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## APPENDIX H

### TRANSPORTATION OPERATIONS STUDY

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# Traffic Operations Study for the Northgate Town Square Project



Prepared for the City of San Rafael

Submitted by  
**W-Trans**

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**TRAFFIC ENGINEERING  
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# Executive Summary

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The Northgate Town Square project would replace some existing retail space at the Northgate Mall in the City of San Rafael with multifamily housing. The project is envisioned in two phases. The first phase, the 2025 Master Plan, as proposed includes up to 977 multifamily residential units and retention of 498,661 total square feet of retail space. The second phase includes conversion of additional land currently used for retail to residential. Both phases combined constitute the 2040 Vision Plan, which includes up to 1,422 residential units and 225,100 square feet of retail space. The analysis addresses the maximum potential development of the 2025 Master Plan and the 2040 Vision Plan. Based on these development levels, the Master Plan would have an estimated average daily trip generation of 3,585 fewer trips per weekday compared to the existing shopping center uses, including 172 additional trips during the a.m. peak hour and 345 fewer trips during the p.m. peak hour. The Vision Plan would add further residential units in lieu of retail area and result in an estimated reduction totaling 8,384 daily trips, with 177 new morning peak hour trips and 886 fewer evening peak hour trips.

The study area is comprised of the Northgate Mall and a network of 17 intersections in the area around the Mall chosen with input from City staff. These 17 intersections operate acceptably under Existing conditions and would continue to operate acceptably under Baseline (2025) conditions without or with traffic added from construction of the Master Plan scenario. Under Future conditions (2040), the intersections would operate acceptably without the project and with the addition of either Master Plan or Vision Plan traffic volumes.

As the project would result in a net reduction in combined peak hour trips for both the Master Plan and Vision Plan scenarios, the City's Traffic Mitigation Fee would not apply.

The residential parking supply for both scenarios was evaluated based on the actual development plan being proposed rather than the maximum development scenario and would be adequate to satisfy applicable requirements. For retail parking, there would be a deficit under the Master Plan which would include 1,863 spaces compared to the requirement for 1,865 spaces. Applying the 85<sup>th</sup> percentile Saturday peak demand rates from ITE would result in an estimated shortfall in supply of 2 parking spaces, though it is noted that this would be less than one percent of the total demand and is based on the more conservative 85<sup>th</sup> percentile rates rather than typical average peak demand rates. For the Vision Plan scenario, the proposed retail parking supply would exceed applicable requirements and estimated demand. The City's *Municipal Code* would require 149 parking spaces to be designated for clean air vehicles under the Master Plan scenario, and 112 spaces to be similarly designated for the Vision Plan scenario. Bicycle parking should be provided based on City requirements, including 178 short-term and 100 long-term spaces for the Master Plan; this could be reduced to 157 short-term and 45 long-term spaces for the Vision Plan.

# Introduction

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This report presents an analysis of the potential traffic operational effects that would be associated with the redevelopment of the Northgate Mall in the City of San Rafael. The redevelopment would be constructed in two phases: a “2025 Master Plan” that includes up to 977 multifamily residential units and retention of 498,661 total square feet of retail space compared to the existing 766,507 square feet of retail space. Additional land currently used for retail would be converted to residential use in the second phase; both phases combined constitute the “2040 Vision Plan” which would reduce the retail square footage further to 225,100 square feet and increase the residential unit count to 1,422. Both plans include at least ten percent affordable housing. The traffic study was completed in accordance with criteria established by the City of San Rafael and is consistent with standard traffic engineering techniques.

## Prelude

The purpose of a traffic operations study is to provide City staff and policy makers with data that they can use to make an informed decision regarding the project’s adherence to city policies. Vehicular traffic service levels at key intersections were evaluated for consistency with General Plan policies by determining the number of new trips that the proposed project would be expected to generate, distributing these trips to the surrounding street system based on anticipated travel patterns specific to the proposed project, then analyzing the effect the new traffic would be expected to have on the study intersections and need for improvements to maintain acceptable operation. Adequacy of parking is also addressed as a policy issue, as is the need to contribute towards transportation impact fees.

## Project Profile

The project is to be located at the site of the Northgate Mall in the City of San Rafael and would result in several existing retail areas and parking lots being replaced with new commercial and residential spaces centered around a “town square” concept. The project site is located at the Northgate Mall, as shown in Figure 1.



Traffic Operations Study for the Northgate Town Square Project  
**Figure 1 – Study Area and Existing Lane Configurations**



# Transportation Setting

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## Study Area and Periods

The study area consists of the following intersections:

1. Freitas Parkway/Las Gallinas Avenue
2. Freitas Parkway/Northgate Drive
3. Freitas Parkway/Del Presidio Boulevard
4. Freitas Parkway/US 101 South Ramps
5. Redwood Highway/US 101 North On-ramp
6. Freitas Parkway/US 101 North Ramps
7. Freitas Parkway/Redwood Highway-Civic Center Drive
8. Las Gallinas Avenue/Nova Albion Way
9. Las Gallinas Avenue/Northgate Drive
10. Las Gallinas Avenue/Del Presidio Boulevard
11. Las Gallinas Avenue/Merrydale Road
12. Merrydale Road/Civic Center Drive
13. Northgate Drive/Thorndale Drive
14. Northgate Drive/El Faisan Drive
15. Northgate Drive/Nova Albion Way
16. Los Ranchitos Road-Las Gallinas Avenue/Northgate Drive
17. Los Ranchitos Road/North San Pedro Road

It is noted that the project driveways were not considered as study intersections, unless at an existing intersection between two off-site streets such as Las Gallinas Avenue/Del Presidio Boulevard or Las Gallinas Avenue/Merrydale Road. The *California Vehicle Code* defines an intersection as “the area embraced within the prolongation of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways, of two highways which join one another at approximately right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.” This definition specifies that intersections are created where two “highways,” or public streets, intersect. As driveways are not public streets, where they connect with a public road is not an intersection, so it would be unreasonable to evaluate it as such. The driveway connections were, however, evaluated for operational issues such as adequacy of sight distance, need for turn lanes, and delay as relevant in some cases, though it would not be associated with a Level of Service metric.

An initial review of the proposed change in land use from retail to residential would result in a reduction in trips during the evening peak hour and an increase in trips during the morning peak hour when most businesses in the shopping center are closed. Operating conditions during only the a.m. peak period were therefore evaluated to capture the highest potential adverse effects for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute. Operation during the evening peak period would be expected to improve upon occupation of the project due to the overall reduction in trips to the area that would be expected.

## Study Intersections

**Freitas Parkway/Las Gallinas Avenue** is a signalized four-legged intersection with protected left-turn phasing on the eastbound and westbound approaches and permitted left-turn phasing on the northbound and southbound approaches. There is a stop-controlled channelized right-turn lane on the westbound approach. Pedestrian crosswalks and phasing exist on the north, west, and south legs, and there are bicycle lanes on all four legs.

**Freitas Parkway/Northgate Drive** is a four-legged signalized intersection with protected left-turn phasing on the Freitas Parkway approaches and permitted left-turn phasing on the Northgate Drive approaches. There are crosswalks on all but the east leg.

**Freitas Parkway/Del Presidio Boulevard** is a signalized intersection with four legs. The northbound and southbound approaches have permitted left-turn phasing; left-turns from Freitas Parkway are prohibited. The north leg of the intersection is the off-ramp from southbound US 101 and includes a channelized right-turn lane. There are crosswalks with pedestrian phasing on the south and east legs.

**Freitas Parkway/US 101 South Ramps** includes two slip ramps from Freitas Parkway in each direction to US 101 South. There is a crosswalk across the ramp from westbound Freitas Parkway.

**Redwood Highway/US 101 North On-ramp** is a tee intersection enabling access to US 101 North from Redwood Highway in both directions. There is a sidewalk on the east side of Redwood Highway.

**Freitas Parkway/US 101 North Ramps** is a tee intersection directly adjacent to Freitas Parkway/Redwood Highway-Civic Center Drive with a sidewalk along the northeast corner. There are channelized right-turn lanes for movements to and from the connector to Civic Center Drive.

**Freitas Parkway/Redwood Highway-Civic Center Drive** is an intersection with three approaches and four departures, as the east leg is eastbound only. The Redwood Highway and Civic Center Drive approaches are stop controlled, whereas the Freitas Parkway approach is uncontrolled. There are sidewalks on the northeast, northwest, and southeast corners, and a crosswalk on the north leg. Bicycle lanes exist on Civic Center Drive south of the intersection.

**Las Gallinas Avenue/Nova Albion Way** is a signalized intersection with four legs, a protected northbound left-turn phase, split phasing on the eastbound and westbound approaches, and a southbound right-turn overlap. Crosswalks and pedestrian signals exist on all four legs, and there are bicycle lanes on Las Gallinas Avenue.

**Las Gallinas Avenue/Northgate Drive** is a four-legged intersection controlled by a traffic signal with protected left-turn phasing on Northgate Drive and permissive phasing on Las Gallinas Avenue. There are crosswalks and pedestrian signals on all four legs, and bicycle route pavement markings on Las Gallinas Avenue west of the intersection.

**Las Gallinas Avenue/Del Presidio Boulevard** is a signalized intersection with protected left-turn phasing in the eastbound direction, and a right-turn overlap in the westbound direction. The south leg is southbound only and left turns are prohibited on westbound Las Gallinas Avenue. Crosswalks and pedestrian signals exist across all but the east leg, and a multi-use trail runs along the south side of Las Gallinas Avenue in addition to a bicycle lane on the southbound departure on Del Presidio Boulevard.

**Las Gallinas Avenue/Merrydale Road** is a four-legged signalized intersection with protected left-turn phasing in all directions and crosswalks with pedestrian signals on the west, north, and east legs. There is a multi-use trail on the west side of Las Gallinas Avenue in addition to bicycle lanes on Las Gallinas Avenue south of the intersection and Merrydale Road west of the intersection.

**Merrydale Road/Civic Center Drive** is a signalized intersection with four legs and protected left-turn phasing in all four directions. Crosswalks and pedestrian signals exist on the north and east legs, as do bicycle lanes on the north, west, and south legs.

**Northgate Drive/Thorndale Drive** is a four-legged intersection with stop controls on the eastbound and westbound approaches, and no controls on Northgate Drive. There is a crosswalk on the west leg and bicycle lanes on Northgate Drive.



**Northgate Drive/El Faisan Drive** is a tee intersection with stop control on El Faisan Drive and bicycle lanes on Northgate Drive.

**Northgate Drive/Nova Albion Way** has three legs and stop control on the Nova Albion Way approach with no controls on the Northgate Drive approaches. Crosswalks exist on the west and south legs, and there are bicycle lanes on Northgate Drive.

**Los Ranchitos Road-Las Gallinas Avenue/Northgate Drive** is a four-legged signalized intersection with protected left-turn phasing on the northbound approach and permissive phasing for all other movements. The east leg is a driveway to the Mt. Olivet Cemetery. There are crosswalks and pedestrian signals on the east and south legs, and bicycle lanes on the west and north legs.

**Los Ranchitos Road/North San Pedro Road** is an intersection with three legs and signal control, including a protected phase for the eastbound left-turn movement. Crosswalks and pedestrian signals exist on the north and west legs, and there are bicycle lanes on Los Ranchitos Road including high-visibility markings in the westbound direction.

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



# Project Data

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The project is proposed to replace portions of the existing Northgate Mall and its surrounding commercial pads and parking lots with housing and a reduced commercial area. The Master Plan phase is envisioned for 2025 and would consist of up to 977 apartment units and 498,661 square feet of retail space. The second phase would result in additional existing retail area being replaced by residential units, and both phases combined would constitute the Vision Plan, proposed for 2040, which would increase the housing count to 1,422 apartment units and reduce the retail area to 225,100 square feet. Both plans would consist of at least ten percent affordable housing and a central “town square” concept. An interior network of roadways, bicycle lanes, and sidewalks would connect the various on-site buildings and amenities.

The proposed project site plans are shown in Figure 2 for the Master Plan and Figure 3 for the Vision Plan. It is noted that these plans are for less intense development proposals than has been evaluated for potential effects on traffic operation.

## Trip Generation

The anticipated trip generations for the existing mall and proposed project were estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11<sup>th</sup> Edition, 2021 for “Shopping Center (> 150k)” (ITE LU 820) and “Multifamily Housing (Mid-Rise)” (ITE LU 221). As trip generation rates for shopping centers grow logarithmically with size (larger shopping centers generate fewer trips per square foot than smaller shopping centers), the fitted curve equation was applied for the existing and proposed retail land uses to reflect the increased rates as the size decreases.

## Internal Capture Trips

The *Trip Generation Manual* also includes data and methodologies that can be applied to determine the proportion of internal trips that may occur within a development area that includes a variety of land uses. Internal trips occur at mixed-use developments, and in the case of the Northgate Town Square would consist of residents working at or patronizing adjacent retail uses. The majority of these trips would be made by walking, and the few that would be made by automobile would only travel on-site, so would not affect the adjacent street network.

## Pass-by Trips

Some portion of traffic associated with retail uses is drawn from existing traffic on nearby streets. These vehicle trips are not considered “new,” but are instead comprised of drivers who are already driving on the adjacent street system and choose to make an interim stop and are referred to as “pass-by.” The percentage of these pass-by trips was developed based on information provided in the *Trip Generation Manual*. This reference includes p.m. peak hour pass-by data collected at numerous locations for many land uses, such as the retail use applied in this traffic analysis. It is noted that larger shopping centers tend to have lower pass-by rates as they act more as primary destinations. Therefore, only data points with areas within 150,000 square feet of each shopping center size were used, resulting in average pass-by rates of 15 percent for the existing 766,507-square-foot shopping center, 20 percent for the Master Plan shopping center of 498,661 square feet, and 32 percent for the Vision Plan shopping center of 225,100 square feet. While fewer pass-by trips would occur during the a.m. peak hour, a portion of the p.m. peak hour pass-by rate was assigned to the a.m. peak hour to account for trips made to uses such as the existing Peets Coffee that may attract some drivers from Northgate Drive or Las Gallinas Avenue heading to work or from dropping children off at area schools. A pass-by value between the a.m. peak hour and p.m. peak hour was assigned to each daily rate to account for the overall average pass-by across a typical weekday.



**Traffic Operations Study for the Northgate Town Square Project**  
**Figure 2 – Master Plan Site Plan**







# Traffic Operations Study for the Northgate Town Square Project

## Figure 3 – Vision Plan Site Plan



## Total Project Trip Generation

The expected trip generation potential for the proposed project is indicated in Table 1 for the Master Plan, with deductions taken for trips made to and from the existing Mall at the site, which will cease with the construction of the project, as well as for pass-by and internal capture. The proposed project for the Master Plan scenario is expected to generate an average of 20,739 trips per day, including 735 trips during the a.m. peak hour and 1,734 during the p.m. peak hour. After deductions are taken into account, the project would be expected to generate a net reduction of 3,585 trips on a daily basis, including adding 172 trips during the morning peak hour and 345 fewer trips during the evening peak hour; these new morning peak hour trips represent the increase in traffic associated with the project compared to existing volumes.

**Table 1 – 2025 Master Plan Trip Generation Summary**

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
<b>Existing</b>											
Shopping Center	-766.507 ksf	33.76	-25,877	-0.76	-586	-363	-223	3.19	-2,446	-1,174	-1,272
Pass-by		-6%	1,553	-4%	23	15	8	-15%	367	176	191
<i>Existing Subtotal</i>			<i>-24,324</i>		<i>-563</i>	<i>-348</i>	<i>-215</i>		<i>-2,079</i>	<i>-998</i>	<i>-1,081</i>
<b>Proposed</b>											
Shopping Center	498.661 ksf	37.87	18,884	0.86	428	265	163	3.60	1,795	861	934
Townhouses	92 du	7.20	662	0.48	44	14	30	0.57	52	30	22
Apartments	885 du	4.54	4,018	0.37	327	75	252	0.39	345	211	134
<i>Proposed Subtotal</i>			<i>23,564</i>		<i>799</i>	<i>354</i>	<i>445</i>		<i>2,192</i>	<i>1,102</i>	<i>1,090</i>
Internal Capture		-5%	-1,178	-5%	-40	-18	-22	-5%	-110	-55	-55
Pass-by		-9%	-1,647	-6%	-24	-15	-9	-20%	-348	-167	-181
<b>Proposed Total</b>			<b>20,739</b>		<b>735</b>	<b>321</b>	<b>414</b>		<b>1,734</b>	<b>880</b>	<b>854</b>
<b>Net New Total (Proposed Less Existing)</b>			<b>-3,585</b>		<b>172</b>	<b>-27</b>	<b>199</b>		<b>-345</b>	<b>-118</b>	<b>-227</b>

Note: ksf = 1,000 square feet; du = dwelling unit

For the Vision Plan scenario, and as shown in Table 2, the project would generate an average of 15,940 trips per day including 740 during the morning peak hour and 1,193 during the evening peak hour. With deductions for the existing land use, pass-by trips, and internal capture included, the project is anticipated to result in 8,384 fewer trips per day, including a net decrease of 886 trips during the p.m. peak hour, though a net increase of 177 trips during the a.m. peak hour is anticipated. These changes represent the change in traffic volumes anticipated to occur upon completion of the Vision Plan compared to retention of the existing shopping center use.

**Table 2 – 2040 Vision Plan Trip Generation Summary**

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
<b>Existing</b>											
Shopping Center	-766.507 ksf	33.76	-25,877	-0.76	-586	-363	-223	3.19	-2,446	-1,174	-1,272
Pass-by		-6%	1,553	-4%	23	15	8	-15%	367	176	191
<i>Existing Subtotal</i>			-24,324		-563	-348	-215		-2,079	-998	-1,081
<b>Proposed</b>											
Shopping Center	225.100 ksf	52.16	11,741	1.18	266	165	101	4.50	1,012	486	526
Townhouses	92 du	7.20	662	0.48	44	14	30	0.57	52	30	22
Apartments	1,330 du	4.54	6,038	0.37	492	113	379	0.39	519	316	203
<i>Proposed Subtotal</i>			18,441		802	292	510		1,583	832	751
Internal Capture		-5%	-922	-5%	-40	-15	-25	-5%	-79	-42	-37
Pass-by		-14%	-1,579	-9%	-22	-14	-8	-32%	-311	-149	-162
<b>Proposed Total</b>			<b>15,940</b>		<b>740</b>	<b>263</b>	<b>477</b>		<b>1,193</b>	<b>641</b>	<b>552</b>
<b>Net New Total (Proposed Less Existing)</b>			<b>-8,384</b>		<b>177</b>	<b>-85</b>	<b>262</b>		<b>-886</b>	<b>-357</b>	<b>-529</b>

Note: ksf = 1,000 square feet; du = dwelling unit

## Trip Distribution

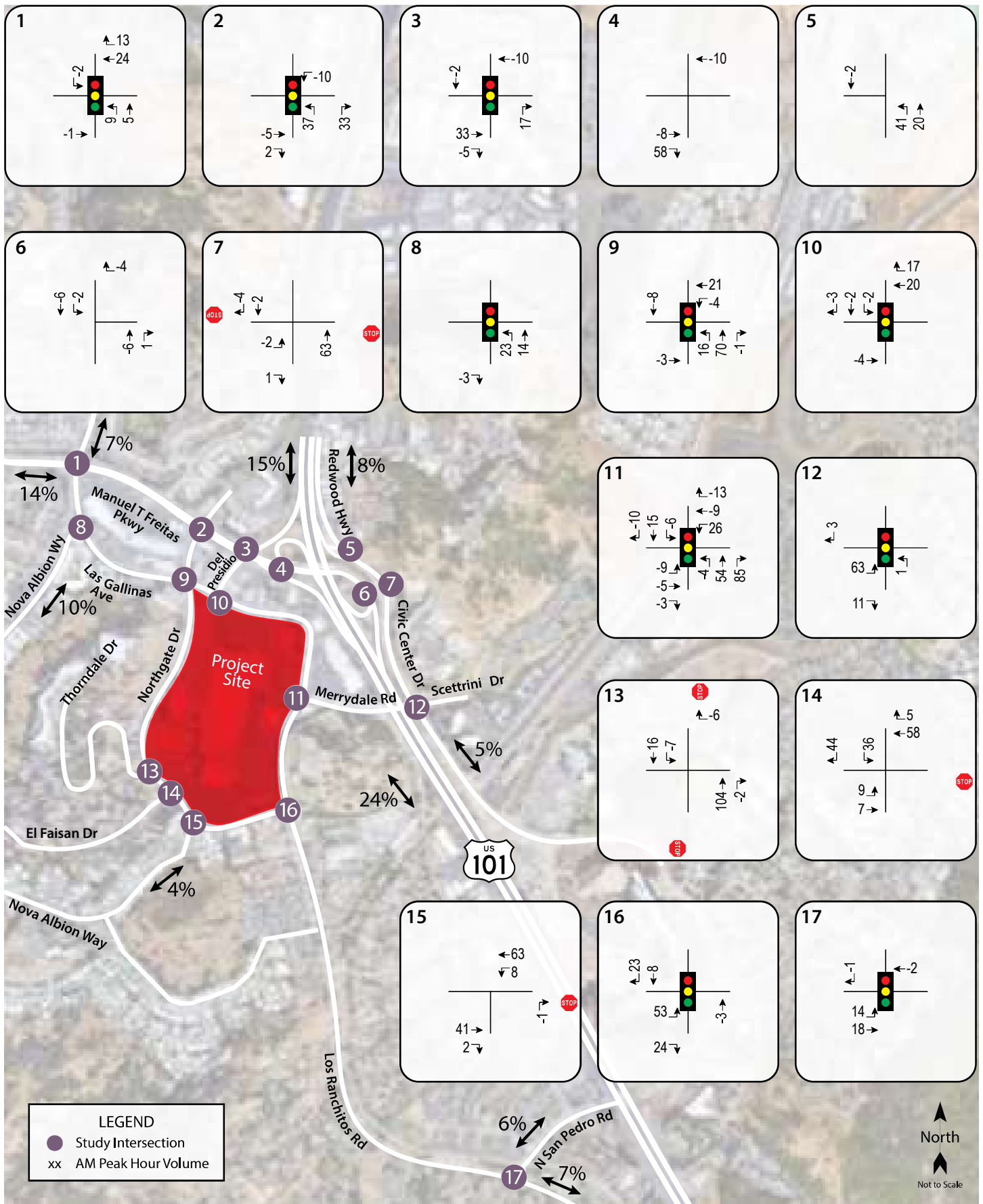
The pattern used to allocate trips generated by the existing and proposed uses to the street network is based on existing traffic volumes and applied knowledge regarding traffic patterns in the area. The applied assumptions are shown in Table 3.

**Table 3 – Trip Distribution Assumptions**

Route	Percent
US 101 south of Freitas Pkwy	24
US 101 north of Freitas Pkwy	15
Freitas Pkwy west of Las Gallinas Ave	14
Nova Albion Wy south of Las Gallinas Ave	10
Redwood Hwy north of Freitas Pkwy	8
Los Ranchitos Rd south of N San Pedro Rd	7
Las Gallinas Ave north of Freitas Pkwy	7
N San Pedro Rd east of Los Ranchitos Rd	6
Civic Center Dr south of Merrydale Rd	5
Nova Albion Wy south of Northgate Dr	4
<b>TOTAL</b>	<b>100</b>

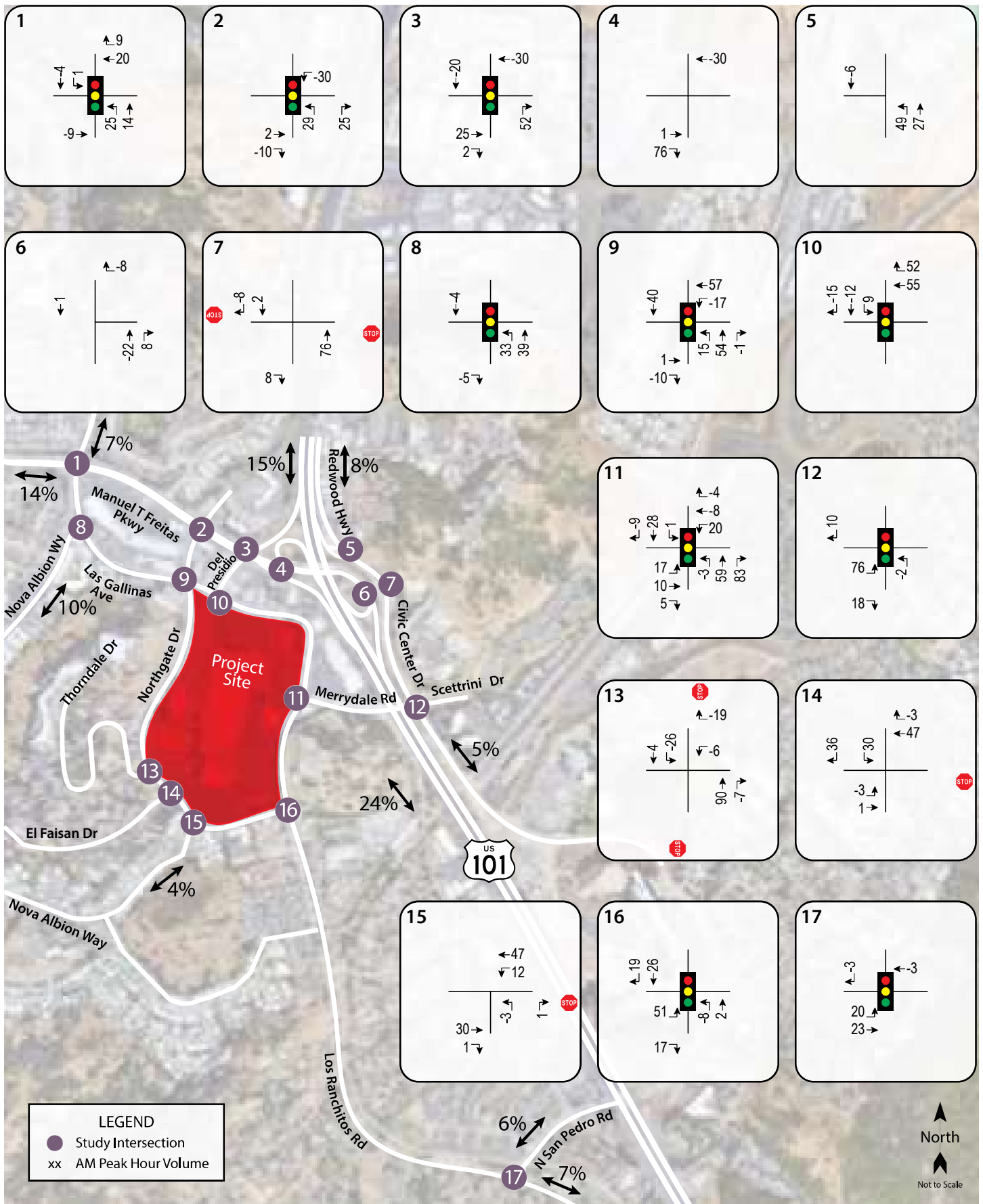
Figure 4 shows the anticipated project volumes as applied to each study intersection for the Master Plan scenario, and Figure 5 shows these volumes for the Vision Plan scenario.





