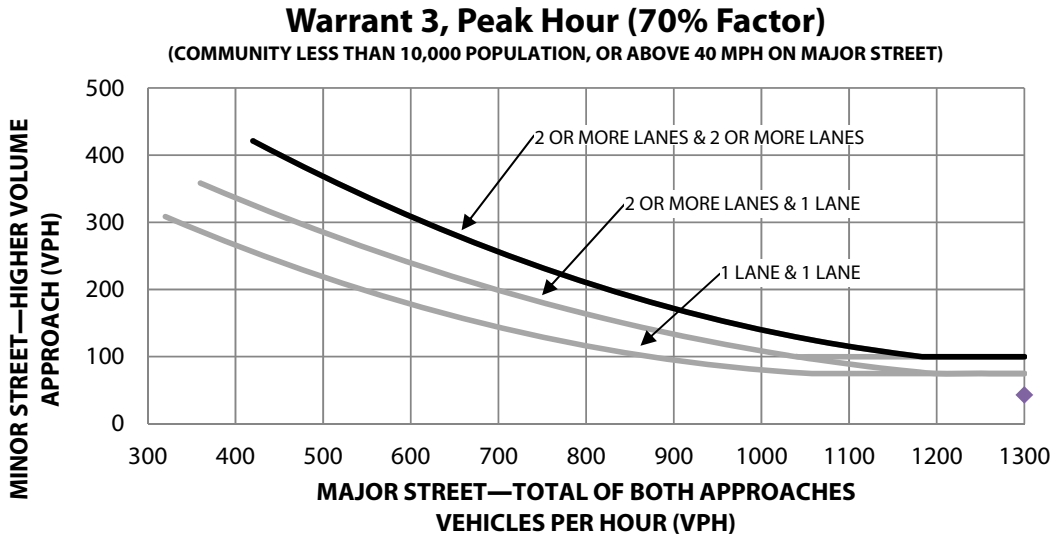
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1793 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marinda Dr

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marinda Dr
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000?	Yes
Date of Count:	General Plan Data
Scenario:	PM Future + Project

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.49 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 38 vph

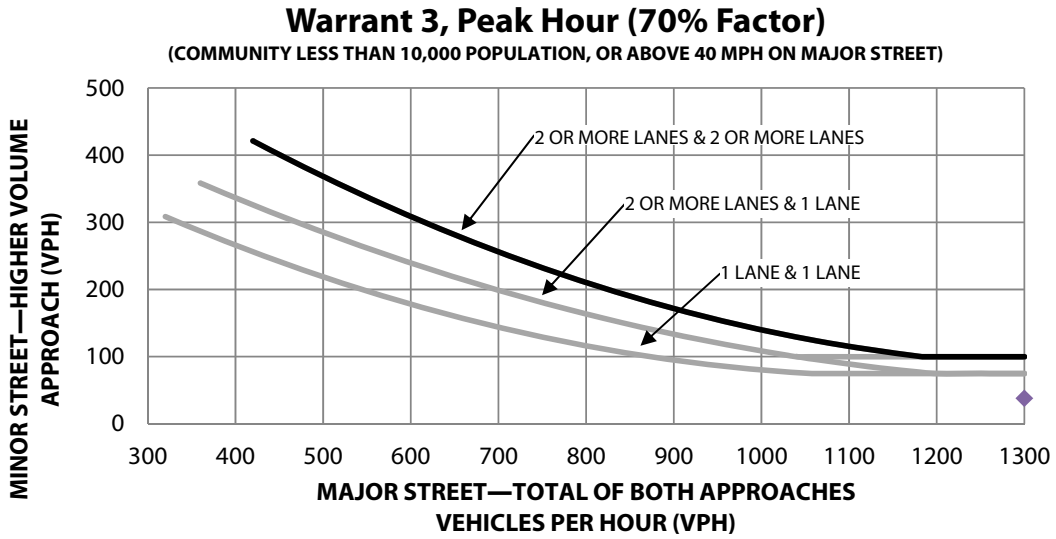
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1741 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marin Rd

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marin Rd
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000? Yes
Date of Count: General Plan Data
Scenario: AM Future