Traffic Operations Study for the Northgate Town Square Project  
**Figure 4 - Master Plan Trip Traffic Volumes and Distribution**





Traffic Operations Study for the Northgate Town Square Project  
**Figure 5 - Vision Plan Trip Traffic Volumes and Distribution**

# Capacity Analysis

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In keeping with General Plan policies, the potential for the project to effect traffic operation was evaluated.

## 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)*, Sixth Edition, Transportation Research Board, 2017. 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.

The Levels of Service for the intersections with side street stop controls, or those which are unsignalized and have one or two approaches stop controlled, 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 approaches together with the weighted overall average delay for the intersection.

The study intersections that are 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 the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from the City of San Rafael and initial queues were applied.

As the HCM requires at least one controlled approach, the delay at Freitas Parkway/US 101 North Ramps was calculated using the average delay across ten simulation runs of the SIMTRAFFIC application of Synchro. This intersection is uncontrolled, with delay resulting only from southbound drivers waiting for oncoming northbound traffic to clear before turning left. This methodology was also used for Freitas Parkway/Redwood Highway-Civic Center Drive, as this intersection would operate over theoretical capacity under some scenarios, which is incompatible with the HCM methodology.

The ranges of delay associated with the various levels of service are indicated in Table 4.



<b>Table 4 – Intersection Level of Service Criteria</b>		
<b>LOS</b>	<b>Two-Way Stop-Controlled</b>	<b>Signalized</b>
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, 2017

## Traffic Operation Standards

The *Transportation Impact Analysis Guidelines*, City of San Rafael, June 2021, detail mobility deficiency criteria for development projects. For intersection traffic control, the Guidelines refer to the Level of Service (LOS) standard published in the *San Rafael General Plan 2040*, City of San Rafael, August 2021. General Plan Policy M-2.5 outlines a general citywide standard of LOS D operation, with exemptions for intersections in the Downtown Precise Plan boundary and signalized freeway ramp intersections. LOS E operation is acceptable at:

- Andersen Drive/Bellam Boulevard;
- Bellam Boulevard/Francisco Boulevard East during the a.m. peak hour;
- Freitas Parkway/Redwood Highway-Civic Center Drive;
- Las Gallinas Avenue/Merrydale Road during the p.m. peak hour; and
- Freitas Parkway/Northgate Drive during the p.m. peak hour.

LOS F operation is acceptable at:

- Andersen Drive/Francisco Boulevard West during the a.m. peak hour;
- Bellam Boulevard/Francisco Boulevard East during the p.m. peak hour; and
- Merrydale Road/Civic Center Drive during the a.m. peak hour.

The Guidelines state that an adverse effect would occur if the addition of project traffic would cause a deficient level of delay at an intersection, or if the delay at an intersection operating deficiently without project traffic would increase by five seconds or more with the addition of project traffic.

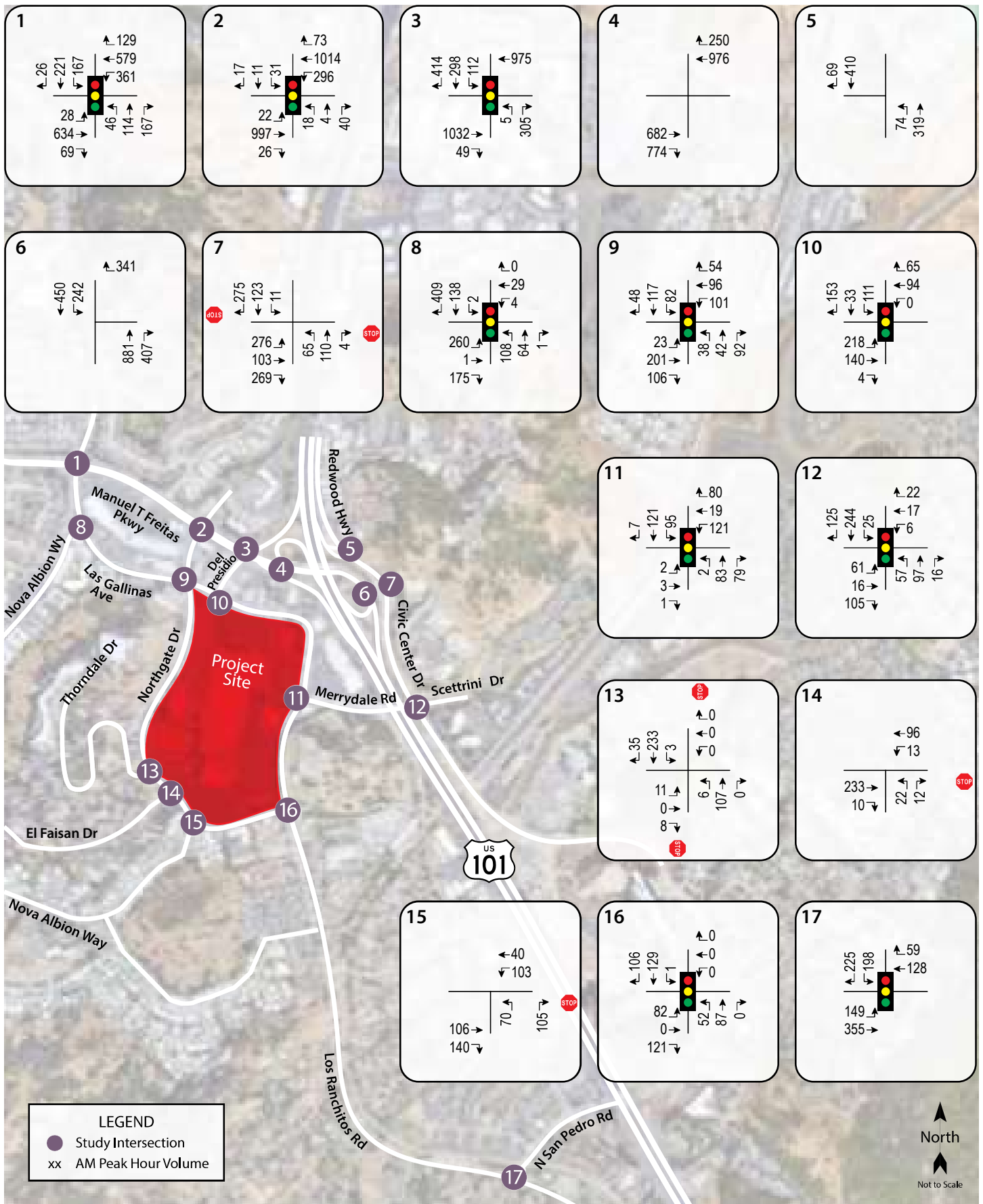
## Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected in September 2021 while local schools were in session and students were attending in-person classes. Under existing conditions, the study intersections are operating acceptably at LOS C or better. A summary of the intersection Level of Service calculations is contained in Table 5, and copies of the calculations are provided in Appendix A. The existing traffic volumes are shown in Figure 6.

**Table 5 – Existing AM Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Standard		Existing Conditions	
	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	34.9	C
2. Freitas Pkwy/Northgate Dr	<55.0	D	19.1	B
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.3	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.7	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	4.1	A
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	4.1	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	E	7.3	A
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	E	7.3	A
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.4	C
9. Las Gallinas Ave/Northgate Dr	<55.0	D	17.6	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	21.4	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	11.9	B
12. Merrydale Rd/Civic Center Dr	-	F	14.1	B
13. Northgate Dr/Thorndale Dr	<35.0	D	0.7	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	D	11.9	B
14. Northgate Dr/El Faisan Dr	<35.0	D	1.3	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	D	11.7	B
15. Northgate Dr/Nova Albion Wy	<35.0	D	4.4	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	D	14.2	B
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	9.0	A
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	6.6	A

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*



Traffic Operations Study for the Northgate Town Square Project  
**Figure 6 – Existing Traffic Volumes**

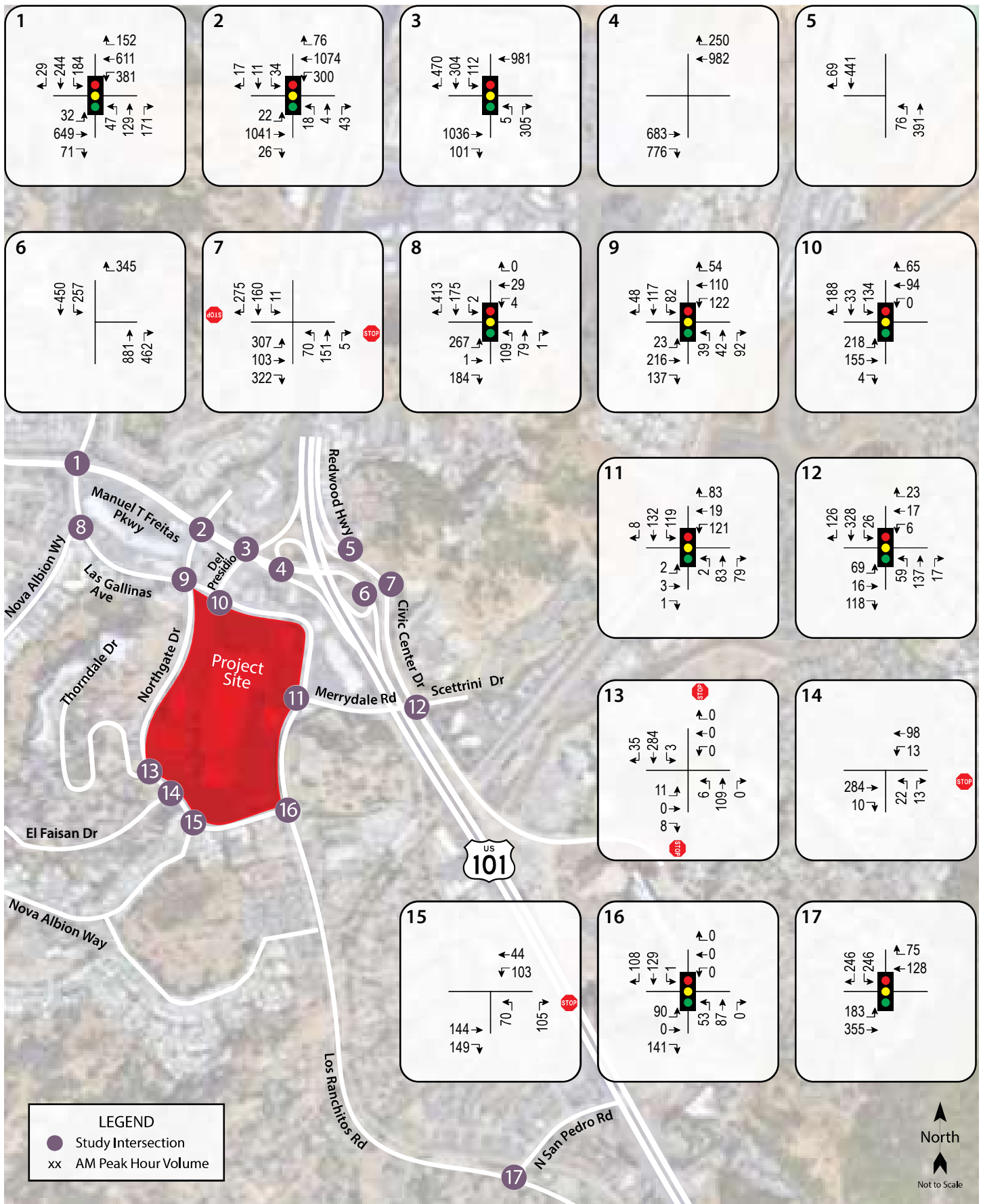
## Baseline Conditions

Baseline operating conditions for the projected horizon year during which the first phase of the project would be completed (2025 Master Plan) were determined by adding one-quarter of the anticipated increase in traffic volumes between 2020 and 2040 to the Future Conditions (2040) volumes. Derivation of the Future volumes is detailed under the Future Conditions section. Under Baseline volumes, the intersections would continue to have acceptable operations at LOS D or better. These results are summarized in Table 6 and Baseline volumes are shown in Figure 7.

**Table 6 – Baseline AM Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Standard		Baseline Conditions	
	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	37.1	D
2. Freitas Pkwy/Northgate Dr	<55.0	D	19.3	B
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.3	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.7	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	4.5	A
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	4.4	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	E	7.9	A
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	E	8.1	A
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.3	C
9. Las Gallinas Ave/Northgate Dr	<55.0	D	16.6	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	22.1	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	11.9	B
12. Merrydale Rd/Civic Center Dr	-	F	15.1	C
13. Northgate Dr/Thorndale Dr	<35.0	D	0.7	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	D	12.7	B
14. Northgate Dr/El Faisan Dr	<35.0	D	1.2	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	D	12.4	B
15. Northgate Dr/Nova Albion Wy	<35.0	D	4.4	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	D	15.6	C
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	9.4	A
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	7.6	A

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*



Traffic Operations Study for the Northgate Town Square Project  
**Figure 7 – Baseline Traffic Volumes**

## Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the Transportation Authority of Marin (TAM) travel demand model and translated to turning movement volumes at each of the study intersections using the “Furness” method. The Furness method is an iterative process that employs existing turn movement data, existing link volumes and future link volumes to predict likely turning future movement volumes at intersections. For future capacity improvements, while the General Plan details several transportation facility improvements such as upgrades to the Freitas Parkway/US 101 interchange, there are currently no capacity-enhancement projects funded in the study area per the most recent *Capital Improvement Program*, City of San Rafael, June 2021. Therefore, to provide a more conservative analysis, existing intersection and roadway capacities were used for the Future Conditions scenario.

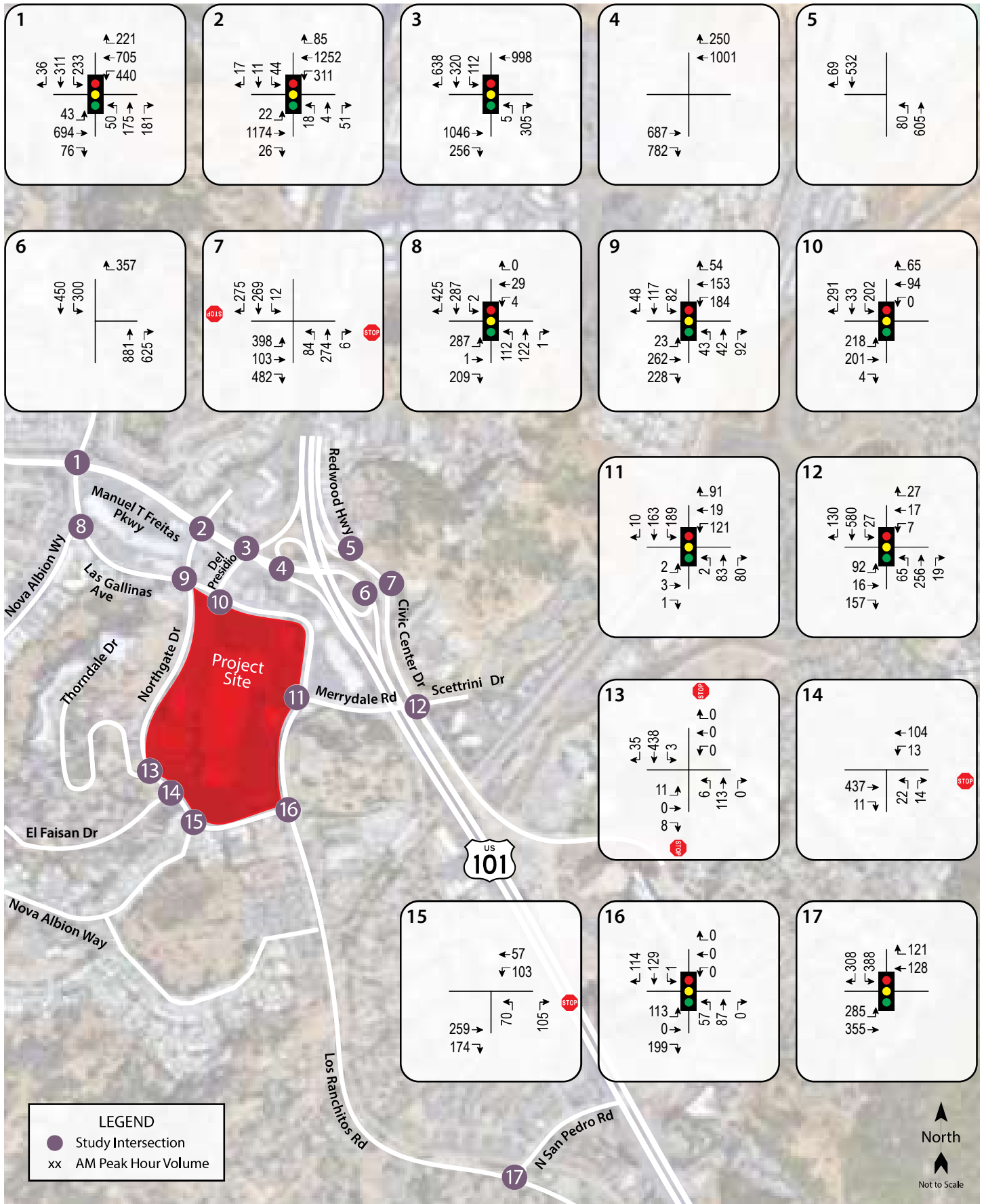
Under the anticipated Future volumes, the study intersections are expected to operate acceptably at LOS D or better. Operating conditions are summarized in Table 7 and Future volumes are shown in Figure 8.

**Table 7 – Future AM Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Standard		Future Conditions	
	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	50.2	D
2. Freitas Pkwy/Northgate Dr	<55.0	D	20.2	C
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.5	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.6	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	10.4	B
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	6.1	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	<i>E</i>	10.6	<i>B</i>
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	<i>E</i>	11.5	<i>B</i>
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.4	C
9. Las Gallinas Ave/Northgate Dr	<55.0	D	14.7	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	21.3	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	12.0	B
12. Merrydale Rd/Civic Center Dr	-	F	22.3	C
13. Northgate Dr/Thorndale Dr	<35.0	D	0.6	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	<i>D</i>	15.7	<i>C</i>
14. Northgate Dr/El Faisan Dr	<35.0	D	1.1	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	<i>D</i>	15.2	<i>C</i>
15. Northgate Dr/Nova Albion Wy	<35.0	D	5.1	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	<i>D</i>	22.4	<i>C</i>
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	10.5	B
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	11.2	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*





Traffic Operations Study for the Northgate Town Square Project  
**Figure 8 – Future Traffic Volumes**

## Project Conditions

### Baseline plus Master Plan Conditions

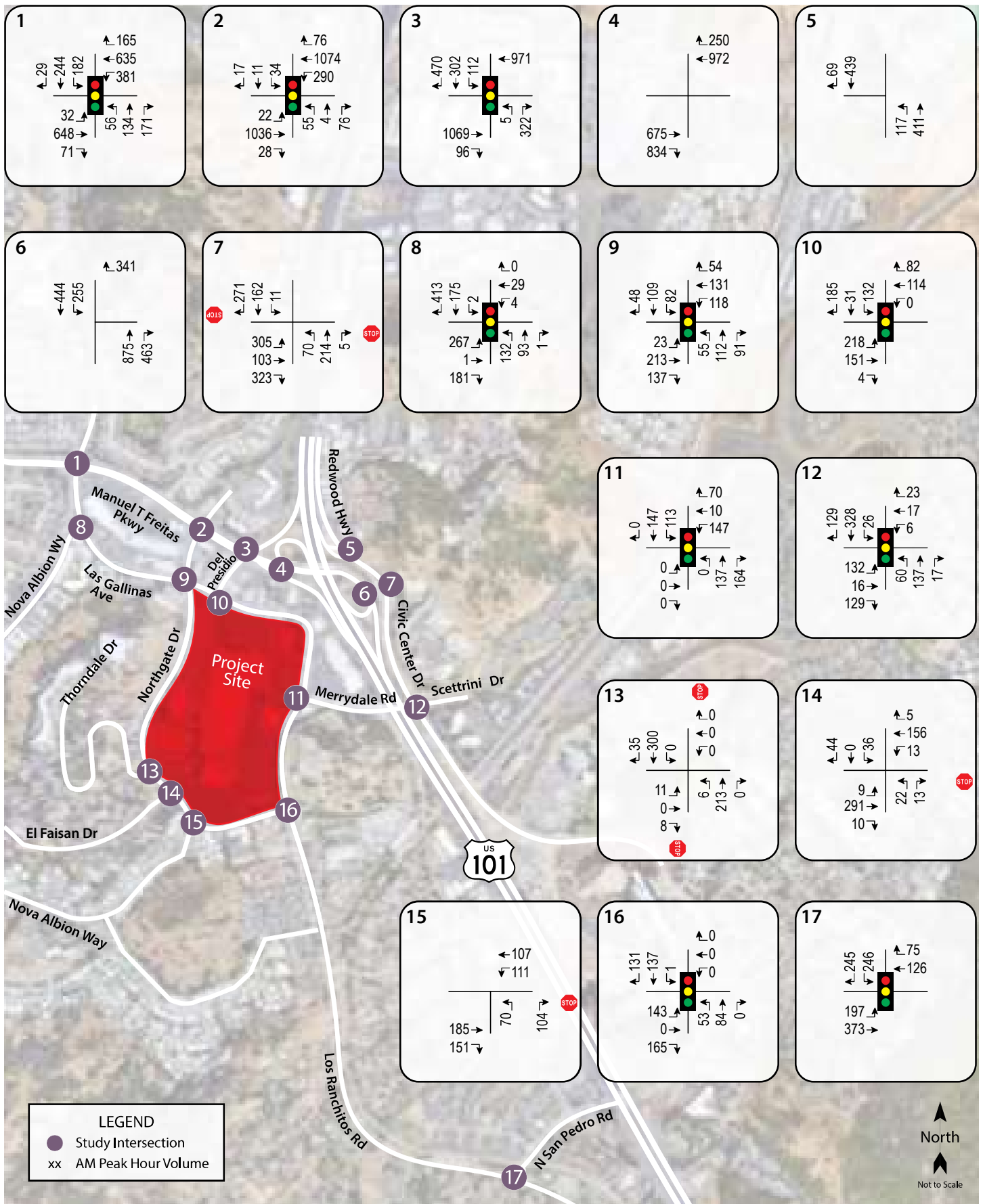
Upon the addition of project-generated traffic for the Master Plan scenario to the anticipated Baseline volumes, the study intersections are expected to continue operating acceptably during the morning peak hour. The Master Plan operating conditions are summarized in Table 8. Baseline plus Master Plan traffic volumes are shown in Figure 9. Note that although 172 net new a.m. peak hour trips would be generated by the Master Plan scenario, the operational analysis was conducted using a more conservative project description that resulted in 223 net new trips during the a.m. peak hour.

**Table 8 – Baseline plus Master Plan AM Peak Hour Intersection Levels of Service**

Study Intersection Approach	Standard		Baseline Conditions		Baseline plus Master Plan	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	37.1	D	36.5	D
2. Freitas Pkwy/Northgate Dr	<55.0	D	19.3	B	19.5	B
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.3	A	8.2	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.7	A	1.0	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	4.5	A	4.5	A
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	4.4	A	4.8	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	E	7.9	A	8.9	A
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	E	8.1	A	8.0	A
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.3	C	34.8	C
9. Las Gallinas Ave/Northgate Dr	<55.0	D	16.6	B	19.2	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	22.1	C	22.6	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	11.9	B	11.0	B
12. Merrydale Rd/Civic Center Dr	-	F	15.1	B	16.4	B
13. Northgate Dr/Thorndale Dr	<35.0	D	0.7	A	0.6	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	D	12.7	B	14.3	B
14. Northgate Dr/El Faisan Dr	<35.0	D	1.2	A	2.7	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	D	12.4	B	15.3	C
<i>Southbound (Project Driveway) Approach</i>	<35.0	D	-	-	13.9	B
15. Northgate Dr/Nova Albion Wy	<35.0	D	4.4	A	4.7	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	D	15.6	C	19.8	C
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	9.4	A	10.0	B
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	7.6	A	7.6	A

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*





Traffic Operations Study for the Northgate Town Square Project  
**Figure 9 - Baseline plus Master Plan Project Traffic Volumes**

**Finding** – The study intersections would operate at acceptable Levels of Service without or with the addition of project traffic for the Master Plan scenario to anticipated Baseline volumes.

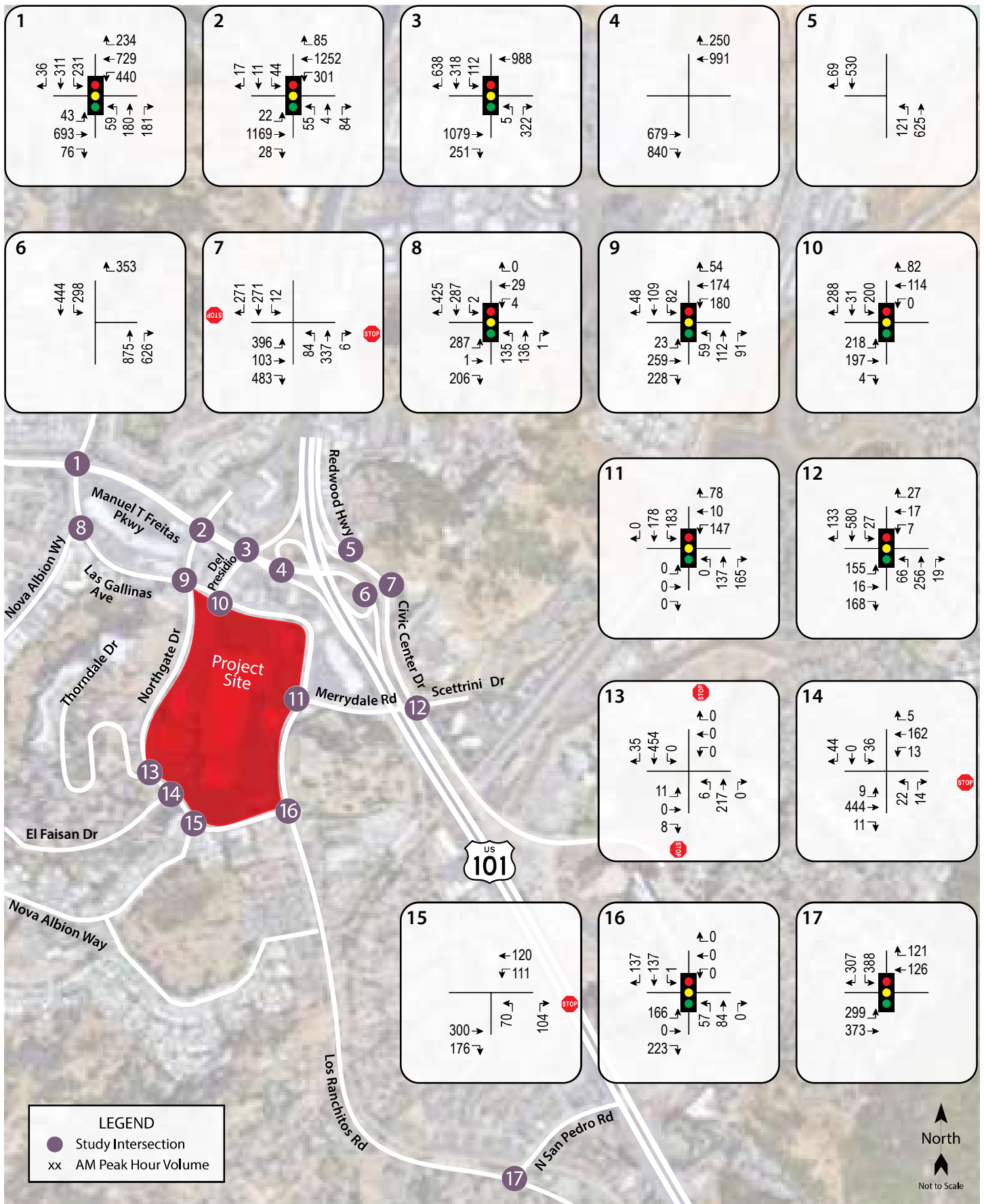
### Future plus Master Plan Conditions

Conditions with the Master Plan and 2040 volumes were also evaluated to ensure that the most conservative combination was studied, as the Master Plan would result in a higher trip generation (and therefore traffic volumes) than full completion of the Vision Plan. With Master Plan scenario traffic added to the estimated Future traffic volumes, the study intersections would operate at acceptable Levels of Service during the morning peak hour. Table 9 summarizes the anticipated delays and levels of service, and Figure 10 shows the Future plus Master Plan volumes.