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.45 vehicle-hours

Condition A2 — Not Met

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 43 vph

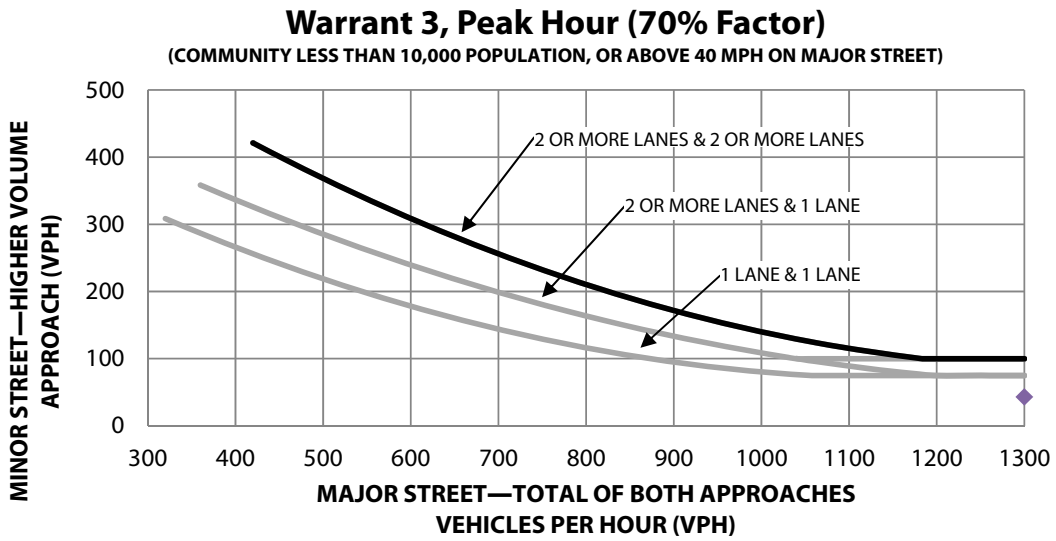
Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1669 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Town of Fairfax
Sir Francis Drake Blvd & Marin Rd

Marinda Heights TIS

	Major Street	Minor Street
Street Name	Sir Francis Drake Blvd	Marin Rd
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	25	25

Population less than 10,000? Yes
Date of Count: General Plan Data
Scenario: AM Future + Project

Warrant 3 Met?: Met when either Condition A or B is met — **No**

Condition A: Met when conditions A1, A2, and A3 are met — Not Met

Condition A1 — Not Met

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 0.45 vehicle-hours

Condition A2 — Not Met

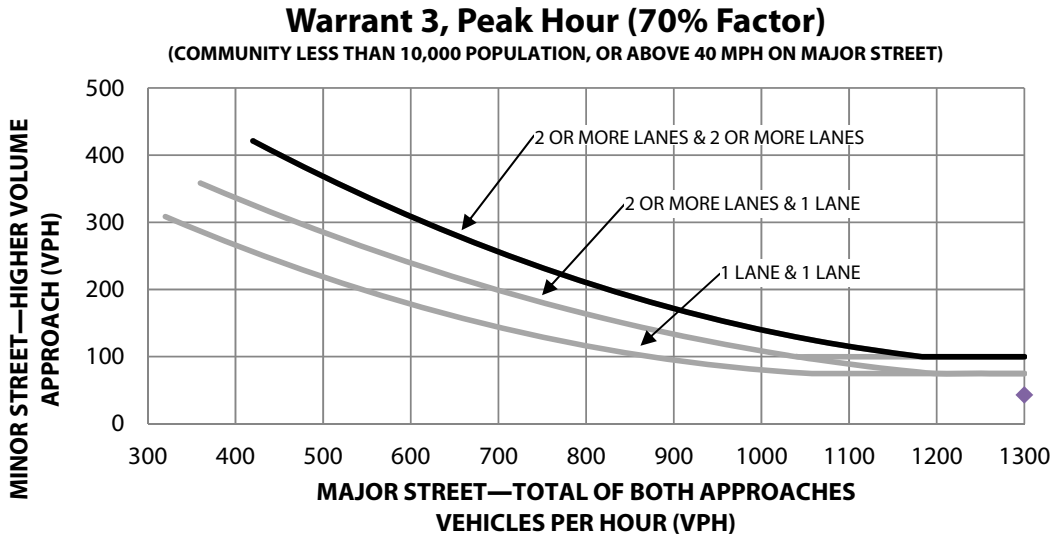
The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 43 vph

Condition A3 — Met

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches

Total Entering Volume: 1671 vph

Condition B — Not Met

The plotted point falls above the curve