**Table 9 – Future plus Master Plan AM Peak Hour Intersection Levels of Service**

Study Intersection Approach	Standard		Future Conditions		Future plus Master Plan	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	50.2	D	49.8	D
2. Freitas Pkwy/Northgate Dr	<55.0	D	20.2	C	20.3	C
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.5	A	8.3	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.6	A	0.8	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	10.4	B	7.2	A
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	6.1	A	6.8	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	E	10.6	B	13.6	B
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	E	11.5	B	10.9	B
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.4	C	34.8	C
9. Las Gallinas Ave/Northgate Dr	<55.0	D	14.7	B	17.4	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	21.3	C	21.8	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	12.0	B	11.0	B
12. Merrydale Rd/Civic Center Dr	-	F	22.3	C	24.4	C
13. Northgate Dr/Thorndale Dr	<35.0	D	0.6	A	0.5	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	D	15.7	C	18.0	C
14. Northgate Dr/El Faisan Dr	<35.0	D	1.1	A	2.7	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	D	15.2	C	19.8	C
<i>Southbound (Project Driveway) Approach</i>	<35.0	D	-	-	17.4	C
15. Northgate Dr/Nova Albion Wy	<35.0	D	5.1	A	6.3	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	D	22.4	C	32.0	D
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	10.5	B	11.0	B
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	11.2	B	11.4	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*



Traffic Operations Study for the Northgate Town Square Project  
**Figure 10 - Future plus Master Plan Project Traffic Volumes**

**Finding** – Upon the addition of Master Plan scenario traffic to estimated Future a.m. peak hour volumes, the study intersections would be expected to continue operating acceptably.

### Future plus Vision Plan Conditions

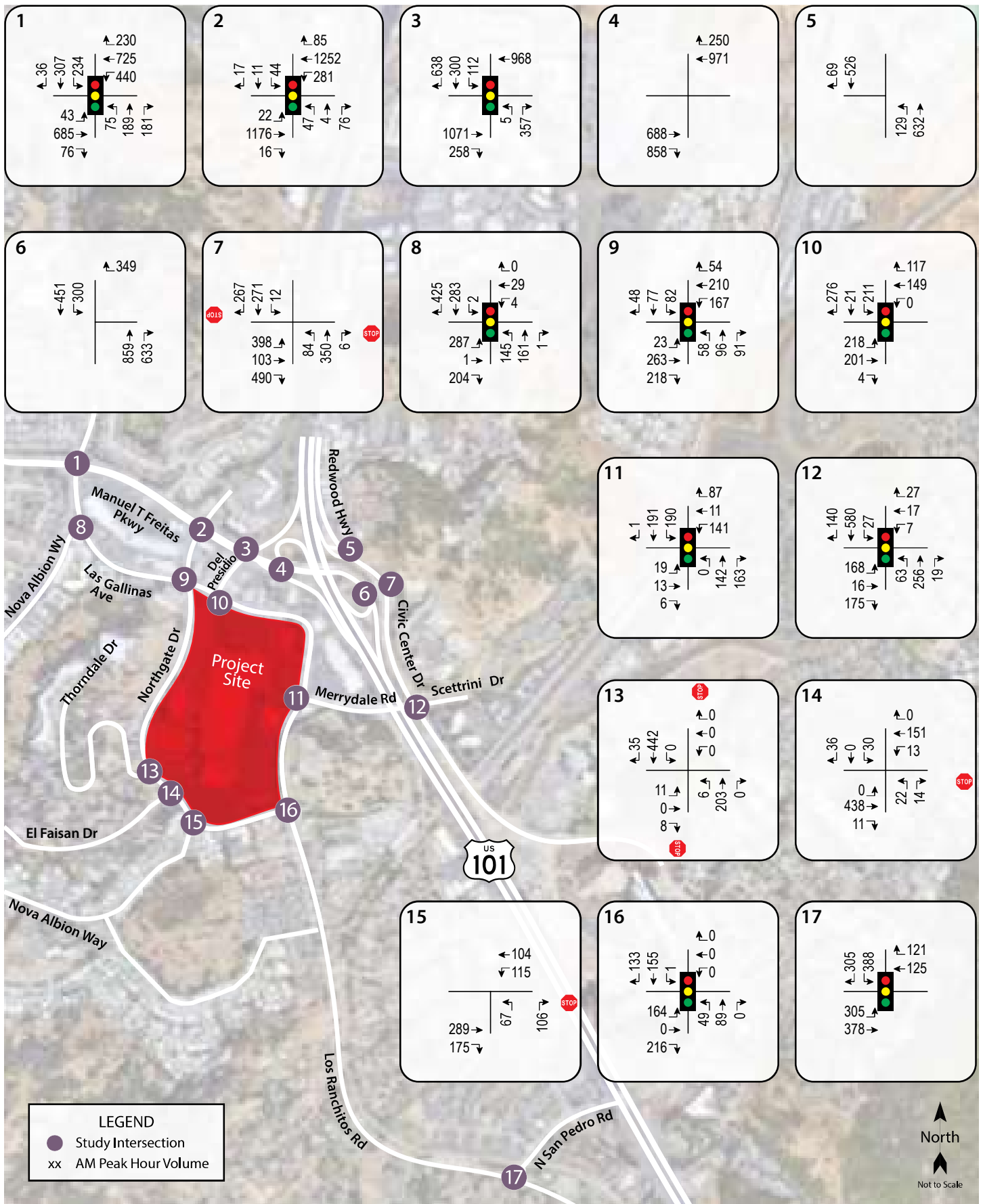
The study intersections would operate acceptably during the morning peak hour with the addition of anticipated Vision Plan traffic to projected Future volumes, as demonstrated in Table 10. Future plus Vision Plan volumes are shown in Figure 11. Note that while the Vision Plan scenario would result in a net new a.m. peak hour trip generation of 177 trips, the operational analysis includes a more conservative project description that would generate 260 net new trips during the a.m. peak hour.

**Table 10 – Future plus Vision Plan AM Peak Hour Intersection Levels of Service**

Study Intersection Approach	Standard		Future Conditions		Future plus Vision Plan	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Freitas Pkwy/Las Gallinas Ave	<55.0	D	50.2	D	49.4	D
2. Freitas Pkwy/Northgate Dr	<55.0	D	20.2	C	19.9	B
3. Freitas Pkwy/Del Presidio Blvd	-	Exempt	8.5	A	8.1	A
4. Freitas Pkwy/US 101 S Ramps	<35.0	D	0.0	A	0.0	A
5. Redwood Hwy/US 101 N On-ramp	<35.0	D	0.6	A	0.9	A
6. Freitas Pkwy/US 101 N Ramps	<35.0	D	10.4	B	9.3	A
7. Freitas Pkwy/Redwood Hwy-Civic Center Dr	<50.0	E	6.1	A	6.8	A
<i>Northbound (Civic Center Dr) Approach</i>	<50.0	E	10.6	B	13.0	B
<i>Southbound (Redwood Hwy) Approach</i>	<50.0	E	11.5	B	11.5	B
8. Las Gallinas Ave/Nova Albion Wy	<55.0	D	33.4	C	35.2	D
9. Las Gallinas Ave/Northgate Dr	<55.0	D	14.7	B	16.0	B
10. Las Gallinas Ave/Del Presidio Blvd	<55.0	D	21.3	C	22.5	C
11. Las Gallinas Ave/Merrydale Rd	<55.0	D	12.0	B	14.5	B
12. Merrydale Rd/Civic Center Dr	-	F	22.3	C	25.8	C
13. Northgate Dr/Thorndale Dr	<35.0	D	0.6	A	0.6	A
<i>Eastbound (Thorndale Dr) Approach</i>	<35.0	D	15.7	C	17.4	C
14. Northgate Dr/El Faisan Dr	<35.0	D	1.1	A	2.6	A
<i>Northbound (El Faisan Dr) Approach</i>	<35.0	D	15.2	C	18.7	C
<i>Southbound (Project Driveway) Approach</i>	<35.0	D	-	-	16.7	C
15. Northgate Dr/Nova Albion Wy	<35.0	D	5.1	A	5.8	A
<i>Northbound (Nova Albion Wy) Approach</i>	<35.0	D	22.4	C	28.8	D
16. Los Ranchitos Rd-Las Gallinas Ave/Northgate Dr	<55.0	D	10.5	B	10.6	B
17. Los Ranchitos Rd/N San Pedro Rd	<55.0	D	11.2	B	11.5	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*

**Finding** – It is anticipated that acceptable operations would be maintained at all study intersections with the addition of Vision Plan a.m. peak hour traffic to Future volumes.



Traffic Operations Study for the Northgate Town Square Project  
**Figure 11 - Future plus Vision Plan Project Traffic Volumes**

# Traffic Mitigation Fee

The City of San Rafael's *Development Impact Fees* document outlines a variety of fees that may be collected by the City for new development projects. The Traffic Mitigation Fee is collected to compensate for the effect that traffic generated by a development project may have on the surrounding roadway network, and to fund traffic improvements accordingly. The fee levied is \$4,246.00 per net new a.m. and p.m. peak hour vehicle trip. The *Transportation Impact Analysis Guidelines*, City of San Rafael, June 2021, further details how to calculate the fee, such as stipulating that pass-by and diverted link trips shall not be counted towards the trip generation used to calculate the fee. For existing trips to and from the site, the Guidelines specify that approval by City staff shall be secured prior to preparation of the transportation analysis. The trip generation methodology used for this analysis, including credit given for the existing commercial space, was approved by City staff in October 2021.

The anticipated trip generation for the Master Plan and Vision Plan scenarios with deductions for existing trips but not for pass-by or diverted link trips is detailed in Table 11. The Master Plan scenario would be estimated to result in an increase in 173 a.m. peak hour trips and a decrease of 364 p.m. peak hour trips, for a net decrease of 191 trips across both peak hours. For the Vision Plan scenario, the morning peak hour trip generation would be anticipated to increase by 176 trips whereas the afternoon peak hour trip generation would decrease by 942 trips, for a net decrease across both peak hours of 766 trips. As the project would result in a net decrease in peak hour trips under either scenario, the Traffic Mitigation Fee would not apply.

**Table 11 – Trip Generation for Calculating Traffic Mitigation Fee**

Land Use	Units	Master Plan				Vision Plan				
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		
		Rate	Trips	Rate	Trips	Rate	Trips	Rate	Trips	
<b>Existing</b>										
Shopping Center	-766.507 ksf	-0.76	-586	3.19	-2,446	-766.507 ksf	-0.76	-586	3.19	-2,446
<b>Proposed</b>										
Shopping Center	498.661 ksf	0.86	428	3.60	1,795	225.100 ksf	1.18	266	4.50	1,012
Townhouses	92 du	0.48	44	0.57	52	92 du	0.48	44	0.57	52
Apartments	885 du	0.37	327	0.39	345	1,330 du	0.37	492	0.39	519
<i>Proposed Subtotal</i>			799		2,192			802		1,583
Internal Capture		-5%	-40	-5%	-110		-5%	-40	-5%	-79
<i>Proposed Total</i>			759		423			762		1,504
<b>Net New Total</b>			<b>173</b>		<b>-364</b>			<b>176</b>		<b>-942</b>

Note: ksf = 1,000 square feet; du = dwelling unit

**Finding** – The City's Traffic Mitigation Fee would not apply to this project as the fee is based on the net new a.m. and p.m. peak hour trips, and both project scenarios would result in a net decrease to peak hour trips.



# Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand. The project site as proposed would provide a total of 1,566 standard parking spaces for the residential use and 1,860 standard parking spaces for the retail use for the Master Plan scenario, for a total of 3,426 spaces. The Vision Plan scenario would include 3,711 spaces, including 2,314 residential spaces and 1,397 retail spaces. It is noted that the parking analysis reflects the demand associated with the project as indicated on the site plan and not the higher density option evaluated in the operational analysis.

## Residential Parking

For market-rate units, the City of San Rafael’s *Municipal Code* requires one to two parking spaces per multifamily dwelling unit depending on the number of bedrooms, in addition to one guest space per five units. *Resolution 14891*, City of San Rafael, February 2021, stipulates that affordable housing developments are to provide one parking space per studio or one-bedroom unit. Table 12 shows the proposed unit counts by numbers of bedrooms, proposed parking supply, and City requirements for the Master Plan and Vision Plan development scenarios.

**Table 12 – Residential City Code Parking Requirements**

Category	Rate	Master Plan		Vision Plan	
		Units	Spaces Required	Units	Spaces Required
<b>Affordable Rate</b>					
0- or 1-Bed Apartment	1 per du	96	96	138	138
<b>Market Rate</b>					
Studio Apartment	1 per du	88	88	156	156
1-Bed Apartment	1.5 per du	469	704	696	1,044
2-Bed Apartment/Townhouse	2 per du	211	422	287	574
3-Bed Apartment/Townhouse	2 per du	36	72	36	72
4-Bed Apartment/Townhouse	2 per du	7	14	7	14
Guest Parking	1 per 5 du	811 <sup>1</sup>	162	1,182 <sup>1</sup>	236
<b>Total Spaces Required by City Code</b>		<b>1,558</b>		<b>2,234</b>	
<b>Proposed Spaces</b>		<b>1,566</b>		<b>2,314</b>	
<b>Surplus</b>		<b>8</b>		<b>40</b>	

Note: du = dwelling unit; <sup>1</sup> Guest parking is not required for affordable housing

**Finding** – The 1,566 proposed parking spaces for the Master Plan scenario would exceed the applicable requirement by eight spaces, and the Vision Plan’s proposed 2,314 parking spaces would provide an excess of 80 spaces over the requirement for 2,234 spaces.

The *Municipal Code* requires that one covered space be provided per market-rate unit as part of the required total, or 811 covered spaces for the Master Plan scenario and 1,182 covered spaces for the Vision Plan scenario. Under the Master Plan scenario, the residential area would include three parking garages with five or six levels of covered parking in addition to an uncovered roof parking level, and one ground-floor parking garage with an adjacent outside lot. With this design, there would be 1,433 covered parking spaces of the proposed supply of 1,566, which exceeds the requirement for covered spaces. The Vision Plan would add two parking garages with four and five

levels of covered parking plus one additional level of uncovered roof parking, for a total of 2,057 covered spaces out of the proposed supply of 2,314. This exceeds the requirement for covered spaces.

**Finding** – Sufficient covered parking would be provided, including 1,433 spaces under the Master Plan scenario and 2,057 spaces under the Vision Plan scenario, exceeding the *Municipal Code* requirement for 811 and 1,182 covered spaces, respectively.

## Commercial Parking

The *Municipal Code* requires one parking space per 250 square feet of retail, which when applied to the proposed Master Plan retail area of 498,661 square feet results in a requirement of 1,995 parking spaces, or 132 more spaces than the proposed commercial parking supply of 1,863 parking spaces. For the Vision Plan scenario, the proposed 225,100 square feet of retail area would net a requirement for 900 parking spaces, which is 502 spaces fewer than the proposed parking supply of 1,402 spaces.

The parking demand for the commercial use was estimated using ITE's *Parking Generation* 85<sup>th</sup> percentile rates for the "Shopping Center" (ITE LU #820) land use. The project's proposed parking supply would exceed demand on weekdays and Sundays, though the Master Plan scenario may face a minor shortfall during the Saturday peak demand period, as shown in Table 13. Note that the estimated shortfall of 2 parking spaces is less than one percent of the total and is based on the more conservative 85<sup>th</sup> percentile demand rates rather than the lower and more typically applied average peak demand rates.

Land Use	Units	Peak Weekday		Peak Saturday		Peak Sunday	
		ITE Rate	Demand	ITE Rate	Demand	ITE Rate	Demand
<b>Master Plan</b>							
Retail	498.661 ksf	3.68/ksf	1,835	3.74/ksf	1,865	2.27/ksf	1,132
Proposed Spaces			1,863		1,863		1,863
<b>Surplus (Deficiency)</b>			<b>28</b>		<b>(2)</b>		<b>731</b>
<b>Vision Plan</b>							
Retail	225.100 ksf	3.68/ksf	828	3.74/ksf	842	2.27/ksf	511
Proposed Spaces			1,402		1,402		1,402
<b>Surplus</b>			<b>574</b>		<b>560</b>		<b>891</b>

Note: ksf = 1,000 square feet

Also included in the *Municipal Code* is a requirement for designated clean air vehicle parking, at a rate of eight percent of nonresidential parking spaces. These spaces are not delineated on the site plan, but should be incorporated, including 149 such spaces for the Master Plan's supply of 1,863 retail spaces, and 112 such spaces for the Vision Plan's 1,402 retail spaces.

**Finding** – The Master Plan project would provide 1,863 commercial parking spaces, which is just short of the City Code requirement of 1,865 parking spaces. However, the proposed supply exceeds the estimated demand by 28 spaces using the 85<sup>th</sup> percentile ITE demand rates for weekdays, by 731 spaces on Sunday, and may have a deficit of 2 spaces on Saturday. Although there is a minor deficit, this is not anticipated to result in operational issues as the 85<sup>th</sup> percentile rates are conservative estimates of peak parking demand. The 1,402 parking spaces proposed for the Vision Plan would exceed the City's requirement as well as the estimated demand. The *Municipal Code* also requires designation of clean air vehicle parking.

**Recommendation** – The project should be constructed with 149 designated clean air vehicle parking spaces for the Master Plan scenario, and 112 spaces for the Vision Plan scenario.



# Conclusions and Recommendations

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## Conclusions

- Upon construction of the Master Plan scenario, a net decrease of 3,585 daily trips is anticipated, including a decrease of 345 p.m. peak hour trips but an increase of 172 a.m. peak hour trips. For the Vision Plan, the estimated trip generation includes a decrease in daily traffic of 8,384 daily trips, though there would be an increase of 177 trips during the morning peak hour and a decrease of 886 trips during the evening peak hour.
- Because the project would be expected to decrease site-related trips during the evening peak hour, and therefore improve operation in the study area, this time period was not evaluated. The focus of the analysis was the morning peak hour when the project would result in an increased number of trips.
- During the a.m. peak hour, the 17 study intersections all operate acceptably under Existing conditions and would continue to operate acceptably under Baseline (2025) conditions without or with the addition of Master Plan traffic, and Future (2040) conditions without or with the addition of either the Master Plan or Vision Plan traffic.
- The project would result in a net reduction of total peak hour vehicle trips for both the Master Plan and Vision Plan scenarios. Therefore, the City's Traffic Mitigation Fee would not apply.
- The proposed supply of 1,566 and 2,314 residential parking spaces for the Master Plan and Vision Plan scenarios would exceed the applicable requirements for 1,558 and 2,234 residential spaces, respectively. The Master Plan proposed retail parking supply of 1,863 spaces would be 2 fewer than the requirement for 1,865 parking spaces though would exceed the anticipated peak demand on weekdays and Sundays. The proposed retail parking supply under the Vision Plan scenario would exceed the City requirements and estimated peak demand. Designated clean air vehicle parking is required for the retail uses totaling 149 and 112 such spaces for the Master Plan and Vision Plan scenarios, respectively.

## Recommendations

- There should be 149 parking spaces under the Master Plan scenario and 112 spaces under the Vision Plan scenario designated for clean air vehicle parking.

# Study Participants and References

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## Study Participants

<b>Principal in Charge</b>	Dalene J. Whitlock, PE, PTOE
<b>Traffic Engineer</b>	Kevin Carstens, PE
<b>Graphics</b>	Cameron Wong
<b>Editing/Formatting</b>	Hannah Yung-Boxdell, Cameron Wong, Jessica Bender
<b>Quality Control</b>	Dalene J. Whitlock, PE, PTOE
<b>Modeling</b>	Damian Stefanakis, Kittelson & Associates, Inc.

## References

- Bicycle and Pedestrian Master Plan*, City of San Rafael, 2018
- California Manual on Uniform Traffic Control Devices for Streets and Highways Revision 6*, California Department of Transportation, 2021
- California Vehicle Code*, State of California, 2018,  
[http://leginfo.ca.gov/faces/codesTOCSelected.xhtml?tocCode=VEH&tocTitle="+Vehicle+Code+"+VEH](http://leginfo.ca.gov/faces/codesTOCSelected.xhtml?tocCode=VEH&tocTitle=)
- Capital Improvement Program*, City of San Rafael, 2021
- City of San Rafael Transportation Impact Analysis Guidelines*, City of San Rafael, June 2021
- Development Impact Fees*, City of San Rafael, 2019
- General Plan 2040*, City of San Rafael, 2021
- Highway Capacity Manual*, 6<sup>th</sup> Edition, Transportation Research Board, 2017
- Merrydale Conceptual Design Informational Report*, City of San Rafael, April 2022
- Parking Generation*, 5<sup>th</sup> Edition, Institute of Transportation Engineers, 2019
- Resolution 14891*, City of San Rafael, February 2021
- San Rafael, California Municipal Code*, Municipal Code Corporation, 2021
- San Rafael General Plan 2040*, City of San Rafael, 2021
- Trip Generation Manual*, 11<sup>th</sup> Edition, Institute of Transportation Engineers, 2021

SRA130-2



# Appendix A

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## Intersection Level of Service Calculations





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HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↖	↗	↘		↖	↗	↘		↖	↗	↘
Traffic Volume (veh/h)	2	26	634	69	24	337	579	129	46	114	167	167
Future Volume (veh/h)	2	26	634	69	24	337	579	129	46	114	167	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97		1.00		1.00	0.99		0.97	0.99	
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
Work Zone On Approach		No				No				No		
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	30	737	47		392	673	0	53	133	131	194	
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	91	707	305		586	1746		317	598	493	386	
Arrive On Green	0.05	0.21	0.21		0.69	1.00	0.00	0.34	0.34	0.34	0.34	
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	1090	1772	1461	1105	
Grp Volume(v), veh/h	30	737	47		392	673	0	53	133	131	194	
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	1090	1772	1461	1105	
Q Serve(g_s), s	1.7	21.0	2.6		13.2	0.0	0.0	4.0	5.4	6.5	15.2	
Cycle Q Clear(g_c), s	1.7	21.0	2.6		13.2	0.0	0.0	15.2	5.4	6.5	20.6	
Prop In Lane	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	91	707	305		586	1746		317	598	493	386	
V/C Ratio(X)	0.33	1.04	0.15		0.67	0.39		0.17	0.22	0.27	0.50	
Avail Cap(c_a), veh/h	236	707	305		586	1746		440	797	657	510	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00		0.88	0.88	0.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	45.6	39.5	32.2		12.0	0.0	0.0	31.6	23.7	24.1	31.1	
Incr Delay (d2), s/veh	2.5	45.4	0.5		2.7	0.6	0.0	0.3	0.2	0.3	1.2	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.8	12.9	1.0		3.5	0.1	0.0	1.1	2.3	2.3	4.2	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.1	84.9	32.7		14.7	0.6	0.0	31.8	23.9	24.4	32.3	
LnGrp LOS	D	F	C		B	A		C	C	C	C	
Approach Vol, veh/h		814				1065	A		317			
Approach Delay, s/veh		80.5				5.8			25.5			
Approach LOS		F				A			C			
Timer - Assigned Phs	1	2	4	5	6	8						
Phs Duration (G+Y+Rc), s	38.2	24.5	37.3	7.4	55.4	37.3						
Change Period (Y+Rc), s	5.5	5.5	5.5	4.0	5.5	5.5						
Max Green Setting (Gmax), s	21.5	19.0	43.0	12.0	30.0	43.0						
Max Q Clear Time (g_c+1), s	15.2	23.0	17.2	3.7	2.0	22.6						
Green Ext Time (p_c), s	1.1	0.0	1.8	0.0	3.3	2.7						

Intersection Summary

HCM 6th Ctrl Delay	34.9
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↓	↘
Traffic Volume (veh/h)	221	26
Future Volume (veh/h)	221	26
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	257	23
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	598	489
Arrive On Green	0.34	0.34
Sat Flow, veh/h	1772	1449
Grp Volume(v), veh/h	257	23
Grp Sat Flow(s),veh/h/ln	1772	1449
Q Serve(g_s), s	11.2	1.1
Cycle Q Clear(g_c), s	11.2	1.1
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	598	489
V/C Ratio(X)	0.43	0.05
Avail Cap(c_a), veh/h	797	652
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	25.7	22.3
Incr Delay (d2), s/veh	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.4
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	26.3	22.3
LnGrp LOS	C	C
Approach Vol, veh/h	474	
Approach Delay, s/veh	28.6	
Approach LOS	C	
Timer - Assigned Phs		

HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (veh/h)	3	19	997	26	16	280	1014	73	18	4	40	31	11	17
Future Volume (veh/h)	3	19	997	26	16	280	1014	73	18	4	40	31	11	17
Initial Q (Qb), veh	0	0	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	0.98	1.00	0.98	1.00	0.98	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	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1772	1740	1772	1673	1772	1772	1575	1740	1772	1575	1638	1772	1772	1772
Adj Flow Rate, veh/h	21	1096	0	308	1114	0	20	4	0	34	12	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	2199	0	417	2582	0	187	31	0	212	181	0	0	0
Arrive On Green	0.01	0.22	0.00	0.13	0.77	0.00	0.11	0.11	0.00	0.11	0.11	0.00	0.00	0.00
Sat Flow, veh/h	1688	3394	0	3092	3455	0	1101	283	1502	1234	1638	0	0	0
Grp Volume(v), veh/h	21	1096	0	308	1114	0	24	0	0	34	12	0	0	0
Grp Sat Flow(s),veh/h/ln	1688	1653	0	1546	1683	0	1384	0	1502	1234	1638	0	0	0
Q Serve(g_s), s	1.2	29.0	0.0	9.6	11.5	0.0	1.1	0.0	0.0	0.5	0.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	29.0	0.0	9.6	11.5	0.0	1.7	0.0	0.0	2.2	0.7	0.0	0.0	0.0
Prop In Lane	1.00	0.00	0.00	1.00	0.00	0.83	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Lane Grp Cap(c), veh/h	55	2199	0	417	2582	0	219	0	0	212	181	0	0	0
V/C Ratio(X)	0.38	0.50	0.00	0.74	0.43	0.00	0.11	0.00	0.00	0.16	0.07	0.00	0.00	0.00
Avail Cap(c_a), veh/h	186	2199	0	526	2582	0	597	0	0	552	632	0	0	0
HCM Platoon Ratio	0.33	0.33	0.33	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)	0.34	0.34	0.00	0.93	0.93	0.00	0.98	0.00	0.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	48.5	24.4	0.0	41.6	4.1	0.0	40.4	0.0	0.0	40.5	39.9	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.3	0.0	3.4	0.5	0.0	0.2	0.0	0.0	0.1	0.1	0.0	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	12.8	0.0	3.8	3.0	0.0	0.6	0.0	0.0	0.8	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	49.0	24.7	0.0	44.9	4.5	0.0	40.6	0.0	0.0	40.7	39.9	0.0	0.0	0.0
LnGrp LOS	D	C		D	A		D	A		D	D			
Approach Vol, veh/h		1117	A		1422	A		24	A		46	A		
Approach Delay, s/veh		25.1			13.3			40.6			40.5			
Approach LOS		C			B			D			D			
Timer - Assigned Phs	1	2	4	5	6	8								
Phs Duration (G+Y+Rc), s	69.5	14.0	6.3	79.7	14.0									
Change Period (Y+Rc), s	5.0	4.6	4.5	5.0	* 4.6									
Max Green Setting (Gmax), s	34.0	36.4	9.5	40.0	* 37									
Max Q Clear Time (g_c+I), s	31.0	3.7	3.2	13.5	4.2									
Green Ext Time (p_c), s	0.4	1.6	0.1	0.0	6.1	0.0								

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Notes  
User approved ignoring U-Turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1032	49	0	975	0	5	0	305	112	298	414
Future Volume (veh/h)	0	1032	49	0	975	0	5	0	305	112	298	414
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	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1772	1843	1772	1772	1843
Adj Flow Rate, veh/h	0	1110	0	0	1048	0	5	0	0	120	320	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	0	2	0	2	2	2	2	2	2
Cap, veh/h	0	2581	0	0	3566	0	151	0	0	222	481	0
Arrive On Green	0.00	1.00	0.00	0.00	0.74	0.00	0.20	0.00	0.00	0.20	0.20	0.00
Sat Flow, veh/h	0	3686	0	0	5156	0	431	0	1562	829	2449	0
Grp Volume(v), veh/h	0	1110	0	0	1048	0	5	0	0	239	201	0
Grp Sat Flow(s),veh/h/ln	0	1751	0	0	1612	0	431	0	1562	1666	1532	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.3	0.0	0.4	0.0	0.0	0.4	12.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.3	0.0	12.4	0.0	0.0	12.9	12.0	0.0
Prop In Lane	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.50	0.00	0.00
Lane Grp Cap(c), veh/h	0	2581	0	0	3566	0	160	0	0	392	311	0
V/C Ratio(X)	0.00	0.43	0.00	0.00	0.29	0.00	0.03	0.00	0.00	0.61	0.65	0.00
Avail Cap(c_a), veh/h	0	2581	0	0	3566	0	410	0	0	765	674	0
HCM Platoon Ratio	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.35	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	4.4	0.0	43.1	0.0	0.0	36.9	36.6	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	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	0.0	0.1	0.0	0.0	1.9	0.0	0.1	0.0	0.0	5.5	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.2	0.0	0.0	4.5	0.0	43.1	0.0	0.0	37.5	37.4	0.0
LnGrp LOS	A	A		A	A	A	D	A	A	D	D	
Approach Vol, veh/h		1110	A		1048			5	A		440	A
Approach Delay, s/veh		0.2			4.5			43.1			37.4	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	2	4	6	8								
Phs Duration (G+Y+Rc), s	76.7	23.3	76.7	23.3								
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0								
Max Green Setting (Gmax), s	47.0	41.0	47.0	41.0								
Max Q Clear Time (g_c+I), s	2.0	14.9	9.3	14.4								
Green Ext Time (p_c), s	6.5	1.0	5.9	0.0								

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

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

HCM Unsignalized Intersection Capacity Analysis  
4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑							
Traffic Volume (veh/h)	0	682	774	0	976	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	682	774	0	976	250	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	0	718	815	0	1027	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		353										
pX, platoon unblocked												
vC, conflicting volume	1290			1533			1232	2008	359	1518	2692	645
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1290			1533			1232	2008	359	1518	2692	645
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	533			430			133	59	638	82	21	415
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	359	359	815	685	605							
Volume Left	0	0	0	0	0							
Volume Right	0	0	815	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.48	0.40	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			53.9%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↗	↑	↘	↘
Traffic Volume (veh/h)	0	0	74	319	410	69
Future Volume (Veh/h)	0	0	74	319	410	69
Sign Control			Stop	Free	Free	
Grade			0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	81	351	451	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1002	489	451			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1002	489	451			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	93			
cM capacity (veh/h)	249	579	1109			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	81	351	527			
Volume Left	81	0	0			
Volume Right	0	0	76			
eSH	1109	1700	1700			
Volume to Capacity	0.07	0.21	0.31			
Queue Length 95th (ft)	6	0	0			
Control Delay (s)	8.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.6		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			42.5%		ICU Level of Service	A
Analysis Period (min)			15			



SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	0.0	0.3
Total Del/Veh (s)	4.0	1.3	9.3	4.1

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	7.3	7.3	4.1

Total Zone Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	690.3

HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations												
Traffic Volume (veh/h)	260	1	175	4	29	0	108	64	1	2	138	409
Future Volume (veh/h)	260	1	175	4	29	0	108	64	1	2	138	409
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	313	1	131	5	35	0	130	77	1	2	166	459
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	370	1	324	20	158	0	168	1154	15	30	950	1109
Arrive On Green	0.21	0.21	0.21	0.09	0.09	0.00	0.09	0.63	0.63	0.52	0.52	0.51
Sat Flow, veh/h	1776	6	1555	232	1626	0	1781	1842	24	4	1865	1537
Grp Volume(v), veh/h	314	0	131	40	0	0	130	0	78	168	0	459
Grp Sat Flow(s),veh/h/ln	1782	0	1555	1859	0	0	1781	0	1865	1869	0	1537
Q Serve(g_s), s	22.1	0.0	9.5	2.6	0.0	0.0	9.3	0.0	2.1	0.0	0.0	15.5
Cycle Q Clear(g_c), s	22.1	0.0	9.5	2.6	0.0	0.0	9.3	0.0	2.1	6.2	0.0	15.5
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	371	0	324	176	0	0	168	0	1169	980	0	1109
V/C Ratio(X)	0.85	0.00	0.40	0.23	0.00	0.00	0.77	0.00	0.07	0.17	0.00	0.41
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1181	992	0	1117
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.5	0.0	44.9	54.8	0.0	0.0	57.5	0.0	9.5	17.3	0.0	7.6
Incr Delay (d2), s/veh	14.0	0.0	0.8	0.2	0.0	0.0	8.5	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	0.0	4.3	1.8	0.0	0.0	4.6	0.0	0.9	2.8	0.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	46.7	57.8	0.0	0.0	66.1	0.0	9.6	17.3	0.0	7.7
LnGrp LOS	E	A	D	E	A	A	E	A	A	B	A	A
Approach Vol, veh/h	445				40			208				627
Approach Delay, s/veh	58.6				57.8			44.9				10.3
Approach LOS	E				E			D				B
Timer - Assigned Phs	2			4	5	6		8				
Phs Duration (G+Y+Rc), s	85.3			29.9	15.2	70.1		14.8				
Change Period (Y+Rc), s	4.9			4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s	60.1			28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+1), s	4.1			24.1	11.3	17.5		4.6				
Green Ext Time (p_c), s	0.3			0.8	0.1	3.2		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay	33.4											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	23	201	106	101	96	54	38	42	92	82	117	48
Future Volume (veh/h)	23	201	106	101	96	54	38	42	92	82	117	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	248	103	125	119	52	47	52	0	101	144	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	930	1716	689	749	828	371	113	120		136	285	
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.08	0.08	0.00	0.09	0.10	0.00
Sat Flow, veh/h	1210	2322	932	920	1120	501	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	177	174	139	0	157	47	52	0	101	144	0
Grp Sat Flow(s), veh/h/ln	1210	1683	1570	1030	0	1512	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	0.7	3.1	3.3	3.9	0.0	3.0	3.0	3.2	0.0	6.8	4.6	0.0
Cycle Q Clear(g_c), s	3.7	3.1	3.3	7.2	0.0	3.0	3.0	3.2	0.0	6.8	4.6	0.0
Prop In Lane	1.00		0.59	0.90		0.33	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	930	1244	1161	830	0	1117	113	120		136	285	
V/C Ratio(X)	0.03	0.14	0.15	0.17	0.00	0.14	0.41	0.43		0.74	0.50	
Avail Cap(c_a), veh/h	930	1244	1161	830	0	1117	300	520		346	1107	
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	0.89	0.00	0.89	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	4.3	3.8	3.8	4.7	0.0	3.8	44.1	44.1	0.0	44.1	43.0	0.0
Incr Delay (d2), s/veh	0.1	0.2	0.3	0.0	0.0	0.0	0.9	0.9	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2	1.0	1.0	0.9	0.0	0.8	1.1	1.3	0.0	2.5	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.4	4.0	4.1	4.8	0.0	3.8	45.0	45.0	0.0	44.4	43.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h		379			296			99	A		245	A
Approach Delay, s/veh		4.1			4.3			45.0			43.6	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.5			76.9	12.5	10.6		76.9				
Change Period (Y+Rc), s	4.0	4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s	35.4			* 33	23.0	31.4		* 33				
Max Q Clear Time (g_c+1), s	6.6			5.7	8.8	5.2		9.2				
Green Ext Time (p_c), s	0.0	0.4		0.9	0.2	0.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	218	140	4	0	94	65	0	0	0	111	33	153
Future Volume (veh/h)	218	140	4	0	94	65	0	0	0	111	33	153
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	159	5	0	107	58				82	100	77
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	2303	1439	45	0	194	293				164	172	145
Arrive On Green	1.00	1.00	1.00	0.00	0.11	0.10				0.10	0.10	0.10
Sat Flow, veh/h	3274	1707	54	0	1772	1439				1688	1772	1492
Grp Volume(v), veh/h	248	0	164	0	107	58				82	100	77
Grp Sat Flow(s), veh/h/ln	1637	0	1761	0	1772	1439				1688	1772	1492
Q Serve(g_s), s	0.0	0.0	0.0	0.0	5.7	3.4				4.6	5.4	4.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	5.7	3.4				4.6	5.4	4.9
Prop In Lane	1.00		0.03	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	2303	0	1484	0	194	293				164	172	145
V/C Ratio(X)	0.11	0.00	0.11	0.00	0.55	0.20				0.50	0.58	0.53
Avail Cap(c_a), veh/h	2303	0	1484	0	638	654				557	585	492
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.97	0.00	0.97	0.00	1.00	1.00				0.50	0.50	0.50
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	42.2	33.4				42.9	43.2	43.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.9	0.1				0.4	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.1	0.0	0.0	2.6	1.4				2.0	2.4	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.1	0.0	43.1	33.5				43.3	43.8	43.6
LnGrp LOS	A	A	A	A	D	C				D	D	D
Approach Vol, veh/h		412			165						259	
Approach Delay, s/veh		0.1			39.7						43.6	
Approach LOS		A			D						D	
Timer - Assigned Phs	2		4		5	6						
Phs Duration (G+Y+Rc), s	87.3		12.7		73.4	13.9						
Change Period (Y+Rc), s	4.9		* 4.2		4.0	4.9						
Max Green Setting (Gmax), s	59.1		* 32		21.0	34.1						
Max Q Clear Time (g_c+1), s	2.0		7.4		2.0	7.7						
Green Ext Time (p_c), s	0.4		0.6		0.3	0.4						

Intersection Summary

HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	2	3	1	121	19	80	2	83	79	95	121	7
Future Volume (veh/h)	2	3	1	121	19	80	2	83	79	95	121	7
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		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	2	4	0	142	22	53	2	98	38	112	142	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	62	0	314	94	226	46	202	78	393	662	19
Arrive On Green	0.03	0.04	0.00	0.21	0.22	0.21	0.03	0.18	0.15	0.26	0.41	0.39
Sat Flow, veh/h	1500	1673	0	1500	435	1047	1500	1135	440	1500	1618	46
Grp Volume(v), veh/h	2	4	0	142	0	75	2	0	136	112	0	146
Grp Sat Flow(s), veh/h/ln	1500	1673	0	1500	0	1482	1500	0	1576	1500	0	1664
Q Serve(g_s), s	0.0	0.1	0.0	3.2	0.0	1.6	0.0	0.0	3.0	2.3	0.0	2.2
Cycle Q Clear(g_c), s	0.0	0.1	0.0	3.2	0.0	1.6	0.0	0.0	3.0	2.3	0.0	2.2
Prop In Lane	1.00		0.00	1.00		0.71	1.00		0.28	1.00		0.03
Lane Grp Cap(c), veh/h	46	62	0	314	0	320	46	0	280	393	0	680
V/C Ratio(X)	0.04	0.06	0.00	0.45	0.00	0.23	0.04	0.00	0.49	0.29	0.00	0.21
Avail Cap(c_a), veh/h	667	964	0	667	0	1047	667	0	1113	864	0	1176
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	17.8	0.0	13.2	0.0	12.4	18.0	0.0	14.3	11.3	0.0	7.3
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.4	0.0	0.1	0.1	0.0	0.5	0.1	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.0	0.9	0.0	0.5	0.0	0.0	0.9	0.6	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.1	17.9	0.0	13.6	0.0	12.6	18.1	0.0	14.7	11.4	0.0	7.4
LnGrp LOS	B	B	A	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h	6			217			138			258		
Approach Delay, s/veh	18.0			13.2			14.8			9.1		
Approach LOS	B			B			B			A		

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	1.0	4.4	4.2	18.6	4.2	11.2	13.0	9.8
Change Period (Y+Rc), s	4.0	* 4.2	4.0	4.9	4.0	* 4.2	4.0	4.9
Max Green Setting (Gmax), s	16.0	* 21	16.0	25.1	16.0	* 26	21.0	25.1
Max Q Clear Time (g_c+I), s	2.1	2.0	4.2	2.0	3.6	4.3	5.0	
Green Ext Time (p_c), s	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1

Intersection Summary  
 HCM 6th Ctrl Delay 11.9  
 HCM 6th LOS B

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

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔	
Traffic Volume (veh/h)	61	16	105	6	17	22	57	97	16	1	24	244	125
Future Volume (veh/h)	61	16	105	6	17	22	57	97	16	1	24	244	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	68	18	90	7	19	15	63	108	17	27	271	115	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	267	57	284	110	113	89	258	561	88	174	384	163	
Arrive On Green	0.15	0.21	0.18	0.06	0.12	0.09	0.15	0.36	0.33	0.10	0.31	0.29	
Sat Flow, veh/h	1781	277	1383	1781	968	764	1781	1576	248	1781	1243	528	
Grp Volume(v), veh/h	68	0	108	7	0	34	63	0	125	27	0	386	
Grp Sat Flow(s), veh/h/ln	1781	0	1660	1781	0	1733	1781	0	1824	1781	0	1771	
Q Serve(g_s), s	1.4	0.0	2.4	0.2	0.0	0.8	1.3	0.0	2.0	0.6	0.0	8.3	
Cycle Q Clear(g_c), s	1.4	0.0	2.4	0.2	0.0	0.8	1.3	0.0	2.0	0.6	0.0	8.3	
Prop In Lane	1.00		0.83	1.00		0.44	1.00		0.14	1.00		0.30	
Lane Grp Cap(c), veh/h	267	0	340	110	0	202	258	0	650	174	0	547	
V/C Ratio(X)	0.25	0.00	0.32	0.06	0.00	0.17	0.24	0.00	0.19	0.15	0.00	0.71	
Avail Cap(c_a), veh/h	498	0	1237	415	0	1291	913	0	1572	498	0	1526	
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	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	16.1	0.0	14.9	19.0	0.0	17.3	16.3	0.0	9.6	17.7	0.0	13.3	
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.1	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.6	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/ln	0.5	0.0	0.8	0.1	0.0	0.3	0.5	0.0	0.7	0.2	0.0	2.9	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	16.3	0.0	15.1	19.1	0.0	17.4	16.5	0.0	9.7	17.9	0.0	13.9	
LnGrp LOS	B	A	B	B	A	B	B	A	A	B	A	B	
Approach Vol, veh/h	176			41			188			413			
Approach Delay, s/veh	15.6			17.7			11.9			14.1			
Approach LOS	B			B			B			B			

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	11.8	9.2	16.3	9.4	8.0	7.2	18.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0	
Max Q Clear Time (g_c+I), s	4.4	3.3	10.3	3.4	2.8	2.6	4.0	
Green Ext Time (p_c), s	0.0	0.3	0.1	1.0	0.0	0.0	0.3	

Intersection Summary  
 HCM 6th Ctrl Delay 14.1  
 HCM 6th LOS B

Notes  
 User approved ignoring U-Turning movement.

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔				↔		↔		
Traffic Vol, veh/h	11	0	8	0	0	0	6	107	0	3	233	35
Future Vol, veh/h	11	0	8	0	0	0	6	107	0	3	233	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	145	0	4	315	47

Major/Minor	Minor2	Minor1	Major1	Major2										
Conflicting Flow All	509	511	340	515	534	147	363	0	0	147	0	0		
Stage 1	348	348	-	163	163	-	-	-	-	-	-	-		
Stage 2	161	163	-	352	371	-	-	-	-	-	-	-		
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-		
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-		
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-		
Pot Cap-1 Maneuver	475	466	702	470	452	900	1196	-	-	1435	-	-		
Stage 1	668	634	-	839	763	-	-	-	-	-	-	-		
Stage 2	841	763	-	665	620	-	-	-	-	-	-	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	471	459	701	458	446	899	1195	-	-	1433	-	-		
Mov Cap-2 Maneuver	471	459	-	458	446	-	-	-	-	-	-	-		
Stage 1	663	631	-	831	756	-	-	-	-	-	-	-		
Stage 2	835	756	-	652	617	-	-	-	-	-	-	-		

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	0	0.4	0.1
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1195	-	-	546	-	1433	-	-
HCM Lane V/C Ratio	0.007	-	-	0.047	-	0.003	-	-
HCM Control Delay (s)	8	-	-	11.9	0	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	0	-	-

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	↔
Traffic Vol, veh/h	233	10	13	96	22	12
Future Vol, veh/h	233	10	13	96	22	12
Conflicting Peds, #/hr	0	3	3	0	4	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	70	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	328	14	18	135	31	17

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	345	0	513	341
Stage 1	-	-	-	-	338	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1214	-	521	701
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1211	-	510	697
Mov Cap-2 Maneuver	-	-	-	-	510	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	839	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	510	697	-	-	1211	-
HCM Lane V/C Ratio	0.061	0.024	-	-	0.015	-
HCM Control Delay (s)	12.5	10.3	-	-	8	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-

HCM 6th TWSC  
15: Nova Albion Way & Northgate Drive/Northgate

11/14/2021

Intersection							
Int Delay, s/veh	4.4						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑	↑
Traffic Vol, veh/h	106	140	4	99	40	70	105
Future Vol, veh/h	106	140	4	99	40	70	105
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	166	219	6	155	63	109	164

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	389
Stage 1	-	-	170
Stage 2	-	-	382
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1170
Stage 1	-	-	860
Stage 2	-	-	690
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	~ -26
Mov Cap-2 Maneuver	-	-	~ -26
Stage 1	-	-	857
Stage 2	-	-	685

Approach	EB	WB	NB
HCM Control Delay, s	0		14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	664	-	-	+	-
HCM Lane V/C Ratio	0.412	-	-	-	-
HCM Control Delay (s)	14.2	-	-	-	-
HCM Lane LOS	B	-	-	-	-
HCM 95th %tile Q(veh)	2	-	-	-	-

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

HCM 6th Signalized Intersection Summary  
16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

11/14/2021

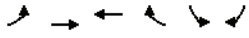
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑		↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	82	0	121	0	0	0	52	87	0	1	129	106
Future Volume (veh/h)	82	0	121	0	0	0	52	87	0	1	129	106
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	98	0	100	0	0	0	62	104	0	1	154	71
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	511	284	179	0	284	0	227	1035	0	122	358	164
Arrive On Green	0.16	0.00	0.12	0.00	0.00	0.00	0.13	0.58	0.00	0.37	0.31	0.35
Sat Flow, veh/h	1677	1772	1490	0	1772	0	1688	1772	0	3	1136	521
Grp Volume(v), veh/h	98	0	100	0	0	0	62	104	0	226	0	0
Grp Sat Flow(s),veh/h/ln	1677	1772	1490	0	1772	0	1688	1772	0	1660	0	0
Q Serve(g_s), s	1.5	0.0	1.9	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.5	0.0	1.9	0.0	0.0	0.0	1.0	0.8	0.0	3.1	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		0.31
Lane Grp Cap(c), veh/h	511	284	179	0	284	0	227	1035	0	733	0	0
V/C Ratio(X)	0.19	0.00	0.56	0.00	0.00	0.00	0.27	0.10	0.00	0.31	0.00	0.00
Avail Cap(c_a), veh/h	1652	1490	1193	0	1502	0	908	2170	0	1907	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.1	0.0	12.3	0.0	0.0	0.0	11.6	2.7	0.0	7.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.0	0.0	0.0	0.0	0.6	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	0.5	0.0	0.5	0.0	0.0	0.0	0.3	0.1	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	13.4	0.0	0.0	0.0	12.2	2.7	0.0	8.0	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h	198			0			166			226		
Approach Delay, s/veh	12.3			0.0			6.3			8.0		
Approach LOS	B						A			A		
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	22.0		7.8		8.0		14.0		7.8			
Change Period (Y+Rc), s	4.6		* 4.2		4.0		4.6		* 4.2			
Max Green Setting (Gmax), s	36.4		* 24		16.0		30.4		* 24			
Max Q Clear Time (g_c+1), s	2.8		3.9		3.0		5.1		0.0			
Green Ext Time (p_c), s	0.1		0.1		0.1		0.4		0.0			

Intersection Summary	
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes  
 User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
17: Los Ranchitos Road & N. San Pedro Road

11/14/2021



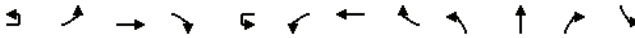
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↖	↘	↙	↚
Traffic Volume (veh/h)	149	355	128	59	198	225
Future Volume (veh/h)	149	355	128	59	198	225
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No		
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	171	408	147	0	228	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	314	964	370		372	
Arrive On Green	0.19	0.52	0.21	0.00	0.22	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	171	408	147	0	228	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	2.1	3.2	1.7	0.0	2.8	0.0
Cycle Q Clear(g_c), s	2.1	3.2	1.7	0.0	2.8	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	314	964	370		372	
V/C Ratio(X)	0.54	0.42	0.40		0.61	
Avail Cap(c_a), veh/h	2309	2521	2424		2309	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	3.4	8.0	0.0	8.2	0.0
Incr Delay (d2), s/veh	0.5	0.2	0.5	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.5	0.0	0.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.2	3.6	8.5	0.0	8.8	0.0
LnGrp LOS	A	A	A		A	
Approach Vol, veh/h	579	147	A	228	A	
Approach Delay, s/veh	5.3	8.5		8.8		
Approach LOS	A	A		A		
Timer - Assigned Phs	1	2	4		6	
Phs Duration (G+Y+Rc), s7.4	7.9		8.2		15.2	
Change Period (Y+Rc), s 4.0	4.6		4.0		4.6	
Max Green Setting (Gmax), s	30.4		31.0		30.4	
Max Q Clear Time (g_c+1), s	3.7		4.8		5.2	
Green Ext Time (p_c), s 0.4	0.4		0.5		1.3	

Intersection Summary	
HCM 6th Ctrl Delay	6.6
HCM 6th LOS	A

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

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↗	↖		↘	↙	↚		↛	↜	↞
Traffic Volume (veh/h)	2	30	649	71	24	357	611	152	47	129	171	184
Future Volume (veh/h)	2	30	649	71	24	357	611	152	47	129	171	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00		1.00	1.00	0.99			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	35	755	50		415	710	0	55	150	136	136	214
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	97	707	305		556	1673		319	630	520	393	
Arrive On Green	0.06	0.21	0.21		0.66	0.99	0.00	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	1061	1772	1462	1084	
Grp Volume(v), veh/h	35	755	50		415	710	0	55	150	136	136	214
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	1061	1772	1462	1084	
Q Serve(g_s), s	2.0	21.0	2.8		16.5	0.2	0.0	4.2	6.0	6.6	17.3	
Cycle Q Clear(g_c), s	2.0	21.0	2.8		16.5	0.2	0.0	16.5	6.0	6.6	23.3	
Prop In Lane	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	97	707	305		556	1673		319	630	520	393	
V/C Ratio(X)	0.36	1.07	0.16		0.75	0.42		0.17	0.24	0.26	0.54	
Avail Cap(c_a), veh/h	236	707	305		556	1673		419	797	658	495	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00		0.86	0.86	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	39.5	32.3		14.3	0.2	0.0	31.0	22.7	22.9	30.9	
Incr Delay (d2), s/veh	2.7	53.4	0.5		4.9	0.7	0.0	0.3	0.2	0.3	1.4	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.9	13.7	1.0		4.5	0.2	0.0	1.1	2.5	2.3	4.7	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.1	92.9	32.9		19.2	0.8	0.0	31.3	22.9	23.2	32.3	
LnGrp LOS	D	F	C		B	A		C	C	C	C	
Approach Vol, veh/h			840			1125		A		341		
Approach Delay, s/veh			87.5			7.6				24.4		
Approach LOS			F			A				C		
Timer - Assigned Phs	1	2	4	5	6	8						
Phs Duration (G+Y+Rc), s	36.4	24.5	39.1	7.7	53.2	39.1						
Change Period (Y+Rc), s	5.5	5.5	5.5	4.0	5.5	5.5						
Max Green Setting (Gmax), s	21.5	19.0	43.0	12.0	30.0	43.0						
Max Q Clear Time (g_c+1), s	18.5	23.0	18.5	4.0	2.2	25.3						
Green Ext Time (p_c), s	0.6	0.0	1.9	0.0	3.5	2.9						

Intersection Summary	
HCM 6th Ctrl Delay	37.1
HCM 6th LOS	D

Notes  
User approved pedestrian interval to be less than phase max green.  
User approved ignoring U-Turning movement.  
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	244	29
Future Volume (veh/h)	244	29
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	284	27
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	630	516
Arrive On Green	0.36	0.36
Sat Flow, veh/h	1772	1451
Grp Volume(v), veh/h	284	27
Grp Sat Flow(s),veh/h/ln	1772	1451
Q Serve(g_s), s	12.3	1.2
Cycle Q Clear(g_c), s	12.3	1.2
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	630	516
V/C Ratio(X)	0.45	0.05
Avail Cap(c_a), veh/h	797	653
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	24.7	21.1
Incr Delay (d2), s/veh	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.4
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	25.3	21.2
LnGrp LOS	C	C
Approach Vol, veh/h	525	
Approach Delay, s/veh	27.9	
Approach LOS	C	

Timer - Assigned Phs

HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑			↑	↑			↑	↑	↑	↑	
Traffic Volume (veh/h)	3	19	1041	26	16	284	1074	76	18	4	43	34	11	17
Future Volume (veh/h)	3	19	1041	26	16	284	1074	76	18	4	43	34	11	17
Initial Q (Qb), veh	0	0	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	0.98		1.00	0.98		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	1.00
Work Zone On Approach	No		No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1740	1772		1673	1772	1772	1575	1740	1772	1575	1638	1772	
Adj Flow Rate, veh/h	21	1144	0		312	1180	0	20	4	0	37	12	0	
Peak Hour Factor	0.91	0.91	0.91		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2	2	
Cap, veh/h	55	2188			421	2576		190	32		215	184		
Arrive On Green	0.01	0.22	0.00		0.14	0.77	0.00	0.11	0.11	0.00	0.11	0.11	0.00	
Sat Flow, veh/h	1688	3394	0		3092	3455	0	1102	283	1502	1234	1638	0	
Grp Volume(v), veh/h	21	1144	0		312	1180	0	24	0	0	37	12	0	
Grp Sat Flow(s),veh/h/ln	1688	1653	0		1546	1683	0	1385	0	1502	1234	1638	0	
Q Serve(g_s), s	1.2	30.5	0.0		9.7	12.7	0.0	1.1	0.0	0.0	0.7	0.7	0.0	
Cycle Q Clear(g_c), s	1.2	30.5	0.0		9.7	12.7	0.0	1.7	0.0	0.0	2.4	0.7	0.0	
Prop In Lane	1.00		0.00		1.00		0.00	0.83		1.00	1.00		0.00	
Lane Grp Cap(c), veh/h	55	2188			421	2576		221	0		215	184		
V/C Ratio(X)	0.38	0.52			0.74	0.46		0.11	0.00		0.17	0.07		
Avail Cap(c_a), veh/h	186	2188			526	2576		598	0		552	632		
HCM Platoon Ratio	0.33	0.33	0.33		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.30	0.30	0.00		0.92	0.92	0.00	0.98	0.00	0.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	48.5	25.1	0.0		41.5	4.2	0.0	40.2	0.0	0.0	40.4	39.7	0.0	
Incr Delay (d2), s/veh	0.5	0.3	0.0		3.5	0.5	0.0	0.2	0.0	0.0	0.1	0.1	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	13.5	0.0		3.8	3.3	0.0	0.6	0.0	0.0	0.8	0.3	0.0	
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	48.9	25.4	0.0		45.0	4.8	0.0	40.4	0.0	0.0	40.6	39.8	0.0	
LnGrp LOS	D	C			D	A		D	A		D	D		
Approach Vol, veh/h			1165	A			1492	A		24	A		49	A
Approach Delay, s/veh			25.8				13.2		40.4				40.4	
Approach LOS			C				B		D				D	

Timer - Assigned Phs

Phs Duration (G+Y+Rc), s	1	2	4	5	6	8
Change Period (Y+Rc), s	69.2	5.0	14.2	6.3	79.5	14.2
Max Green Setting (Gmax), s	4.6	34.0	36.4	9.5	40.0	* 37
Max Q Clear Time (g_c+I), s	32.5	3.7	3.2	14.7	4.4	
Green Ext Time (p_c), s	0.4	0.9	0.1	0.0	6.6	0.0

Intersection Summary

HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

User approved ignoring U-Turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



HCM 6th Signalized Intersection Summary  
 3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔↔↔				↔	↔	↔↔		
Traffic Volume (veh/h)	0	1036	101	0	981	0	5	0	305	112	304	470
Future Volume (veh/h)	0	1036	101	0	981	0	5	0	305	112	304	470
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1772	1843	1772	1772	1843
Adj Flow Rate, veh/h	0	1114	0	0	1055	0	5	0	0	120	327	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	0	2	0	2	2	2	2	2	2
Cap, veh/h	0	2574	0	0	3557	0	159	0	395	112	327	470
Arrive On Green	0.00	1.00	0.00	0.00	0.74	0.00	0.20	0.00	0.00	0.20	0.20	0.00
Sat Flow, veh/h	0	3686	0	0	5156	0	424	0	1562	817	2464	0
Grp Volume(v), veh/h	0	1114	0	0	1055	0	5	0	0	243	204	0
Grp Sat Flow(s),veh/h/ln	0	1751	0	0	1612	0	424	0	1562	1668	1532	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.4	0.0	0.4	0.0	0.0	0.4	12.2	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.4	0.0	12.7	0.0	0.0	13.1	12.2	0.0
Prop In Lane	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.49	0.00	0.00	0.00
Lane Grp Cap(c), veh/h	0	2574	0	0	3557	0	159	0	395	112	327	470
V/C Ratio(X)	0.00	0.43	0.00	0.00	0.30	0.00	0.03	0.00	0.00	0.61	0.65	0.00
Avail Cap(c_a), veh/h	0	2574	0	0	3557	0	406	0	766	674	0	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.28	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	4.5	0.0	43.1	0.0	0.0	36.8	36.5	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	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	0.0	0.1	0.0	0.0	1.9	0.0	0.1	0.0	0.0	5.6	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	4.5	0.0	43.1	0.0	0.0	37.4	37.3	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	D	D
Approach Vol, veh/h	1114	A		1055			5	A		447	A	
Approach Delay, s/veh	0.1			4.5			43.1			37.4		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	76.5		23.5		76.5		23.5					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	47.0		41.0		47.0		41.0					
Max Q Clear Time (g_c+1), s	2.0		15.1		9.4		14.7					
Green Ext Time (p_c), s	6.6		1.0		5.9		0.0					

Intersection Summary		
HCM 6th Ctrl Delay	8.3	
HCM 6th LOS	A	

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

HCM Unsignalized Intersection Capacity Analysis  
 4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔				↔	↔↔		
Traffic Volume (veh/h)	0	683	776	0	982	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	683	776	0	982	250	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			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
Hourly flow rate (vph)	0	719	817	0	1034	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	353											
pX, platoon unblocked												
vC, conflicting volume	1297			1536			1236	2016	360	1525	2702	648
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1297			1536			1236	2016	360	1525	2702	648
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	530			429			132	58	637	81	21	413
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	360	360	817	689	608							
Volume Left	0	0	0	0	0							
Volume Right	0	0	817	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.48	0.41	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0				0.0							
Approach LOS												
Intersection Summary												
Average Delay				0.0								
Intersection Capacity Utilization				54.1%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis  
 5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↖	↗	↘	
Traffic Volume (veh/h)	0	0	76	391	441	69
Future Volume (Veh/h)	0	0	76	391	441	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	84	430	485	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1121	523	485			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1121	523	485			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	92			
cM capacity (veh/h)	210	554	1078			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	84	430	561			
Volume Left	84	0	0			
Volume Right	0	0	76			
cSH	1078	1700	1700			
Volume to Capacity	0.08	0.25	0.33			
Queue Length 95th (ft)	6	0	0			
Control Delay (s)	8.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.4		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			44.5%	ICU Level of Service	A	
Analysis Period (min)			15			

SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	0.0	0.4
Total Del/Veh (s)	4.1	1.4	10.8	4.5

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	7.9	8.1	4.4

Total Zone Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	854.3

HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕			↕	↕
Traffic Volume (veh/h)	267	1	184	4	29	0	109	79	1	2	175	413
Future Volume (veh/h)	267	1	184	4	29	0	109	79	1	2	175	413
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	322	1	142	5	35	0	131	95	1	2	211	464
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	1	330	20	159	0	169	1150	12	30	942	1108
Arrive On Green	0.21	0.21	0.21	0.09	0.09	0.00	0.09	0.63	0.62	0.51	0.51	0.51
Sat Flow, veh/h	1776	6	1556	232	1626	0	1781	1847	19	3	1866	1536
Grp Volume(v), veh/h	323	0	142	40	0	0	131	0	96	213	0	464
Grp Sat Flow(s),veh/h/ln	1782	0	1556	1859	0	0	1781	0	1866	1869	0	1536
Q Serve(g_s), s	22.7	0.0	10.3	2.6	0.0	0.0	9.3	0.0	2.6	0.0	0.0	15.7
Cycle Q Clear(g_c), s	22.7	0.0	10.3	2.6	0.0	0.0	9.3	0.0	2.6	8.2	0.0	15.7
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	377	0	330	176	0	0	169	0	1162	972	0	1108
V/C Ratio(X)	0.86	0.00	0.43	0.23	0.00	0.00	0.78	0.00	0.08	0.22	0.00	0.42
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1175	984	0	1117
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.3	0.0	44.8	54.8	0.0	0.0	57.5	0.0	9.8	18.0	0.0	7.7
Incr Delay (d2), s/veh	15.3	0.0	0.9	0.2	0.0	0.0	8.8	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	0.0	4.6	1.8	0.0	0.0	4.7	0.0	1.2	3.7	0.0	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	0.0	46.8	57.8	0.0	0.0	66.3	0.0	10.0	18.1	0.0	7.8
LnGrp LOS	E	A	D	E	A	A	E	A	A	B	A	A
Approach Vol, veh/h		465			40			227			677	
Approach Delay, s/veh		59.2			57.8			42.5			11.0	
Approach LOS		E			E			D			B	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		84.8		30.4	15.3	69.5		14.8				
Change Period (Y+Rc), s		4.9		4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s		60.1		28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+I1), s		4.6		24.7	11.3	17.7		4.6				
Green Ext Time (p_c), s		0.4		0.8	0.1	3.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			33.3									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue

11/14/2021


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (veh/h)	23	216	137	122	110	54	39	42	92	82	117	48
Future Volume (veh/h)	23	216	137	122	110	54	39	42	92	82	117	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	267	141	151	136	52	48	52	0	101	144	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	910	1577	803	750	821	315	114	120		136	283	
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.08	0.08	0.00	0.09	0.09	0.00
Sat Flow, veh/h	1192	2133	1087	918	1111	426	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	209	199	152	0	187	48	52	0	101	144	0
Grp Sat Flow(s),veh/h/ln	192	1683	1537	927	0	1527	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	0.7	3.7	3.9	5.5	0.0	3.6	3.1	3.2	0.0	6.8	4.6	0.0
Cycle Q Clear(g_c), s	4.4	3.7	3.9	9.4	0.0	3.6	3.1	3.2	0.0	6.8	4.6	0.0
Prop In Lane	1.00		0.71	0.99		0.28	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	910	1244	1136	757	0	1129	114	120		136	283	
V/C Ratio(X)	0.03	0.17	0.18	0.20	0.00	0.17	0.42	0.43		0.74	0.51	
Avail Cap(c_a), veh/h	910	1244	1136	757	0	1129	300	520		346	1107	
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	0.87	0.00	0.87	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	4.5	3.9	3.9	5.3	0.0	3.9	44.1	44.1	0.0	44.1	43.1	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	0.0	0.0	0.9	0.9	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.2	1.2	1.0	0.0	1.0	1.2	1.3	0.0	2.5	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.6	4.2	4.3	5.4	0.0	3.9	45.0	45.0	0.0	44.4	43.1	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h		436			339			100	A		245	A
Approach Delay, s/veh		4.2			4.6			45.0			43.6	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	12.5		76.9	12.5	10.6		76.9				
Change Period (Y+Rc), s	4.0	4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s	35.4			* 33	23.0	31.4		* 33				
Max Q Clear Time (g_c+I1), s	6.6			6.4	8.8	5.2		11.4				
Green Ext Time (p_c), s	0.1	0.4		1.1	0.2	0.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay								16.6				
HCM 6th LOS								B				

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	218	155	4	0	94	65	0	0	0	134	33	188
Future Volume (veh/h)	218	155	4	0	94	65	0	0	0	134	33	188
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach	No			No						No		
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	176	5	0	107	58				95	118	117
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	0	2	2				2	2	2
Cap, veh/h	2231	1406	40	0	194	326				201	211	178
Arrive On Green	1.00	1.00	1.00	0.00	0.11	0.10				0.12	0.12	0.12
Sat Flow, veh/h	3274	1713	49	0	1772	1439				1688	1772	1494
Grp Volume(v), veh/h	248	0	181	0	107	58				95	118	117
Grp Sat Flow(s), veh/h/ln	1637	0	1762	0	1772	1439				1688	1772	1494
Q Serve(g_s), s	0.0	0.0	0.0	0.0	5.7	3.3				5.3	6.3	7.5
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	5.7	3.3				5.3	6.3	7.5
Prop In Lane	1.00		0.03	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	2231	0	1446	0	194	326				201	211	178
V/C Ratio(X)	0.11	0.00	0.13	0.00	0.55	0.18				0.47	0.56	0.66
Avail Cap(c_a), veh/h	2231	0	1446	0	638	687				557	585	493
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.00	1.00	1.00				0.45	0.45	0.45
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	42.2	31.6				41.1	41.6	42.1
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.0	0.9	0.1				0.3	0.4	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.1	0.0	2.6	1.4				2.2	2.8	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.2	0.0	43.1	31.7				41.4	42.0	42.8
LnGrp LOS	A	A	A	A	D	C				D	D	D
Approach Vol, veh/h	429			165						330		
Approach Delay, s/veh	0.1			39.1						42.1		
Approach LOS	A			D						D		
Timer - Assigned Phs	2		4	5	6							
Phs Duration (G+Y+Rc), s	85.1		14.9	71.2	13.9							
Change Period (Y+Rc), s	4.9		* 4.2	4.0	4.9							
Max Green Setting (Gmax), s	59.1		* 32	21.0	34.1							
Max Q Clear Time (g_c+1), s	2.0		9.5	2.0	7.7							
Green Ext Time (p_c), s	0.4		0.8	0.3	0.4							


**Intersection Summary**

HCM 6th Ctrl Delay	22.1
HCM 6th LOS	C

**Notes**  
 User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	2	3	1	121	19	83	2	83	79	119	132	8
Future Volume (veh/h)	2	3	1	121	19	83	2	83	79	119	132	8
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			0.97	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No						No		
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	2	4	0	142	22	57	2	98	38	140	155	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	62	0	314	89	230	46	202	78	393	659	21
Arrive On Green	0.03	0.04	0.00	0.21	0.22	0.21	0.03	0.18	0.15	0.26	0.41	0.39
Sat Flow, veh/h	1500	1673	0	1500	412	1067	1500	1135	440	1500	1610	52
Grp Volume(v), veh/h	2	4	0	142	0	79	2	0	136	140	0	160
Grp Sat Flow(s), veh/h/ln	1500	1673	0	1500	0	1478	1500	0	1576	1500	0	1662
Q Serve(g_s), s	0.0	0.1	0.0	3.2	0.0	1.7	0.0	0.0	3.0	2.9	0.0	2.4
Cycle Q Clear(g_c), s	0.0	0.1	0.0	3.2	0.0	1.7	0.0	0.0	3.0	2.9	0.0	2.4
Prop In Lane	1.00		0.00	1.00		0.72	1.00		0.28	1.00		0.03
Lane Grp Cap(c), veh/h	46	62	0	314	0	319	46	0	280	393	0	680
V/C Ratio(X)	0.04	0.06	0.00	0.45	0.00	0.25	0.04	0.00	0.49	0.36	0.00	0.24
Avail Cap(c_a), veh/h	667	964	0	667	0	1045	667	0	1113	864	0	1175
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	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	17.8	0.0	13.2	0.0	12.5	18.0	0.0	14.3	11.5	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.4	0.0	0.1	0.1	0.0	0.5	0.2	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.0	0.9	0.0	0.5	0.0	0.0	0.9	0.8	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.1	17.9	0.0	13.6	0.0	12.6	18.1	0.0	14.7	11.7	0.0	7.5
LnGrp LOS	B	B	A	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h	6			221			138			300		
Approach Delay, s/veh	18.0			13.2			14.8			9.4		
Approach LOS	B			B			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.0	4.4	4.2	18.6	4.2	11.2	13.0	9.8				
Change Period (Y+Rc), s	4.0	* 4.2	4.0	4.9	4.0	* 4.2	4.0	4.9				
Max Green Setting (Gmax), s	1.0	* 21	16.0	25.1	16.0	* 26	21.0	25.1				
Max Q Clear Time (g_c+1), s	2.1	2.0	4.4	2.0	3.7	4.9	5.0					
Green Ext Time (p_c), s	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1				

**Intersection Summary**

HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

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

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	69	16	118	6	17	23	59	137	17	1	25	328
Future Volume (veh/h)	69	16	118	6	17	23	59	137	17	1	25	328
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	77	18	104	7	19	17	66	152	18	28	364	116
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	50	290	101	103	92	248	646	77	167	473	151
Arrive On Green	0.15	0.21	0.18	0.06	0.11	0.09	0.14	0.39	0.37	0.09	0.35	0.33
Sat Flow, veh/h	1781	244	1410	1781	910	814	1781	1640	194	1781	1357	432
Grp Volume(v), veh/h	77	0	122	7	0	36	66	0	170	28	0	480
Grp Sat Flow(s), veh/h/ln	1781	0	1654	1781	0	1724	1781	0	1834	1781	0	1789
Q Serve(g_s), s	1.8	0.0	3.1	0.2	0.0	0.9	1.6	0.0	3.0	0.7	0.0	11.5
Cycle Q Clear(g_c), s	1.8	0.0	3.1	0.2	0.0	0.9	1.6	0.0	3.0	0.7	0.0	11.5
Prop In Lane	1.00		0.85	1.00		0.47	1.00		0.11	1.00		0.24
Lane Grp Cap(c), veh/h	265	0	340	101	0	195	248	0	723	167	0	623
V/C Ratio(X)	0.29	0.00	0.36	0.07	0.00	0.18	0.27	0.00	0.24	0.17	0.00	0.77
Avail Cap(c_a), veh/h	446	0	1104	372	0	1151	818	0	1416	446	0	1381
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.2	0.0	16.7	21.4	0.0	19.5	18.4	0.0	9.7	20.0	0.0	14.0
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.1	0.0	0.2	0.2	0.0	0.1	0.2	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.7	0.0	1.1	0.1	0.0	0.3	0.6	0.0	1.0	0.3	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.4	0.0	17.0	21.5	0.0	19.6	18.6	0.0	9.8	20.2	0.0	14.8
LnGrp LOS	B	A	B	C	A	B	B	A	A	C	A	B
Approach Vol, veh/h	199			43			236			508		
Approach Delay, s/veh	17.5			19.9			12.3			15.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	9.7	19.7	10.1	8.4	7.5	21.9					
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0					
Max Q Clear Time (g_c+I), s	5.1	3.6	13.5	3.8	2.9	2.7	5.0					
Green Ext Time (p_c), s	0.0	0.3	0.1	1.2	0.1	0.1	0.4					

Intersection Summary												
HCM 6th Ctrl Delay	15.1											
HCM 6th LOS	B											

Notes  
 User approved ignoring U-Turning movement.

HCM 6th TWSC  
 13: Northgate Drive/Northgate & Thorndale Drive/Northgate Mall

11/14/2021

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	11	0	8	0	0	0	6	109	0	3	284	35
Future Vol, veh/h	11	0	8	0	0	0	6	109	0	3	284	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	147	0	4	384	47

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	580	582	409	586
Stage 1	417	417	-	165
Stage 2	163	165	-	421
Critical Hdwy	7.12	6.52	6.22	7.12
Critical Hdwy Stg 1	6.12	5.52	-	6.12
Critical Hdwy Stg 2	6.12	5.52	-	6.12
Follow-up Hdwy	3.518	4.018	3.318	3.518
Pot Cap-1 Maneuver	426	425	642	422
Stage 1	613	591	-	837
Stage 2	839	762	-	610
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	422	419	641	411
Mov Cap-2 Maneuver	422	419	-	411
Stage 1	607	588	-	829
Stage 2	832	754	-	597

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	0	0.4	0.1
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1127	-	-	493	-	1430	-	-
HCM Lane V/C Ratio	0.007	-	-	0.052	-	0.003	-	-
HCM Control Delay (s)	8.2	-	-	12.7	0	7.5	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	0	-	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	↖
Traffic Vol, veh/h	284	10	13	98	22	13
Future Vol, veh/h	284	10	13	98	22	13
Conflicting Peds, #/hr	0	3	3	0	4	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	70	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	400	14	18	138	31	18

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	417	0	588 413
Stage 1	-	-	-	-	410 -
Stage 2	-	-	-	-	178 -
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	-	-	1142	-	471 639
Stage 1	-	-	-	-	670 -
Stage 2	-	-	-	-	853 -
Platoon blocked, %	-	-	-	-	- -
Mov Cap-1 Maneuver	-	-	1139	-	461 636
Mov Cap-2 Maneuver	-	-	-	-	461 -
Stage 1	-	-	-	-	669 -
Stage 2	-	-	-	-	836 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	461	636	-	-	1139	-
HCM Lane V/C Ratio	0.067	0.029	-	-	0.016	-
HCM Control Delay (s)	13.4	10.8	-	-	8.2	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-

Intersection							
Int Delay, s/veh	4.4						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↗	↖		↖	↗	↖	↗
Traffic Vol, veh/h	144	149	4	99	44	70	105
Future Vol, veh/h	144	149	4	99	44	70	105
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	225	233	6	155	69	109	164

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	462	0 617 229
Stage 1	-	-	-	-	229 -
Stage 2	-	-	-	-	388 -
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	-	-	-	1099	- 453 810
Stage 1	-	-	-	-	809 -
Stage 2	-	-	-	-	686 -
Platoon blocked, %	-	-	-	-	- -
Mov Cap-1 Maneuver	-	-	~ -26	~ -26	- 448 807
Mov Cap-2 Maneuver	-	-	-	-	448 -
Stage 1	-	-	-	-	807 -
Stage 2	-	-	-	-	681 -

Approach	EB	WB	NB
HCM Control Delay, s	0		15.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	611	-	-	+	-
HCM Lane V/C Ratio	0.448	-	-	-	-
HCM Control Delay (s)	15.6	-	-	-	-
HCM Lane LOS	C	-	-	-	-
HCM 95th %tile Q(veh)	2.3	-	-	-	-

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

HCM 6th Signalized Intersection Summary

16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘		↙	↔	↔	↙	↘		↙	↘
Traffic Volume (veh/h)	90	0	141	0	0	0	53	87	0	1	129	108
Future Volume (veh/h)	90	0	141	0	0	0	53	87	0	1	129	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	107	0	124	0	0	0	63	104	0	1	154	74
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	532	313	204	0	313	0	229	1017	0	119	344	165
Arrive On Green	0.18	0.00	0.14	0.00	0.00	0.00	0.14	0.57	0.00	0.36	0.31	0.34
Sat Flow, veh/h	1678	1772	1491	0	1772	0	1688	1772	0	3	1119	535
Grp Volume(v), veh/h	107	0	124	0	0	0	63	104	0	229	0	0
Grp Sat Flow(s),veh/h/ln	1678	1772	1491	0	1772	0	1688	1772	0	1657	0	0
Q Serve(g_s), s	1.7	0.0	2.4	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.0	2.4	0.0	0.0	0.0	1.0	0.8	0.0	3.3	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		0.32
Lane Grp Cap(c), veh/h	532	313	204	0	313	0	229	1017	0	715	0	0
V/C Ratio(X)	0.20	0.00	0.61	0.00	0.00	0.00	0.28	0.10	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1613	1453	1164	0	1465	0	886	2116	0	1857	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.0	0.0	12.4	0.0	0.0	0.0	11.8	2.9	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.0	0.0	0.0	0.6	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	0.5	0.0	0.7	0.0	0.0	0.0	0.3	0.1	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	0.0	13.5	0.0	0.0	0.0	12.5	3.0	0.0	8.4	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		231			0			167			229	
Approach Delay, s/veh		12.4			0.0			6.5			8.4	
Approach LOS		B						A			A	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		22.1		8.4	8.1	14.0		8.4				
Change Period (Y+Rc), s		4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s		36.4		* 24	16.0	30.4		* 24				
Max Q Clear Time (g_c+I1), s		2.8		4.4	3.0	5.3		0.0				
Green Ext Time (p_c), s		0.1		0.1	0.1	0.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		9.4
HCM 6th LOS		A

Notes  
 User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

17: Los Ranchitos Road & N. San Pedro Road

11/14/2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↘	↙	↙	↘
Traffic Volume (veh/h)	183	355	128	75	246	246
Future Volume (veh/h)	183	355	128	75	246	246
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	210	408	147	0	283	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	340	944	347		435	
Arrive On Green	0.20	0.51	0.20	0.00	0.26	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	210	408	147	0	283	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	3.0	3.6	1.9	0.0	3.9	0.0
Cycle Q Clear(g_c), s	3.0	3.6	1.9	0.0	3.9	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	340	944	347		435	
V/C Ratio(X)	0.62	0.43	0.42		0.65	
Avail Cap(c_a), veh/h	2071	2261	2174		2071	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.5	4.0	9.2	0.0	8.6	0.0
Incr Delay (d2), s/veh	0.7	0.2	0.6	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.5	0.6	0.0	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.2	4.2	9.8	0.0	9.2	0.0
LnGrp LOS	B	A	A		A	
Approach Vol, veh/h	618	147	A	283	A	
Approach Delay, s/veh	6.2	9.8		9.2		
Approach LOS	A	A		A		
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	8.1		9.7		16.4
Change Period (Y+Rc), s	4.0	4.6		4.0		4.6
Max Green Setting (Gmax), s	30.4	30.4		31.0		30.4
Max Q Clear Time (g_c+I1), s	3.9	3.9		5.9		5.6
Green Ext Time (p_c), s	0.5	0.4		0.7		1.3

Intersection Summary		
HCM 6th Ctrl Delay		7.6
HCM 6th LOS		A

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



HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↖	↗	↘		↖	↗	↘		↖	↗	↘
Traffic Volume (veh/h)	2	41	694	76	24	416	705	221	50	175	181	233
Future Volume (veh/h)	2	41	694	76	24	416	705	221	50	175	181	233
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97		1.00		1.00	0.99		0.98	0.99	
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
Work Zone On Approach		No				No				No		
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	48	807	55		484	820	0	58	203	147	271	
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	108	707	305		466	1471		324	724	599	412	
Arrive On Green	0.06	0.21	0.21		0.55	0.87	0.00	0.41	0.41	0.41	0.41	
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	982	1772	1465	1024	
Grp Volume(v), veh/h	48	807	55		484	820	0	58	203	147	271	
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	982	1772	1465	1024	
Q Serve(g_s), s	2.7	21.0	3.1		27.6	6.0	0.0	4.7	7.6	6.6	24.0	
Cycle Q Clear(g_c), s	2.7	21.0	3.1		27.6	6.0	0.0	19.8	7.6	6.6	31.7	
Prop In Lane	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	108	707	305		466	1471		324	724	599	412	
V/C Ratio(X)	0.44	1.14	0.18		1.04	0.56		0.18	0.28	0.25	0.66	
Avail Cap(c_a), veh/h	236	707	305		466	1471		365	797	659	455	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00		0.79	0.79	0.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	45.1	39.5	32.4		22.4	3.9	0.0	29.3	19.7	19.4	30.3	
Incr Delay (d2), s/veh	3.4	80.0	0.6		47.4	1.2	0.0	0.3	0.3	0.3	3.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	16.3	1.1		12.6	1.5	0.0	1.1	3.2	2.3	6.2	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	119.5	33.0		69.8	5.1	0.0	29.6	20.0	19.7	33.6	
LnGrp LOS	D	F	C		F	A		C	B	B	C	
Approach Vol, veh/h			910				1304	A		408		
Approach Delay, s/veh			110.5				29.1			21.3		
Approach LOS			F				C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.1	24.5		44.4	8.4	47.2		44.4				
Change Period (Y+Rc), s	5.5	5.5		5.5	4.0	5.5		5.5				
Max Green Setting (Gmax), s	21.5	19.0		43.0	12.0	30.0		43.0				
Max Q Clear Time (g_c+1), s	29.6	23.0		21.8	4.7	8.0		33.7				
Green Ext Time (p_c), s	0.0	0.0		2.2	0.1	4.0		2.8				

Intersection Summary

HCM 6th Ctrl Delay	50.2
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↖	↗
Traffic Volume (veh/h)	311	36
Future Volume (veh/h)	311	36
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach		No
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	362	35
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	724	595
Arrive On Green	0.41	0.41
Sat Flow, veh/h	1772	1455
Grp Volume(v), veh/h	362	35
Grp Sat Flow(s),veh/h/ln	1772	1455
Q Serve(g_s), s	15.2	1.5
Cycle Q Clear(g_c), s	15.2	1.5
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	724	595
V/C Ratio(X)	0.50	0.06
Avail Cap(c_a), veh/h	797	655
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	22.0	17.9
Incr Delay (d2), s/veh	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.5
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	22.6	18.0
LnGrp LOS	C	B
Approach Vol, veh/h	668	
Approach Delay, s/veh	26.8	
Approach LOS	C	
Timer - Assigned Phs		

HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	3	19	1174	26	16	295	1252	85	18	4	51	44	11	17
Future Volume (veh/h)	3	19	1174	26	16	295	1252	85	18	4	51	44	11	17
Initial Q (Qb), veh	0	0	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	0.98		1.00	0.98		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	1.00
Work Zone On Approach	No		No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1740	1772		1673	1772	1772	1575	1740	1772	1575	1638	1772	
Adj Flow Rate, veh/h	21	1290	0		324	1376	0	20	4	0	48	12	0	
Peak Hour Factor	0.91	0.91	0.91		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2	2	
Cap, veh/h	55	2152			432	2551		199	33		224	196		
Arrive On Green	0.01	0.21	0.00		0.14	0.76	0.00	0.12	0.12	0.00	0.12	0.12	0.00	
Sat Flow, veh/h	1688	3394	0		3092	3455	0	1108	280	1502	1235	1638	0	
Grp Volume(v), veh/h	21	1290	0		324	1376	0	24	0	0	48	12	0	
Grp Sat Flow(s), veh/h/ln	1688	1653	0		1546	1683	0	1388	0	1502	1235	1638	0	
Q Serve(g_s), s	1.2	35.2	0.0		10.1	16.7	0.0	1.0	0.0	0.0	1.5	0.6	0.0	
Cycle Q Clear(g_c), s	1.2	35.2	0.0		10.1	16.7	0.0	1.7	0.0	0.0	3.2	0.6	0.0	
Prop In Lane	1.00		0.00		1.00		0.00	0.83		1.00	1.00		0.00	
Lane Grp Cap(c), veh/h	55	2152			432	2551		232	0		224	196		
V/C Ratio(X)	0.38	0.60			0.75	0.54		0.10	0.00		0.21	0.06		
Avail Cap(c_a), veh/h	186	2152			526	2551		598	0		553	632		
HCM Platoon Ratio	0.33	0.33	0.33		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.17	0.17	0.00		0.90	0.90	0.00	0.98	0.00	0.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	48.5	27.5	0.0		41.3	5.0	0.0	39.5	0.0	0.0	40.1	39.0	0.0	
Incr Delay (d2), s/veh	0.3	0.2	0.0		3.9	0.7	0.0	0.2	0.0	0.0	0.2	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	15.5	0.0		4.0	4.5	0.0	0.5	0.0	0.0	1.1	0.3	0.0	
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	48.7	27.7	0.0		45.2	5.7	0.0	39.7	0.0	0.0	40.3	39.1	0.0	
LnGrp LOS	D	C			D	A		D	A		D	D		
Approach Vol, veh/h		1311	A			1700	A		24	A		60	A	
Approach Delay, s/veh		28.1				13.2			39.7			40.0		
Approach LOS		C				B			D			D		
Timer - Assigned Phs	1	2	4	5	6	8								
Phs Duration (G+Y+Rc), s	68.1		15.0	6.3	78.8		15.0							
Change Period (Y+Rc), s	4.5	5.0		4.6	4.5	5.0		* 4.6						
Max Green Setting (Gmax), s	34.0		36.4	9.5	40.0		* 37							
Max Q Clear Time (g_c+I), s	37.2		3.7	3.2	18.7		5.2							
Green Ext Time (p_c), s	0.4	0.0	0.1	0.0	7.6		0.0							

Intersection Summary

HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

Notes

- User approved ignoring U-Turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	1046	256	0	998	0	5	0	305	112	320	638
Future Volume (veh/h)	0	1046	256	0	998	0	5	0	305	112	320	638
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
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1772	1843	1772	1772	1843
Adj Flow Rate, veh/h	0	1125	0	0	1073	0	5	0	0	120	344	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	0	2	0	2	2	2	2	2	2
Cap, veh/h	0	2559	0	0	3535	0	149	0	218	506		
Arrive On Green	0.00	1.00	0.00	0.00	0.73	0.00	0.21	0.00	0.00	0.21	0.21	0.00
Sat Flow, veh/h	0	3686	0	0	5156	0	406	0	1562	788	2497	0
Grp Volume(v), veh/h	0	1125	0	0	1073	0	5	0	0	252	212	0
Grp Sat Flow(s), veh/h/ln	0	1751	0	0	1612	0	406	0	1562	1673	1532	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.7	0.0	0.4	0.0	0.0	0.4	12.7	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.7	0.0	13.2	0.0	0.0	13.5	12.7	0.0
Prop In Lane	0.00		0.00		0.00	1.00		1.00	0.48		0.00	
Lane Grp Cap(c), veh/h	0	2559	0	0	3535	0	157	0	403	321		
V/C Ratio(X)	0.00	0.44		0.00	0.30	0.00	0.03	0.00	0.62	0.66		
Avail Cap(c_a), veh/h	0	2559	0	0	3535	0	396	0	768	674		
HCM Platoon Ratio	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.09	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	4.7	0.0	43.1	0.0	0.0	36.6	36.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	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	0.0	0.0	0.0	0.0	2.0	0.0	0.1	0.0	0.0	5.8	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	0.0	0.0	4.7	0.0	43.1	0.0	0.0	37.2	37.2	0.0
LnGrp LOS	A	A		A	A	A	D	A	A	D	D	
Approach Vol, veh/h		1125	A		1073		5	A		464	A	
Approach Delay, s/veh		0.0			4.7		43.1			37.2		
Approach LOS		A			A		D			D		
Timer - Assigned Phs	2	4	6	8								
Phs Duration (G+Y+Rc), s	76.1		23.9		76.1		23.9					
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0		6.0					
Max Green Setting (Gmax), s	47.0		41.0		47.0		41.0					
Max Q Clear Time (g_c+I), s	2.0	15.5		9.7	15.2							
Green Ext Time (p_c), s	6.7	1.0		6.1	0.0							

Intersection Summary

HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

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

HCM Unsignalized Intersection Capacity Analysis  
4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑							
Traffic Volume (veh/h)	0	687	782	0	1001	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	687	782	0	1001	250	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	0	723	823	0	1054	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		353										
pX, platoon unblocked												
vC, conflicting volume	1317			1546			1250	2040	362	1547	2732	658
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1317			1546			1250	2040	362	1547	2732	658
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	521			425			129	56	635	78	20	407
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	362	362	823	703	614							
Volume Left	0	0	0	0	0							
Volume Right	0	0	823	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.48	0.41	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			54.4%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↑	↑	↑	
Traffic Volume (veh/h)	0	0	80	605	532	69
Future Volume (Veh/h)	0	0	80	605	532	69
Sign Control			Stop	Free	Free	
Grade			0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	88	665	585	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1464	623	585			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1464	623	585			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	129	486	990			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	88	665	661			
Volume Left	88	0	0			
Volume Right	0	0	76			
eSH	990	1700	1700			
Volume to Capacity	0.09	0.39	0.39			
Queue Length 95th (ft)	7	0	0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.1		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			50.5%		ICU Level of Service	A
Analysis Period (min)			15			

SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.8	0.0	0.5
Total Del/Veh (s)	4.2	2.0	30.9	10.4

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.1
Total Del/Veh (s)	1.2	10.6	11.5	6.1

Total Zone Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	1009.8

HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations												
Traffic Volume (veh/h)	287	1	209	4	29	0	112	122	1	2	287	425
Future Volume (veh/h)	287	1	209	4	29	0	112	122	1	2	287	425
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	346	1	172	5	35	0	135	147	1	2	346	478
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	1	344	20	160	0	173	1138	8	29	921	1104
Arrive On Green	0.22	0.22	0.22	0.09	0.09	0.00	0.10	0.62	0.61	0.50	0.50	0.50
Sat Flow, veh/h	1776	5	1557	232	1626	0	1781	1855	13	2	1868	1536
Grp Volume(v), veh/h	347	0	172	40	0	0	135	0	148	348	0	478
Grp Sat Flow(s),veh/h/ln	1782	0	1557	1859	0	0	1781	0	1868	1870	0	1536
Q Serve(g_s), s	24.5	0.0	12.6	2.6	0.0	0.0	9.6	0.0	4.3	0.0	0.0	16.6
Cycle Q Clear(g_c), s	24.5	0.0	12.6	2.6	0.0	0.0	9.6	0.0	4.3	14.9	0.0	16.6
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	393	0	344	176	0	0	173	0	1145	950	0	1104
V/C Ratio(X)	0.88	0.00	0.50	0.23	0.00	0.00	0.78	0.00	0.13	0.37	0.00	0.43
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1158	963	0	1114
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.0	0.0	44.8	54.8	0.0	0.0	57.3	0.0	10.6	20.6	0.0	7.9
Incr Delay (d2), s/veh	19.1	0.0	1.1	0.2	0.0	0.0	9.9	0.0	0.2	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.1	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	0.0	5.6	1.8	0.0	0.0	4.8	0.0	1.9	6.7	0.0	10.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.1	0.0	47.0	57.8	0.0	0.0	67.2	0.0	10.9	20.7	0.0	8.0
LnGrp LOS	E	A	D	E	A	A	E	A	B	C	A	A
Approach Vol, veh/h		519			40			283				826
Approach Delay, s/veh		61.1			57.8			37.8				13.4
Approach LOS		E			E			D				B
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		83.6		31.6	15.6	68.0		14.8				
Change Period (Y+Rc), s		4.9		4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s		60.1		28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+1), s		6.3		26.5	11.6	18.6		4.6				
Green Ext Time (p_c), s		0.6		0.5	0.1	4.2		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay	33.4											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↕	↕	↕	↕
Traffic Volume (veh/h)	23	262	228	184	153	54	43	42	92	82	117	48
Future Volume (veh/h)	23	262	228	184	153	54	43	42	92	82	117	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	323	253	227	189	52	53	52	0	101	144	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	857	1325	1010	639	896	246	119	120		136	274	
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.08	0.08	0.00	0.09	0.09	0.00
Sat Flow, veh/h	1136	1792	1367	768	1212	333	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	303	273	227	0	241	53	52	0	101	144	0
Grp Sat Flow(s),veh/h/ln	136	1683	1476	768	0	1546	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	0.8	5.7	6.0	12.0	0.0	4.8	3.4	3.2	0.0	6.8	4.6	0.0
Cycle Q Clear(g_c), s	5.6	5.7	6.0	17.9	0.0	4.8	3.4	3.2	0.0	6.8	4.6	0.0
Prop In Lane	1.00		0.93	1.00		0.22	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	857	1244	1091	639	0	1142	119	120		136	274	
V/C Ratio(X)	0.03	0.24	0.25	0.36	0.00	0.21	0.45	0.43		0.74	0.53	
Avail Cap(c_a), veh/h	857	1244	1091	639	0	1142	300	520		346	1107	
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	0.80	0.00	0.80	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	4.9	4.2	4.2	7.1	0.0	4.0	43.9	44.1	0.0	44.1	43.3	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.6	0.1	0.0	0.0	1.0	0.9	0.0	0.3	0.1	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	1.9	1.7	2.0	0.0	1.3	1.3	1.3	0.0	2.5	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.0	4.6	4.8	7.2	0.0	4.1	44.9	45.0	0.0	44.4	43.4	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h		604			468			105	A		245	A
Approach Delay, s/veh		4.7			5.6			45.0			43.8	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2			76.9	12.5	10.6		76.9				
Change Period (Y+Rc), s	4.0	4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s	35.4			* 33	23.0	31.4		* 33				
Max Q Clear Time (g_c+1), s	6.6			8.0	8.8	5.2		19.9				
Green Ext Time (p_c), s	0.1	0.4		1.6	0.2	0.1		0.4				

Intersection Summary

HCM 6th Ctrl Delay 14.7  
HCM 6th LOS B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↕	↕	↕	↕	↕	↕
Traffic Volume (veh/h)	218	201	4	0	94	65	0	0	0	202	33	291
Future Volume (veh/h)	218	201	4	0	94	65	0	0	0	202	33	291
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	228	5	0	107	58				257	0	234
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	0	2	2				2	2	2
Cap, veh/h	1979	1284	28	0	194	442				662	0	293
Arrive On Green	1.00	1.00	1.00	0.00	0.11	0.10				0.20	0.00	0.20
Sat Flow, veh/h	3274	1726	38	0	1772	1439				3375	0	1497
Grp Volume(v), veh/h	248	0	233	0	107	58				257	0	234
Grp Sat Flow(s),veh/h/ln	1637	0	1764	0	1772	1439				1688	0	1497
Q Serve(g_s), s	0.0	0.0	0.0	0.0	5.7	2.9				6.6	0.0	14.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	5.7	2.9				6.6	0.0	14.9
Prop In Lane	1.00		0.02	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	1979	0	1312	0	194	442				662	0	293
V/C Ratio(X)	0.13	0.00	0.18	0.00	0.55	0.13				0.39	0.00	0.80
Avail Cap(c_a), veh/h	1979	0	1312	0	638	802				1114	0	494
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	0.00	1.00	1.00				0.28	0.00	0.28
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	42.2	25.6				35.0	0.0	38.3
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.0	0.9	0.0				0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	2.6	1.4				2.7	0.0	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	0.3	0.0	43.1	25.7				35.0	0.0	38.8
LnGrp LOS	A	A	A	A	D	C				D	A	D
Approach Vol, veh/h		481			165						491	
Approach Delay, s/veh		0.1			37.0						36.8	
Approach LOS		A			D						D	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		77.4		22.6	63.5	13.9						
Change Period (Y+Rc), s		4.9		* 4.2	4.0	4.9						
Max Green Setting (Gmax), s		59.1		* 32	21.0	34.1						
Max Q Clear Time (g_c+1), s		2.0		16.9	2.0	7.7						
Green Ext Time (p_c), s		0.5		1.3	0.3	0.4						

Intersection Summary


HCM 6th Ctrl Delay 21.3  
HCM 6th LOS C

Notes

User approved volume balancing among the lanes for turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass


11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	2	3	1	121	19	91	2	83	80	189	163	10
Future Volume (veh/h)	2	3	1	121	19	91	2	83	80	189	163	10
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		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	2	4	0	142	22	66	2	98	39	222	192	8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	62	0	314	79	238	46	201	80	392	652	27
Arrive On Green	0.03	0.04	0.00	0.21	0.22	0.21	0.03	0.18	0.15	0.26	0.41	0.39
Sat Flow, veh/h	1500	1673	0	1500	368	1104	1500	1126	448	1500	1593	66
Grp Volume(v), veh/h	2	4	0	142	0	88	2	0	137	222	0	200
Grp Sat Flow(s), veh/h/ln	1500	1673	0	1500	0	1472	1500	0	1574	1500	0	1659
Q Serve(g_s), s	0.0	0.1	0.0	3.2	0.0	1.9	0.0	0.0	3.0	4.9	0.0	3.1
Cycle Q Clear(g_c), s	0.0	0.1	0.0	3.2	0.0	1.9	0.0	0.0	3.0	4.9	0.0	3.1
Prop In Lane	1.00		0.00	1.00		0.75	1.00		0.28	1.00		0.04
Lane Grp Cap(c), veh/h	46	62	0	314	0	318	46	0	280	392	0	679
V/C Ratio(X)	0.04	0.06	0.00	0.45	0.00	0.28	0.04	0.00	0.49	0.57	0.00	0.29
Avail Cap(c_a), veh/h	667	963	0	667	0	1040	667	0	1112	863	0	1172
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	17.8	0.0	13.2	0.0	12.6	18.0	0.0	14.3	12.2	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.4	0.0	0.2	0.1	0.0	0.5	0.5	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.0	0.9	0.0	0.5	0.0	0.0	1.0	1.4	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.1	17.9	0.0	13.6	0.0	12.7	18.1	0.0	14.8	12.7	0.0	7.7
LnGrp LOS	B	B	A	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h		6			230			139			422	
Approach Delay, s/veh		18.0			13.3			14.8			10.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.4	4.2	18.6	4.2	11.2	13.0	9.8					
Change Period (Y+Rc), s	4.2	4.0	4.9	4.0	4.2	4.0	4.9					
Max Green Setting (Gmax), s	21	16.0	25.1	16.0	26	21.0	25.1					
Max Q Clear Time (g_c+I), s	2.1	2.0	5.1	2.0	3.9	6.9	5.0					
Green Ext Time (p_c), s	0.1	0.0	0.0	0.2	0.0	0.1	0.2	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	12.0											
HCM 6th LOS	B											
Notes	* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.											

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔	
Traffic Volume (veh/h)	92	16	157	7	17	27	65	256	19	1	26	580	130
Future Volume (veh/h)	92	16	157	7	17	27	65	256	19	1	26	580	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1.00
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	102	18	147	8	19	21	72	284	20		29	644	120
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	33	272	83	82	90	211	876	62		142	718	134
Arrive On Green	0.13	0.19	0.17	0.05	0.10	0.09	0.12	0.51	0.49		0.08	0.47	0.45
Sat Flow, veh/h	1781	179	1463	1781	812	897	1781	1726	122		1781	1532	285
Grp Volume(v), veh/h	102	0	165	8	0	40	72	0	304		29	0	764
Grp Sat Flow(s), veh/h/ln	1781	0	1643	1781	0	1709	1781	0	1848		1781	0	1817
Q Serve(g_s), s	3.5	0.0	6.1	0.3	0.0	1.4	2.5	0.0	6.5		1.0	0.0	25.7
Cycle Q Clear(g_c), s	3.5	0.0	6.1	0.3	0.0	1.4	2.5	0.0	6.5		1.0	0.0	25.7
Prop In Lane	1.00		0.89	1.00		0.52	1.00		0.07		1.00		0.16
Lane Grp Cap(c), veh/h	235	0	306	83	0	172	211	0	937		142	0	852
V/C Ratio(X)	0.43	0.00	0.54	0.10	0.00	0.23	0.34	0.00	0.32		0.20	0.00	0.90
Avail Cap(c_a), veh/h	321	0	789	268	0	821	589	0	1027		321	0	1010
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00		1.00	0.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	24.9	30.4	0.0	27.8	27.0	0.0	9.7		28.7	0.0	16.3
Incr Delay (d2), s/veh	0.5	0.0	0.6	0.2	0.0	0.3	0.4	0.0	0.1		0.3	0.0	8.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	2.4	0.1	0.0	0.6	1.0	0.0	2.4		0.4	0.0	11.5
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	27.1	0.0	25.5	30.6	0.0	28.1	27.3	0.0	9.8		28.9	0.0	24.9
LnGrp LOS	C	A	C	C	A	C	C	A	A		C	A	C
Approach Vol, veh/h		267			48			376				793	
Approach Delay, s/veh		26.1			28.5			13.1				25.0	
Approach LOS		C			C			B				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	15.4	10.9	34.2	11.8	9.7	8.3	36.8						
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0						
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0						
Max Q Clear Time (g_c+I), s	8.1	4.5	27.7	5.5	3.4	3.0	8.5						
Green Ext Time (p_c), s	0.0	0.4	0.1	1.5	0.1	0.1	0.0	0.7					
Intersection Summary													
HCM 6th Ctrl Delay	22.3												
HCM 6th LOS	C												
Notes	User approved ignoring U-Turning movement.												



Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔					
Traffic Vol, veh/h	11	0	8	0	0	0	6	113	0	3	438	35
Future Vol, veh/h	11	0	8	0	0	0	6	113	0	3	438	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	153	0	4	592	47

Major/Minor	Minor2	Minor1	Major1	Major2										
Conflicting Flow All	794	796	617	800	819	155	640	0	0	155	0	0		
Stage 1	625	625	-	171	171	-	-	-	-	-	-	-		
Stage 2	169	171	-	629	648	-	-	-	-	-	-	-		
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-		
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-		
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-		
Pot Cap-1 Maneuver	306	320	490	303	310	891	944	-	-	1425	-	-		
Stage 1	473	477	-	831	757	-	-	-	-	-	-	-		
Stage 2	833	757	-	470	466	-	-	-	-	-	-	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	303	315	490	293	305	890	943	-	-	1423	-	-		
Mov Cap-2 Maneuver	303	315	-	293	305	-	-	-	-	-	-	-		
Stage 1	468	475	-	822	749	-	-	-	-	-	-	-		
Stage 2	826	749	-	458	464	-	-	-	-	-	-	-		

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	0	0.4	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	943	-	-	361	-	1423	-	-
HCM Lane V/C Ratio	0.009	-	-	0.071	-	0.003	-	-
HCM Control Delay (s)	8.9	-	-	15.7	0	7.5	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	0	-	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	437	11	13	104	22	14
Future Vol, veh/h	437	11	13	104	22	14
Conflicting Peds, #/hr	0	3	3	0	4	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	70	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	615	15	18	146	31	20

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	633	0	812	629
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	186	-
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	-	-	950	-	348	482
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	948	-	339	480
Mov Cap-2 Maneuver	-	-	-	-	339	-
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	826	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	339	480	-	-	948	-
HCM Lane V/C Ratio	0.091	0.041	-	-	0.019	-
HCM Control Delay (s)	16.7	12.8	-	-	8.9	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-

HCM 6th TWSC  
15: Nova Albion Way & Northgate Drive/Northgate

11/14/2021

Intersection							
Int Delay, s/veh	5.1						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑	↑
Traffic Vol, veh/h	259	174	4	99	57	70	105
Future Vol, veh/h	259	174	4	99	57	70	105
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	405	272	6	155	89	109	164
Major/Minor	Major1	Major2	Minor1				
Conflicting Flow All	0	0	-	681	0	817	409
Stage 1	-	-	-	-	-	409	-
Stage 2	-	-	-	-	-	408	-
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	-	-	-	912	-	346	642
Stage 1	-	-	-	-	-	671	-
Stage 2	-	-	-	-	-	671	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	~ -26	-	343	640
Mov Cap-2 Maneuver	-	-	-	-	-	343	-
Stage 1	-	-	-	-	-	669	-
Stage 2	-	-	-	-	-	666	-
Approach	EB	WB	NB				
HCM Control Delay, s	0					22.4	
HCM LOS						C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	475	-	-	+	-		
HCM Lane V/C Ratio	0.576	-	-	-	-		
HCM Control Delay (s)	22.4	-	-	-	-		
HCM Lane LOS	C	-	-	-	-		
HCM 95th %tile Q(veh)	3.6	-	-	-	-		
Notes	~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						

HCM 6th Signalized Intersection Summary  
16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

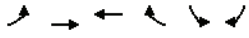
11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑		↑	↑	↑	↑		↑	↑	↑
Traffic Volume (veh/h)	113	0	199	0	0	0	57	87	0	1	129	114
Future Volume (veh/h)	113	0	199	0	0	0	57	87	0	1	129	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	135	0	193	0	0	0	68	104	0	1	154	81
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	592	394	278	0	394	0	237	969	0	110	308	161
Arrive On Green	0.22	0.00	0.19	0.00	0.00	0.00	0.14	0.55	0.00	0.33	0.29	0.32
Sat Flow, veh/h	1680	1772	1494	0	1772	0	1688	1772	0	3	1081	566
Grp Volume(v), veh/h	135	0	193	0	0	0	68	104	0	236	0	0
Grp Sat Flow(s),veh/h/ln	1680	1772	1494	0	1772	0	1688	1772	0	1650	0	0
Q Serve(g_s), s	2.2	0.0	4.0	0.0	0.0	0.0	1.2	0.9	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	4.0	0.0	0.0	0.0	1.2	0.9	0.0	3.8	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		0.34
Lane Grp Cap(c), veh/h	592	394	278	0	394	0	237	969	0	660	0	0
V/C Ratio(X)	0.23	0.00	0.70	0.00	0.00	0.00	0.29	0.11	0.00	0.36	0.00	0.00
Avail Cap(c_a), veh/h	1493	1344	1079	0	1355	0	819	1957	0	1711	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.8	0.0	12.5	0.0	0.0	0.0	12.7	3.6	0.0	9.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.0	0.0	0.0	0.7	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	0.7	0.0	1.1	0.0	0.0	0.0	0.4	0.2	0.0	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	13.7	0.0	0.0	0.0	13.3	3.6	0.0	9.8	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h	328			0				172			236	
Approach Delay, s/veh	12.6			0.0				7.5			9.8	
Approach LOS	B							A			A	
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	22.6		10.3		8.6		14.0		10.3			
Change Period (Y+Rc), s	4.6		* 4.2		4.0		4.6		* 4.2			
Max Green Setting (Gmax), s	36.4		* 24		16.0		30.4		* 24			
Max Q Clear Time (g_c+1), s	2.9		6.0		3.2		5.8		0.0			
Green Ext Time (p_c), s	0.1		0.1		0.1		0.4		0.0			

Intersection Summary	
HCM 6th Ctrl Delay	10.5
HCM 6th LOS	B
Notes	User approved pedestrian interval to be less than phase max green. * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
17: Los Ranchitos Road & N. San Pedro Road

11/14/2021



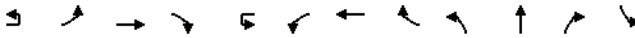
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↘	↔	↖	↗
Traffic Volume (veh/h)	285	355	128	121	388	308
Future Volume (veh/h)	285	355	128	121	388	308
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No		
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	328	408	147	0	446	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	451	929	282		575	
Arrive On Green	0.27	0.50	0.16	0.00	0.34	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	328	408	147	0	446	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	6.8	5.4	2.9	0.0	9.2	0.0
Cycle Q Clear(g_c), s	6.8	5.4	2.9	0.0	9.2	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	451	929	282		575	
V/C Ratio(X)	0.73	0.44	0.52		0.78	
Avail Cap(c_a), veh/h	1397	1526	1467		1397	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	12.9	6.1	14.9	0.0	11.4	0.0
Incr Delay (d2), s/veh	0.8	0.2	1.1	0.0	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2	1.5	1.1	0.0	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	6.3	16.0	0.0	12.3	0.0
LnGrp LOS	B	A	B		B	
Approach Vol, veh/h	736	147	A	446	A	
Approach Delay, s/veh	9.6	16.0		12.3		
Approach LOS	A	B		B		
Timer - Assigned Phs	1	2	4		6	
Phs Duration (G+Y+Rc), s	3.3	9.2	16.2		22.5	
Change Period (Y+Rc), s	4.0	4.6	4.0		4.6	
Max Green Setting (Gmax), s	30.4	30.4	31.0		30.4	
Max Q Clear Time (g_c+1), s	4.9	4.9	11.2		7.4	
Green Ext Time (p_c), s	0.8	0.4	1.1		1.3	

Intersection Summary	
HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

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

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↗	↘		↔	↗	↘	↔	↖	↗	↘
Traffic Volume (veh/h)	2	30	647	71	24	357	632	163	54	133	171	182
Future Volume (veh/h)	2	30	647	71	24	357	632	163	54	133	171	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00		1.00	0.99			0.97	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No	No	No		No				
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	35	752	50		415	735	0	63	155	136	212	
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	97	707	305		554	1670		320	632	521	390	
Arrive On Green	0.06	0.21	0.21		0.66	0.99	0.00	0.36	0.36	0.36	0.36	
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	1061	1772	1462	1079	
Grp Volume(v), veh/h	35	752	50		415	735	0	63	155	136	212	
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	1061	1772	1462	1079	
Q Serve(g_s), s	2.0	21.0	2.8		16.6	0.3	0.0	4.8	6.2	6.6	17.2	
Cycle Q Clear(g_c), s	2.0	21.0	2.8		16.6	0.3	0.0	17.1	6.2	6.6	23.4	
Prop In Lane	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	97	707	305		554	1670		320	632	521	390	
V/C Ratio(X)	0.36	1.06	0.16		0.75	0.44		0.20	0.25	0.26	0.54	
Avail Cap(c_a), veh/h	236	707	305		554	1670		419	797	658	491	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00		0.85	0.85	0.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	45.4	39.5	32.3		14.4	0.2	0.0	31.2	22.7	22.8	30.9	
Incr Delay (d2), s/veh	2.7	52.1	0.5		5.0	0.7	0.0	0.4	0.2	0.3	1.4	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.9	13.5	1.0		4.5	0.2	0.0	1.3	2.6	2.3	4.6	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.1	91.6	32.9		19.3	0.9	0.0	31.6	22.9	23.1	32.4	
LnGrp LOS	D	F	C		B	A		C	C	C	C	
Approach Vol, veh/h		837				1150		A		354		
Approach Delay, s/veh		86.2				7.6				24.5		
Approach LOS		F				A				C		
Timer - Assigned Phs	1	2	4	5	6	8						
Phs Duration (G+Y+Rc), s	36.3	24.5	39.2	7.7	53.1	39.2						
Change Period (Y+Rc), s	5.5	5.5	5.5	4.0	5.5	5.5						
Max Green Setting (Gmax), s	21.5	19.0	43.0	12.0	30.0	43.0						
Max Q Clear Time (g_c+1), s	18.6	23.0	19.1	4.0	2.3	25.4						
Green Ext Time (p_c), s	0.6	0.0	2.0	0.0	3.6	2.9						

Intersection Summary	
HCM 6th Ctrl Delay	36.4
HCM 6th LOS	D

Notes  
User approved pedestrian interval to be less than phase max green.  
User approved ignoring U-Turning movement.  
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	244	29
Future Volume (veh/h)	244	29
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	284	27
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	632	517
Arrive On Green	0.36	0.36
Sat Flow, veh/h	1772	1451
Grp Volume(v), veh/h	284	27
Grp Sat Flow(s),veh/h/ln	1772	1451
Q Serve(g_s), s	12.3	1.2
Cycle Q Clear(g_c), s	12.3	1.2
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	632	517
V/C Ratio(X)	0.45	0.05
Avail Cap(c_a), veh/h	797	653
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	24.7	21.1
Incr Delay (d2), s/veh	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.4
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	25.3	21.1
LnGrp LOS	C	C
Approach Vol, veh/h	523	
Approach Delay, s/veh	27.9	
Approach LOS	C	

Timer - Assigned Phs	
Phs Duration (G+Y+Rc), s	69.3
Change Period (Y+Rc), s	5.0
Max Green Setting (Gmax), s	34.0
Max Q Clear Time (g_c+M), s	32.3
Green Ext Time (p_c), s	0.4

HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑	↑		↑	↑			↑	↑	↑	↑	↑
Traffic Volume (veh/h)	3	19	1036	27	16	274	1074	76	50	4	71	34	11	17
Future Volume (veh/h)	3	19	1036	27	16	274	1074	76	50	4	71	34	11	17
Initial Q (Qb), veh	0	0	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	0.98		1.00	0.99		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	1.00
Work Zone On Approach	No		No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1740	1772		1673	1772	1772	1575	1740	1772	1575	1638	1772	
Adj Flow Rate, veh/h	21	1138	0		301	1180	0	55	4	0	37	12	0	
Peak Hour Factor	0.91	0.91	0.91		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2	2	
Cap, veh/h	55	2193			410	2569		207	13		224	187		
Arrive On Green	0.01	0.22	0.00		0.13	0.76	0.00	0.11	0.11	0.00	0.11	0.11	0.00	
Sat Flow, veh/h	1688	3394	0		3092	3455	0	1207	110	1502	1237	1638	0	
Grp Volume(v), veh/h	21	1138	0		301	1180	0	59	0	0	37	12	0	
Grp Sat Flow(s),veh/h/ln	1688	1653	0		1546	1683	0	1317	0	1502	1237	1638	0	
Q Serve(g_s), s	1.2	30.3	0.0		9.4	12.8	0.0	3.8	0.0	0.0	0.7	0.7	0.0	
Cycle Q Clear(g_c), s	1.2	30.3	0.0		9.4	12.8	0.0	4.5	0.0	0.0	2.3	0.7	0.0	
Prop In Lane	1.00		0.00		1.00		0.00	0.93		1.00	1.00		0.00	
Lane Grp Cap(c), veh/h	55	2193			410	2569		220	0		224	187		
V/C Ratio(X)	0.38	0.52			0.73	0.46		0.27	0.00		0.17	0.06		
Avail Cap(c_a), veh/h	186	2193			526	2569		585	0		560	632		
HCM Platoon Ratio	0.33	0.33	0.33		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.31	0.31	0.00		0.92	0.92	0.00	0.87	0.00	0.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	48.5	25.0	0.0		41.7	4.3	0.0	41.4	0.0	0.0	40.2	39.5	0.0	
Incr Delay (d2), s/veh	0.5	0.3	0.0		3.1	0.5	0.0	0.6	0.0	0.0	0.1	0.1	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	13.4	0.0		3.7	3.3	0.0	1.4	0.0	0.0	0.8	0.3	0.0	
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	49.0	25.3	0.0		44.7	4.9	0.0	42.0	0.0	0.0	40.4	39.6	0.0	
LnGrp LOS	D	C			D	A		D	A		D	D		
Approach Vol, veh/h		1159	A			1481	A		59	A		49	A	
Approach Delay, s/veh		25.7				13.0			42.0			40.2		
Approach LOS		C				B			D			D		

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	69.3		14.4	6.3	79.3	14.4
Change Period (Y+Rc), s	5.0		4.6	4.5	5.0	* 4.6
Max Green Setting (Gmax), s	34.0		36.4	9.5	40.0	* 37
Max Q Clear Time (g_c+M), s	32.3		6.5	3.2	14.8	4.3
Green Ext Time (p_c), s	0.4	1.0	0.2	0.0	6.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes  
User approved ignoring U-Turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑↑	↑↑↑			↑	↑		↑↑	
Traffic Volume (veh/h)	0	1064	96	0	971	0	5	0	318	112	300	470
Future Volume (veh/h)	0	1064	96	0	971	0	5	0	318	112	300	470
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
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1843	1772	1772	1843	
Adj Flow Rate, veh/h	0	1144	0	0	1044	0	5	0	0	120	323	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	0	2	0	2	2	2	2	2	2
Cap, veh/h	0	2578	0	0	3562	0	159	0	0	222	484	
Arrive On Green	0.00	1.00	0.00	0.00	0.74	0.00	0.20	0.00	0.00	0.20	0.20	0.00
Sat Flow, veh/h	0	3686	0	0	5156	0	428	0	1562	824	2456	0
Grp Volume(v), veh/h	0	1144	0	0	1044	0	5	0	0	241	202	0
Grp Sat Flow(s),veh/h/ln	0	1751	0	0	1612	0	428	0	1562	1667	1532	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.3	0.0	0.4	0.0	0.0	0.4	12.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.3	0.0	12.5	0.0	0.0	13.0	12.1	0.0
Prop In Lane	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.50	0.00	0.50	0.00	
Lane Grp Cap(c), veh/h	0	2578	0	0	3562	0	159	0	0	393	312	
V/C Ratio(X)	0.00	0.44	0.00	0.00	0.29	0.00	0.03	0.00	0.00	0.61	0.65	
Avail Cap(c_a), veh/h	0	2578	0	0	3562	0	408	0	0	765	674	
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.32	0.00	0.00	1.00	0.00	0.99	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	4.4	0.0	43.1	0.0	0.0	36.8	36.5	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	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	0.0	0.1	0.0	0.0	1.9	0.0	0.1	0.0	0.0	5.5	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.2	0.0	0.0	4.5	0.0	43.1	0.0	0.0	37.4	37.4	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	D	
Approach Vol, veh/h	1144	A		1044			5	A		443	A	
Approach Delay, s/veh	0.2			4.5			43.1			37.4		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	76.6		23.4		76.6		23.4					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	47.0		41.0		47.0		41.0					
Max Q Clear Time (g_c+1), s	2.0		15.0		9.3		14.5					
Green Ext Time (p_c), s	6.8		1.0		5.9		0.0					

Intersection Summary		
HCM 6th Ctrl Delay	8.2	
HCM 6th LOS	A	

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

HCM Unsignalized Intersection Capacity Analysis  
 4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑							
Traffic Volume (veh/h)	0	675	825	0	972	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	675	825	0	972	250	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	0	711	868	0	1023	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		353										
pX, platoon unblocked												
vC, conflicting volume	1286			1579			1222	1997	356	1510	2734	643
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1286			1579			1222	1997	356	1510	2734	643
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	535			413			135	59	641	83	20	416
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	356	356	868	682	604							
Volume Left	0	0	0	0	0							
Volume Right	0	0	868	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.51	0.40	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		57.3%		ICU Level of Service					B			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis  
 5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↖	↗	↘	
Traffic Volume (veh/h)	0	0	112	409	438	69
Future Volume (Veh/h)	0	0	112	409	438	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	123	449	481	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1214	519	481			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1214	519	481			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	89			
cM capacity (veh/h)	178	557	1082			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	123	449	557			
Volume Left	123	0	0			
Volume Right	0	0	76			
eSH	1082	1700	1700			
Volume to Capacity	0.11	0.26	0.33			
Queue Length 95th (ft)	10	0	0			
Control Delay (s)	8.8	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.9		0.0			
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			1.0			
Intersection Capacity Utilization			46.9%	ICU Level of Service	A	
Analysis Period (min)			15			

SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.7	0.0	0.4
Total Del/Veh (s)	4.1	1.5	11.5	4.8

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	8.6	7.8	4.5

Total Zone Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	784.0



HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕			↕	↕
Traffic Volume (veh/h)	267	1	181	4	29	0	130	90	1	2	175	413
Future Volume (veh/h)	267	1	181	4	29	0	130	90	1	2	175	413
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	322	1	138	5	35	0	157	108	1	2	211	464
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	1	330	20	159	0	195	1152	11	30	915	1085
Arrive On Green	0.21	0.21	0.21	0.09	0.09	0.00	0.11	0.63	0.62	0.50	0.50	0.49
Sat Flow, veh/h	1776	6	1556	232	1626	0	1781	1850	17	3	1866	1536
Grp Volume(v), veh/h	323	0	138	40	0	0	157	0	109	213	0	464
Grp Sat Flow(s),veh/h/ln	1782	0	1556	1859	0	0	1781	0	1867	1869	0	1536
Q Serve(g_s), s	22.7	0.0	10.0	2.6	0.0	0.0	11.2	0.0	3.0	0.0	0.0	16.6
Cycle Q Clear(g_c), s	22.7	0.0	10.0	2.6	0.0	0.0	11.2	0.0	3.0	8.4	0.0	16.6
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	377	0	330	176	0	0	195	0	1163	945	0	1085
V/C Ratio(X)	0.86	0.00	0.42	0.23	0.00	0.00	0.81	0.00	0.09	0.23	0.00	0.43
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1175	957	0	1094
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.3	0.0	44.7	54.8	0.0	0.0	56.6	0.0	9.9	19.1	0.0	8.5
Incr Delay (d2), s/veh	15.3	0.0	0.8	0.2	0.0	0.0	15.6	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	0.0	4.5	1.8	0.0	0.0	5.9	0.0	1.3	3.8	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	0.0	46.6	57.8	0.0	0.0	72.2	0.0	10.0	19.2	0.0	8.6
LnGrp LOS	E	A	D	E	A	A	E	A	B	B	A	A
Approach Vol, veh/h		461			40			266			677	
Approach Delay, s/veh		59.2			57.8			46.7			11.9	
Approach LOS		E			E			D			B	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		84.8		30.4	17.2	67.6		14.8				
Change Period (Y+Rc), s		4.9		4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s		60.1		28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+I1), s		5.0		24.7	13.2	18.6		4.6				
Green Ext Time (p_c), s		0.4		0.8	0.1	3.4		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			34.7									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue


11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (veh/h)	23	213	137	118	127	54	54	102	91	82	108	48
Future Volume (veh/h)	23	213	137	118	127	54	54	102	91	82	108	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	263	141	146	157	52	67	126	0	101	133	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	837	1481	765	674	847	286	129	185		136	376	
Arrive On Green	0.70	0.70	0.70	0.70	0.70	0.70	0.09	0.12	0.00	0.09	0.13	0.00
Sat Flow, veh/h	1169	2121	1096	867	1213	409	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	207	197	161	0	194	67	126	0	101	133	0
Grp Sat Flow(s),veh/h/ln	169	1683	1534	959	0	1530	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	0.8	4.2	4.5	6.1	0.0	4.4	4.3	7.7	0.0	6.8	4.1	0.0
Cycle Q Clear(g_c), s	5.2	4.2	4.5	10.5	0.0	4.4	4.3	7.7	0.0	6.8	4.1	0.0
Prop In Lane	1.00		0.71	0.91		0.27	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	837	1175	1071	738	0	1068	129	185		136	376	
V/C Ratio(X)	0.03	0.18	0.18	0.22	0.00	0.18	0.52	0.68		0.74	0.35	
Avail Cap(c_a), veh/h	837	1175	1071	738	0	1068	300	520		346	1107	
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	0.86	0.00	0.86	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	6.1	5.2	5.3	6.9	0.0	5.2	43.7	42.4	0.0	44.1	40.0	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.4	0.0	0.0	0.0	1.2	1.7	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	1.4	1.3	0.0	1.3	1.6	3.1	0.0	2.5	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	5.5	5.6	6.9	0.0	5.3	44.9	44.0	0.0	44.4	40.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h		432			355			193	A		234	A
Approach Delay, s/veh		5.6			6.0			44.3			41.9	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.6			72.8	12.5	14.7		72.8				
Change Period (Y+Rc), s	4.0	4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s	35.4			* 33	23.0	31.4		* 33				
Max Q Clear Time (g_c+I1), s	6.1			7.2	8.8	9.7		12.5				
Green Ext Time (p_c), s	0.1	0.3		1.1	0.2	0.2		0.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay								18.9				
HCM 6th LOS								B				

Notes  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	218	151	4	0	110	78	0	0	0	130	31	185
Future Volume (veh/h)	218	151	4	0	110	78	0	0	0	130	31	185
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach	No			No						No		
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	172	5	0	125	73				92	114	113
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	0	2	2				2	2	2
Cap, veh/h	2206	1410	41	0	212	337				196	206	174
Arrive On Green	1.00	1.00	1.00	0.00	0.12	0.11				0.12	0.12	0.12
Sat Flow, veh/h	3274	1712	50	0	1772	1442				1688	1772	1494
Grp Volume(v), veh/h	248	0	177	0	125	73				92	114	113
Grp Sat Flow(s), veh/h/ln	1637	0	1761	0	1772	1442				1688	1772	1494
Q Serve(g_s), s	0.0	0.0	0.0	0.0	6.7	4.1				5.1	6.1	7.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	6.7	4.1				5.1	6.1	7.2
Prop In Lane	1.00		0.03	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	2206	0	1451	0	212	337				196	206	174
V/C Ratio(X)	0.11	0.00	0.12	0.00	0.59	0.22				0.47	0.55	0.65
Avail Cap(c_a), veh/h	2206	0	1451	0	638	684				557	585	493
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.00	1.00	1.00				0.46	0.46	0.46
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	41.7	31.3				41.3	41.7	42.3
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.0	1.0	0.1				0.3	0.4	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.0	0.1	0.0	3.0	1.7				2.1	2.7	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.2	0.0	42.6	31.4				41.6	42.1	43.0
LnGrp LOS	A	A	A	A	D	C				D	D	D
Approach Vol, veh/h	425			198						319		
Approach Delay, s/veh	0.1			38.5						42.3		
Approach LOS	A			D						D		
Timer - Assigned Phs	2		4	5	6							
Phs Duration (G+Y+Rc), s	85.4		14.6	70.4	15.0							
Change Period (Y+Rc), s	4.9		* 4.2	4.0	4.9							
Max Green Setting (Gmax), s	59.1		* 32	21.0	34.1							
Max Q Clear Time (g_c+1), s	2.0		9.2	2.0	8.7							
Green Ext Time (p_c), s	0.4		0.7	0.3	0.5							

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes  
 User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	0	0	0	142	10	70	0	129	156	113	145	0
Future Volume (veh/h)	0	0	0	142	10	70	0	129	156	113	145	0
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No					No			No
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	0	0	-1	167	12	41	0	152	129	133	171	-4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	0	294	336	74	254	4	224	190	398	1032	0
Arrive On Green	0.00	0.00	0.00	0.22	0.22	0.22	0.00	0.27	0.25	0.27	0.62	0.00
Sat Flow, veh/h	1500	1673	0	1500	332	1134	1500	824	699	1500	1673	0
Grp Volume(v), veh/h	0	-1	-1	167	0	53	0	0	281	133	167	0
Grp Sat Flow(s), veh/h/ln	1500	1673	1418	1500	0	1466	1500	0	1523	1500	1673	0
Q Serve(g_s), s	0.0	0.0	0.0	3.7	0.0	1.1	0.0	0.0	6.2	2.7	1.6	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.7	0.0	1.1	0.0	0.0	6.2	2.7	1.6	0.0
Prop In Lane	1.00		0.00	1.00		0.77	1.00		0.46	1.00		0.00
Lane Grp Cap(c), veh/h	4	0	0	336	0	328	4	0	413	398	1032	0
V/C Ratio(X)	0.00	0.00	0.00	0.50	0.00	0.16	0.00	0.00	0.68	0.33	0.16	0.00
Avail Cap(c_a), veh/h	677	0	0	677	0	1052	677	0	1092	877	1200	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)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	12.8	0.0	11.8	0.0	0.0	12.5	11.1	3.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.7	0.2	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	0.0	0.0	0.0	1.1	0.0	0.3	0.0	0.0	1.8	0.8	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	13.2	0.0	11.9	0.0	0.0	13.2	11.3	3.1	0.0
LnGrp LOS	A	A	A	B	A	B	A	A	B	B	A	A
Approach Vol, veh/h	-2			220			281				300	
Approach Delay, s/veh	0.0			12.9			13.2				6.7	
Approach LOS	A			B			B				A	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.4	0.0	0.0	26.2	0.0	11.4	13.0	13.2				
Change Period (Y+Rc), s	4.0	* 4.2	4.0	4.9	4.0	* 4.2	4.0	4.9				
Max Green Setting (Gmax), s	1.6	* 21	16.0	25.1	16.0	* 26	21.0	25.1				
Max Q Clear Time (g_c+1), s	0.0	0.0	0.0	3.6	0.0	3.1	4.7	8.2				
Green Ext Time (p_c), s	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.3				

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

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

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	125	16	128	6	17	23	58	137	17	1	25	328
Future Volume (veh/h)	125	16	128	6	17	23	58	137	17	1	25	328
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	139	18	115	7	19	17	64	152	18	28	364	116
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	52	330	97	100	90	238	634	75	162	467	149
Arrive On Green	0.18	0.23	0.21	0.05	0.11	0.09	0.13	0.39	0.37	0.09	0.34	0.32
Sat Flow, veh/h	1781	223	1427	1781	910	814	1781	1640	194	1781	1357	432
Grp Volume(v), veh/h	139	0	133	7	0	36	64	0	170	28	0	480
Grp Sat Flow(s), veh/h/ln	1781	0	1651	1781	0	1724	1781	0	1834	1781	0	1789
Q Serve(g_s), s	3.5	0.0	3.5	0.2	0.0	1.0	1.6	0.0	3.2	0.7	0.0	12.2
Cycle Q Clear(g_c), s	3.5	0.0	3.5	0.2	0.0	1.0	1.6	0.0	3.2	0.7	0.0	12.2
Prop In Lane	1.00		0.86	1.00		0.47	1.00		0.11	1.00		0.24
Lane Grp Cap(c), veh/h	312	0	381	97	0	190	238	0	709	162	0	616
V/C Ratio(X)	0.45	0.00	0.35	0.07	0.00	0.19	0.27	0.00	0.24	0.17	0.00	0.78
Avail Cap(c_a), veh/h	423	0	1044	352	0	1090	775	0	1341	423	0	1309
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	16.6	22.7	0.0	20.7	19.7	0.0	10.5	21.2	0.0	15.0
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.1	0.0	0.2	0.2	0.0	0.1	0.2	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	4.0	0.0	1.2	0.1	0.0	0.4	0.6	0.0	1.1	0.3	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.0	0.0	16.9	22.8	0.0	20.9	19.9	0.0	10.6	21.4	0.0	15.8
LnGrp LOS	B	A	B	C	A	C	B	A	B	C	A	B
Approach Vol, veh/h	272			43			234			508		
Approach Delay, s/veh	18.0			21.2			13.2			16.1		
Approach LOS	B			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.7	9.7	20.4	11.9	8.6	7.6	22.5					
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0					
Max Q Clear Time (g_c+I), s	5.5	3.6	14.2	5.5	3.0	2.7	5.2					
Green Ext Time (p_c), s	0.0	0.3	0.1	1.2	0.1	0.1	0.4					

Intersection Summary												
HCM 6th Ctrl Delay	16.1											
HCM 6th LOS	B											

Notes  
 User approved ignoring U-Turning movement.

HCM 6th TWSC  
 13: Northgate Drive/Northgate & Thorndale Drive/Northgate Mall

11/14/2021

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	11	0	8	0	0	0	6	200	0	0	299	35
Future Vol, veh/h	11	0	8	0	0	0	6	200	0	0	299	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	270	0	0	404	47

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	715	717	429	721
Stage 1	429	429	-	288
Stage 2	286	288	-	433
Critical Hdwy	7.12	6.52	6.22	7.12
Critical Hdwy Stg 1	6.12	5.52	-	6.12
Critical Hdwy Stg 2	6.12	5.52	-	6.12
Follow-up Hdwy	3.518	4.018	3.318	3.518
Pot Cap-1 Maneuver	346	355	626	343
Stage 1	604	584	-	720
Stage 2	721	674	-	601
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	344	351	625	334
Mov Cap-2 Maneuver	344	351	-	334
Stage 1	599	583	-	713
Stage 2	715	667	-	591

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	0	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	1108	-	-	424	-	-	-
HCM Lane V/C Ratio	0.007	-	-	0.061	-	-	-
HCM Control Delay (s)	8.3	-	-	14	0	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-	-

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	9	290	10	13	150	4	22	0	13	33	0	37
Future Vol, veh/h	9	290	10	13	150	4	22	0	13	33	0	37
Conflicting Peds, #/hr	0	0	3	3	0	0	4	0	3	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	71	71	71	71	90	71	90	71	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	408	14	18	211	4	31	0	18	37	0	41

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	215	0	0	425
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1355	-	1134	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1355	-	1131	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.6	15	13.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	321	629	1355	-	-	1131	-	-	490
HCM Lane V/C Ratio	0.097	0.029	0.007	-	-	0.016	-	-	0.159
HCM Control Delay (s)	17.4	10.9	7.7	-	-	8.2	0	-	13.7
HCM Lane LOS	C	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	0	-	-	0	-	-	0.6

Intersection							
Int Delay, s/veh	4.6						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↓	↓	↓	↓
Traffic Vol, veh/h	181	151	4	106	101	69	104
Future Vol, veh/h	181	151	4	106	101	69	104
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	283	236	6	166	158	108	163

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	523
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1043
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-28
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0		19.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	521	-	-	+	-
HCM Lane V/C Ratio	0.519	-	-	-	-
HCM Control Delay (s)	19.1	-	-	-	-
HCM Lane LOS	C	-	-	-	-
HCM 95th %tile Q(veh)	3	-	-	-	-

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

HCM 6th Signalized Intersection Summary

16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘		↙	↔	↔	↙	↘	↔	↙	↘
Traffic Volume (veh/h)	138	0	161	0	0	0	53	84	0	1	136	127
Future Volume (veh/h)	138	0	161	0	0	0	53	84	0	1	136	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	164	0	148	0	0	0	63	100	0	1	162	96
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	562	351	239	0	351	0	227	992	0	116	307	181
Arrive On Green	0.20	0.00	0.16	0.00	0.00	0.00	0.13	0.56	0.00	0.35	0.30	0.33
Sat Flow, veh/h	1679	1772	1492	0	1772	0	1688	1772	0	2	1031	608
Grp Volume(v), veh/h	164	0	148	0	0	0	63	100	0	259	0	0
Grp Sat Flow(s),veh/h/ln	1679	1772	1492	0	1772	0	1688	1772	0	1641	0	0
Q Serve(g_s), s	2.7	0.0	2.9	0.0	0.0	0.0	1.1	0.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.7	0.0	2.9	0.0	0.0	0.0	1.1	0.8	0.0	4.0	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h	562	351	239	0	351	0	227	992	0	688	0	0
V/C Ratio(X)	0.29	0.00	0.62	0.00	0.00	0.00	0.28	0.10	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	1564	1409	1130	0	1420	0	859	2051	0	1785	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.2	0.0	12.3	0.0	0.0	0.0	12.2	3.2	0.0	9.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.0	0.0	0.0	0.0	0.7	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	0.8	0.0	0.8	0.0	0.0	0.0	0.4	0.1	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.3	0.0	13.3	0.0	0.0	0.0	12.9	3.2	0.0	9.1	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		312			0			163			259	
Approach Delay, s/veh		12.2			0.0			7.0			9.1	
Approach LOS		B						A			A	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		22.2		9.2	8.2	14.0		9.2				
Change Period (Y+Rc), s		4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s		36.4		* 24	16.0	30.4		* 24				
Max Q Clear Time (g_c+I1), s		2.8		4.9	3.1	6.0		0.0				
Green Ext Time (p_c), s		0.1		0.1	0.1	0.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	10.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

17: Los Ranchitos Road & N. San Pedro Road

11/14/2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↘	↙	↔	↘
Traffic Volume (veh/h)	195	370	126	75	246	245
Future Volume (veh/h)	195	370	126	75	246	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	224	425	145	0	283	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	357	953	341		433	
Arrive On Green	0.21	0.52	0.19	0.00	0.26	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	224	425	145	0	283	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	3.2	3.8	1.9	0.0	4.0	0.0
Cycle Q Clear(g_c), s	3.2	3.8	1.9	0.0	4.0	0.0
Prop In Lane	1.00		1.00	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	357	953	341		433	
V/C Ratio(X)	0.63	0.45	0.42		0.65	
Avail Cap(c_a), veh/h	2033	2220	2134		2033	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.5	4.0	9.4	0.0	8.8	0.0
Incr Delay (d2), s/veh	0.7	0.2	0.6	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.6	0.6	0.0	1.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.2	4.3	10.0	0.0	9.4	0.0
LnGrp LOS	B	A	B		A	
Approach Vol, veh/h	649	145	A	283	A	
Approach Delay, s/veh	6.3	10.0		9.4		
Approach LOS	A	B		A		
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	8.1		9.8		16.7
Change Period (Y+Rc), s	4.0	4.6		4.0		4.6
Max Green Setting (Gmax), s	30.4	30.4		31.0		30.4
Max Q Clear Time (g_c+I1), s	3.9	3.9		6.0		5.8
Green Ext Time (p_c), s	0.5	0.4		0.7		1.4

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↖	↗	↘		↖	↗	↘	↖	↗	↘	↘
Traffic Volume (veh/h)	2	41	692	76	24	416	726	232	57	179	181	231
Future Volume (veh/h)	2	41	692	76	24	416	726	232	57	179	181	231
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97		1.00		1.00	0.99		0.98	0.99	
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
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	48	805	55		484	844	0	66	208	147	269	
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	108	707	305		465	1469		325	726	600	410	
Arrive On Green	0.06	0.21	0.21		0.55	0.87	0.00	0.41	0.41	0.41	0.41	
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	982	1772	1465	1020	
Grp Volume(v), veh/h	48	805	55		484	844	0	66	208	147	269	
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	982	1772	1465	1020	
Q Serve(g_s), s	2.7	21.0	3.1		27.5	6.4	0.0	5.3	7.9	6.6	24.0	
Cycle Q Clear(g_c), s	2.7	21.0	3.1		27.5	6.4	0.0	20.5	7.9	6.6	31.8	
Prop In Lane	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	108	707	305		465	1469		325	726	600	410	
V/C Ratio(X)	0.44	1.14	0.18		1.04	0.57		0.20	0.29	0.25	0.66	
Avail Cap(c_a), veh/h	236	707	305		465	1469		365	797	659	451	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00		0.78	0.78	0.00	0.99	0.99	0.99	1.00	
Uniform Delay (d), s/veh	45.1	39.5	32.4		22.5	4.0	0.0	29.5	19.7	19.4	30.4	
Incr Delay (d2), s/veh	3.4	78.9	0.6		48.0	1.3	0.0	0.4	0.3	0.3	3.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	16.2	1.1		12.7	1.5	0.0	1.3	3.3	2.3	6.2	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	118.4	33.0		70.5	5.3	0.0	29.9	20.0	19.6	33.7	
LnGrp LOS	D	F	C		F	A		C	C	B	C	
Approach Vol, veh/h		908				1328	A		421			
Approach Delay, s/veh		109.5				29.1			21.4			
Approach LOS		F				C			C			
Timer - Assigned Phs	1	2	4	5	6	8						
Phs Duration (G+Y+Rc), s	31.0	24.5	44.5	8.4	47.1	44.5						
Change Period (Y+Rc), s	5.5	5.5	5.5	4.0	5.5	5.5						
Max Green Setting (Gmax), s	21.5	19.0	43.0	12.0	30.0	43.0						
Max Q Clear Time (g_c+1), s	29.5	23.0	22.5	4.7	8.4	33.8						
Green Ext Time (p_c), s	0.0	0.0	2.3	0.1	4.1	2.8						

Intersection Summary

HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↖	↗
Traffic Volume (veh/h)	311	36
Future Volume (veh/h)	311	36
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	362	35
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	726	596
Arrive On Green	0.41	0.41
Sat Flow, veh/h	1772	1455
Grp Volume(v), veh/h	362	35
Grp Sat Flow(s),veh/h/ln	1772	1455
Q Serve(g_s), s	15.2	1.5
Cycle Q Clear(g_c), s	15.2	1.5
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	726	596
V/C Ratio(X)	0.50	0.06
Avail Cap(c_a), veh/h	797	655
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	21.9	17.9
Incr Delay (d2), s/veh	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.5
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	22.5	17.9
LnGrp LOS	C	B
Approach Vol, veh/h	666	
Approach Delay, s/veh	26.8	
Approach LOS	C	
Timer - Assigned Phs		



HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔			↔	↔	↔	↔	↔	
Traffic Volume (veh/h)	3	19	1169	27	16	285	1252	85	50	4	79	44	11	17
Future Volume (veh/h)	3	19	1169	27	16	285	1252	85	50	4	79	44	11	17
Initial Q (Qb), veh	0	0	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	0.98		1.00	0.99		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	1.00
Work Zone On Approach	No		No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1740	1772		1673	1772	1772	1575	1740	1772	1575	1638	1772	
Adj Flow Rate, veh/h	21	1285	0		313	1376	0	55	4	0	48	12	0	
Peak Hour Factor	0.91	0.91	0.91		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2	2	
Cap, veh/h	55	2161			421	2549		215	13		231	197		
Arrive On Green	0.01	0.22	0.00		0.14	0.76	0.00	0.12	0.12	0.00	0.12	0.12	0.00	
Sat Flow, veh/h	1688	3394	0		3092	3455	0	1212	109	1502	1238	1638	0	
Grp Volume(v), veh/h	21	1285	0		313	1376	0	59	0	0	48	12	0	
Grp Sat Flow(s),veh/h/ln	1688	1653	0		1546	1683	0	1322	0	1502	1238	1638	0	
Q Serve(g_s), s	1.2	35.0	0.0		9.7	16.8	0.0	3.8	0.0	0.0	0.0	0.6	0.0	
Cycle Q Clear(g_c), s	1.2	35.0	0.0		9.7	16.8	0.0	4.4	0.0	0.0	3.0	0.6	0.0	
Prop In Lane	1.00		0.00		1.00		0.00	0.93		1.00	1.00		0.00	
Lane Grp Cap(c), veh/h	55	2161			421	2549		228	0		231	197		
V/C Ratio(X)	0.38	0.59			0.74	0.54		0.26	0.00		0.21	0.06		
Avail Cap(c_a), veh/h	186	2161			526	2549		586	0		560	632		
HCM Platoon Ratio	0.33	0.33	0.33		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.17	0.17	0.00		0.90	0.90	0.00	0.87	0.00	0.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	48.5	27.3	0.0		41.5	5.0	0.0	40.9	0.0	0.0	40.0	39.0	0.0	
Incr Delay (d2), s/veh	0.3	0.2	0.0		3.5	0.7	0.0	0.5	0.0	0.0	0.2	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	15.4	0.0		3.8	4.5	0.0	1.4	0.0	0.0	1.1	0.3	0.0	
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	48.7	27.5	0.0		45.0	5.7	0.0	41.4	0.0	0.0	40.2	39.0	0.0	
LnGrp LOS	D	C			D	A		D	A		D	D		
Approach Vol, veh/h		1306	A			1689	A		59	A		60	A	
Approach Delay, s/veh		27.8				13.0			41.4			39.9		
Approach LOS		C				B			D			D		
Timer - Assigned Phs	1	2	4	5	6	8								
Phs Duration (G+Y+Rc), s	68.4		15.0	6.3	78.7		15.0							
Change Period (Y+Rc), s	4.5	5.0		4.6	4.5	5.0		* 4.6						
Max Green Setting (Gmax), s	34.0		36.4	9.5	40.0		* 37							
Max Q Clear Time (g_c+I), s	37.0		6.4	3.2	18.8		5.0							
Green Ext Time (p_c), s	0.4	0.0	0.2	0.0	7.6		0.0							

Intersection Summary

HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	1074	251	0	988	0	5	0	318	112	316	638
Future Volume (veh/h)	0	1074	251	0	988	0	5	0	318	112	316	638
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
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1772	1843	1772	1772	1843
Adj Flow Rate, veh/h	0	1155	0		1062	0	5	0	0	120	340	0
Peak Hour Factor	0.93	0.93	0.93		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2		0	2	0	2	2	2	2	2
Cap, veh/h	0	2562			3540		149	0	219	502		
Arrive On Green	0.00	1.00	0.00		0.73	0.00	0.21	0.00	0.00	0.21	0.21	0.00
Sat Flow, veh/h	0	3686	0		5156	0	410	0	1562	795	2490	0
Grp Volume(v), veh/h	0	1155	0		1062	0	5	0	0	250	210	0
Grp Sat Flow(s),veh/h/ln	0	1751	0		1612	0	410	0	1562	1672	1532	0
Q Serve(g_s), s	0.0	0.0	0.0		7.5	0.0	0.4	0.0	0.0	0.4	12.6	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0		7.5	0.0	13.0	0.0	0.0	13.4	12.6	0.0
Prop In Lane	0.00		0.00		0.00	1.00		1.00	0.48		0.00	
Lane Grp Cap(c), veh/h	0	2562			3540		157	0	401	319		
V/C Ratio(X)	0.00	0.45			0.30	0.00	0.03	0.00	0.62	0.66		
Avail Cap(c_a), veh/h	0	2562			3540		398	0	767	674		
HCM Platoon Ratio	1.00	2.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.09	0.00		1.00	0.00	0.99	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0		4.6	0.0	43.1	0.0	0.0	36.6	36.3	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0		0.0	0.0	0.0	0.0	0.0	0.6	0.9	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
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0		2.0	0.0	0.1	0.0	0.0	5.7	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0		4.7	0.0	43.1	0.0	0.0	37.2	37.2	0.0
LnGrp LOS	A	A			A	A	D	A	A	D	D	
Approach Vol, veh/h		1155	A			1062		5	A		460	A
Approach Delay, s/veh		0.1				4.7		43.1			37.2	
Approach LOS		A				A		D			D	
Timer - Assigned Phs	2	4	6	8								
Phs Duration (G+Y+Rc), s	76.2		23.8		76.2		23.8					
Change Period (Y+Rc), s	6.0	6.0			6.0		6.0					
Max Green Setting (Gmax), s	47.0		41.0		47.0		41.0					
Max Q Clear Time (g_c+I), s	2.0	15.4			9.5		15.0					
Green Ext Time (p_c), s	6.9	1.0			6.0		0.0					

Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

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

HCM Unsignalized Intersection Capacity Analysis  
4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑							
Traffic Volume (veh/h)	0	679	831	0	991	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	679	831	0	991	250	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			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
Hourly flow rate (vph)	0	715	875	0	1043	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	353											
pX, platoon unblocked												
vC, conflicting volume	1306			1590			1236	2021	358	1532	2764	653
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1306			1590			1236	2021	358	1532	2764	653
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	526			409			132	57	639	80	19	410
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	358	358	875	695	611							
Volume Left	0	0	0	0	0							
Volume Right	0	0	875	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.51	0.41	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay	0.0											
Intersection Capacity Utilization	57.6%			ICU Level of Service			B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis  
5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↑	↑	↑	
Traffic Volume (veh/h)	0	0	116	623	529	69
Future Volume (Veh/h)	0	0	116	623	529	69
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	127	685	581	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1558	619	581			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1558	619	581			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	87			
cM capacity (veh/h)	108	489	993			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	127	685	657			
Volume Left	127	0	0			
Volume Right	0	0	76			
eSH	993	1700	1700			
Volume to Capacity	0.13	0.40	0.39			
Queue Length 95th (ft)	11	0	0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.4	0.0				
Approach LOS						
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	52.8%			ICU Level of Service		
Analysis Period (min)	15			A		

SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.8	0.1	0.5
Total Del/Veh (s)	4.1	1.9	29.8	10.0

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	1.2	12.8	10.6	6.4

Total Zone Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	978.4

HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations												
Traffic Volume (veh/h)	287	1	206	4	29	0	133	133	1	2	287	425
Future Volume (veh/h)	287	1	206	4	29	0	133	133	1	2	287	425
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	346	1	168	5	35	0	160	160	1	2	346	478
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	1	344	20	160	0	198	1139	7	29	895	1082
Arrive On Green	0.22	0.22	0.22	0.09	0.09	0.00	0.11	0.62	0.61	0.49	0.49	0.48
Sat Flow, veh/h	1776	5	1557	232	1626	0	1781	1856	12	2	1868	1536
Grp Volume(v), veh/h	347	0	168	40	0	0	160	0	161	348	0	478
Grp Sat Flow(s),veh/h/ln	1782	0	1557	1859	0	0	1781	0	1868	1869	0	1536
Q Serve(g_s), s	24.5	0.0	12.3	2.6	0.0	0.0	11.4	0.0	4.7	0.0	0.0	17.4
Cycle Q Clear(g_c), s	24.5	0.0	12.3	2.6	0.0	0.0	11.4	0.0	4.7	15.3	0.0	17.4
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	393	0	344	176	0	0	198	0	1146	924	0	1082
V/C Ratio(X)	0.88	0.00	0.49	0.23	0.00	0.00	0.81	0.00	0.14	0.38	0.00	0.44
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1158	937	0	1092
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.0	0.0	44.7	54.8	0.0	0.0	56.5	0.0	10.7	21.7	0.0	8.7
Incr Delay (d2), s/veh	19.1	0.0	1.1	0.2	0.0	0.0	16.4	0.0	0.3	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.1	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	0.0	5.4	1.8	0.0	0.0	6.1	0.0	2.1	6.9	0.0	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	46.8	57.8	0.0	0.0	72.8	0.0	11.0	21.8	0.0	8.8
LnGrp LOS	E	A	D	E	A	A	E	A	B	C	A	A
Approach Vol, veh/h		515			40			321				826
Approach Delay, s/veh		61.2			57.8			41.8				14.3
Approach LOS		E			E			D				B
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		83.6		31.6	17.4	66.2		14.8				
Change Period (Y+Rc), s		4.9		4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s		60.1		28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+1), s		6.7		26.5	13.4	19.4		4.6				
Green Ext Time (p_c), s		0.7		0.5	0.1	4.2		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay	34.7											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (veh/h)	23	259	228	180	170	54	58	102	91	82	108	48
Future Volume (veh/h)	23	259	228	180	170	54	58	102	91	82	108	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	320	253	222	210	52	72	126	0	101	133	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	782	1246	959	599	868	215	132	185		136	371	
Arrive On Green	0.70	0.70	0.70	0.70	0.70	0.70	0.09	0.12	0.00	0.09	0.12	0.00
Sat Flow, veh/h	1115	1784	1373	755	1243	308	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	301	272	222	0	262	72	126	0	101	133	0
Grp Sat Flow(s), veh/h/ln	1115	1683	1474	755	0	1551	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	0.9	6.6	6.9	13.4	0.0	6.1	4.6	7.7	0.0	6.8	4.1	0.0
Cycle Q Clear(g_c), s	7.1	6.6	6.9	20.2	0.0	6.1	4.6	7.7	0.0	6.8	4.1	0.0
Prop In Lane	1.00		0.93	1.00		0.20	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	782	1175	1029	599	0	1083	132	185		136	371	
V/C Ratio(X)	0.04	0.26	0.26	0.37	0.00	0.24	0.55	0.68		0.74	0.36	
Avail Cap(c_a), veh/h	782	1175	1029	599	0	1083	300	520		346	1107	
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	0.80	0.00	0.80	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	6.8	5.5	5.6	9.3	0.0	5.5	43.7	42.4	0.0	44.1	40.2	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.6	0.1	0.0	0.0	1.3	1.7	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.3	2.1	2.3	0.0	1.8	1.8	3.1	0.0	2.5	1.5	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	6.1	6.2	9.4	0.0	5.5	45.0	44.0	0.0	44.4	40.2	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h	601			484			198		A	234		A
Approach Delay, s/veh	6.2			7.3			44.4			42.0		
Approach LOS	A			A			D			D		

Timer - Assigned Phs							
Phs Duration (G+Y+Rc), s	15.4		72.8	12.5	14.7		72.8
Change Period (Y+Rc), s	4.6		* 4.2	4.0	4.6		* 4.2
Max Green Setting (Gmax), s	35.4		* 33	23.0	31.4		* 33
Max Q Clear Time (g_c+I), s	6.1		9.1	8.8	9.7		22.2
Green Ext Time (p_c), s	0.1		0.3	1.6	0.2		0.4

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (veh/h)	218	197	4	0	110	78	0	0	0	198	31	288
Future Volume (veh/h)	218	197	4	0	110	78	0	0	0	198	31	288
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	224	5	0	125	73				250	0	230
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	0	2	2				2	2	2
Cap, veh/h	1954	1288	29	0	212	453				652	0	289
Arrive On Green	1.00	1.00	1.00	0.00	0.12	0.11				0.19	0.00	0.19
Sat Flow, veh/h	3274	1725	39	0	1772	1442				3375	0	1497
Grp Volume(v), veh/h	248	0	229	0	125	73				250	0	230
Grp Sat Flow(s), veh/h/ln	1637	0	1764	0	1772	1442				1688	0	1497
Q Serve(g_s), s	0.0	0.0	0.0	0.0	6.7	3.7				6.5	0.0	14.6
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	6.7	3.7				6.5	0.0	14.6
Prop In Lane	1.00		0.02	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	1954	0	1317	0	212	453				652	0	289
V/C Ratio(X)	0.13	0.00	0.17	0.00	0.59	0.16				0.38	0.00	0.79
Avail Cap(c_a), veh/h	1954	0	1317	0	638	799				1114	0	494
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	0.00	1.00	1.00				0.28	0.00	0.28
Uniform Delay (d), s/veh	0.1	0.0	0.0	0.0	41.7	25.4				35.1	0.0	38.4
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.0	1.0	0.1				0.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.0	0.1	0.0	0.0	3.0	1.7				2.7	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.1	0.0	0.3	0.0	42.6	25.4				35.2	0.0	39.0
LnGrp LOS	A	A	A	A	D	C				D	A	D
Approach Vol, veh/h	477			198						480		
Approach Delay, s/veh	0.2			36.3						37.0		
Approach LOS	A			D						D		

Timer - Assigned Phs				
Phs Duration (G+Y+Rc), s	77.7	22.3	62.7	15.0
Change Period (Y+Rc), s	4.9	* 4.2	4.0	4.9
Max Green Setting (Gmax), s	59.1	* 32	21.0	34.1
Max Q Clear Time (g_c+I), s	2.0	16.6	2.0	8.7
Green Ext Time (p_c), s	0.5	1.3	0.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

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

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	0	142	10	78	0	129	157	183	176	0
Future Volume (veh/h)	0	0	0	142	10	78	0	129	157	183	176	0
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	0.97	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	0	0	-1	167	12	51	0	152	130	215	207	-4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	0	294	336	62	264	4	223	191	398	1033	0
Arrive On Green	0.00	0.00	0.00	0.22	0.22	0.22	0.00	0.27	0.25	0.27	0.62	0.00
Sat Flow, veh/h	1500	1673	0	1500	278	1180	1500	820	702	1500	1673	0
Grp Volume(v), veh/h	0	-1	-1	167	0	63	0	282	215	203	0	0
Grp Sat Flow(s), veh/h/ln	1500	1673	1418	1500	0	1458	1500	0	1522	1500	1673	0
Q Serve(g_s), s	0.0	0.0	0.0	3.7	0.0	1.3	0.0	0.0	6.3	4.6	2.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.7	0.0	1.3	0.0	0.0	6.3	4.6	2.0	0.0
Prop In Lane	1.00	0.00	1.00	0.81	1.00	0.46	1.00	0.00	0.46	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	4	0	0	336	0	326	4	0	414	398	1033	0
V/C Ratio(X)	0.00	0.00	0.00	0.50	0.00	0.19	0.00	0.00	0.68	0.54	0.20	0.00
Avail Cap(c_a), veh/h	677	0	0	677	0	1044	677	0	1090	876	1199	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)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	12.8	0.0	11.9	0.0	0.0	12.5	11.9	3.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.7	0.4	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	0.0	0.0	0.0	1.1	0.0	0.4	0.0	0.0	1.8	1.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	13.2	0.0	12.0	0.0	0.0	13.2	12.3	3.2	0.0
LnGrp LOS	A	A	A	B	A	B	A	A	B	B	A	A
Approach Vol, veh/h	-2			230			282				418	
Approach Delay, s/veh	0.0			12.9			13.2				7.9	
Approach LOS	A			B			B				A	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.4	0.0	0.0	26.3	0.0	11.4	13.0	13.3				
Change Period (Y+Rc), s	4.0	* 4.2	4.0	4.9	4.0	* 4.2	4.0	4.9				
Max Green Setting (Gmax), s	16.0	* 21	16.0	25.1	16.0	* 26	21.0	25.1				
Max Q Clear Time (g_c+I), s	0.0	0.0	0.0	4.0	0.0	3.3	6.6	8.3				
Green Ext Time (p_c), s	0.1	0.0	0.0	0.2	0.0	0.1	0.2	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	10.7											
HCM 6th LOS	B											
Notes	* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.											

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	148	16	167	7	17	27	64	256	19	1	26	580	130
Future Volume (veh/h)	148	16	167	7	17	27	64	256	19	1	26	580	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	164	18	159	8	19	21	71	284	20	29	644	120	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	33	288	82	81	89	207	870	61	141	715	133	
Arrive On Green	0.14	0.20	0.18	0.05	0.10	0.08	0.12	0.50	0.49	0.08	0.47	0.45	
Sat Flow, veh/h	1781	167	1474	1781	812	897	1781	1726	122	1781	1532	285	
Grp Volume(v), veh/h	164	0	177	8	0	40	71	0	304	29	0	764	
Grp Sat Flow(s), veh/h/ln	1781	0	1641	1781	0	1709	1781	0	1848	1781	0	1817	
Q Serve(g_s), s	5.9	0.0	6.7	0.3	0.0	1.5	2.5	0.0	6.7	1.0	0.0	26.4	
Cycle Q Clear(g_c), s	5.9	0.0	6.7	0.3	0.0	1.5	2.5	0.0	6.7	1.0	0.0	26.4	
Prop In Lane	1.00	0.00	0.90	1.00	0.00	0.52	1.00	0.00	0.07	1.00	0.00	0.16	
Lane Grp Cap(c), veh/h	252	0	320	82	0	170	207	0	931	141	0	848	
V/C Ratio(X)	0.65	0.00	0.55	0.10	0.00	0.24	0.34	0.00	0.33	0.21	0.00	0.90	
Avail Cap(c_a), veh/h	314	0	770	261	0	802	575	0	1003	314	0	987	
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	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	27.7	0.0	25.2	31.2	0.0	28.5	27.7	0.0	10.1	29.4	0.0	16.8	
Incr Delay (d2), s/veh	1.6	0.0	0.6	0.2	0.0	0.3	0.4	0.0	0.1	0.3	0.0	9.3	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/ln	0.0	0.0	2.6	0.1	0.0	0.6	1.1	0.0	2.5	0.4	0.0	12.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	29.3	0.0	25.7	31.4	0.0	28.8	28.1	0.0	10.1	29.7	0.0	26.1	
LnGrp LOS	C	A	C	C	A	C	C	A	B	C	A	C	
Approach Vol, veh/h	341			48			375					793	
Approach Delay, s/veh	27.4			29.2			13.5					26.2	
Approach LOS	C			C			B					C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	16.3	10.9	34.8	12.6	9.8	8.4	37.4						
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0						
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0						
Max Q Clear Time (g_c+I), s	8.7	4.5	28.4	7.9	3.5	3.0	8.7						
Green Ext Time (p_c), s	0.0	0.4	0.1	1.4	0.1	0.1	0.0	0.7					
Intersection Summary													
HCM 6th Ctrl Delay	23.5												
HCM 6th LOS	C												
Notes	User approved ignoring U-Turning movement.												

HCM 6th TWSC  
13: Northgate Drive/Northgate & Thorndale Drive/Northgate Mall

11/14/2021

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔				↔					
Traffic Vol, veh/h	11	0	8	0	0	0	6	204	0	0	453	35
Future Vol, veh/h	11	0	8	0	0	0	6	204	0	0	453	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	276	0	0	612	47

Major/Minor	Minor2	Minor1	Major1	Major2											
Conflicting Flow All	929	931	637	935	954	278	660	0	0	-	-	0			
Stage 1	637	637	-	294	294	-	-	-	-	-	-	-			
Stage 2	292	294	-	641	660	-	-	-	-	-	-	-			
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	-	-	-			
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-			
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-			
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	-	-	-			
Pot Cap-1 Maneuver	248	267	477	246	259	761	928	-	-	0	-	-			
Stage 1	465	471	-	714	670	-	-	-	-	0	-	-			
Stage 2	716	670	-	463	460	-	-	-	-	0	-	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	246	264	477	238	256	760	927	-	-	-	-	-			
Mov Cap-2 Maneuver	246	264	-	238	256	-	-	-	-	-	-	-			
Stage 1	460	471	-	705	662	-	-	-	-	-	-	-			
Stage 2	709	662	-	453	460	-	-	-	-	-	-	-			

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	0	0.3	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	927	-	-	309	-	-	-
HCM Lane V/C Ratio	0.009	-	-	0.083	-	-	-
HCM Control Delay (s)	8.9	-	-	17.7	0	-	-
HCM Lane LOS	A	-	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	-	-

HCM 6th TWSC  
14: El Faisan Drive/Project Driveway & Northgate Drive

11/14/2021

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	9	443	11	13	156	4	22	0	14	33	0	37
Future Vol, veh/h	9	443	11	13	156	4	22	0	14	33	0	37
Conflicting Peds, #/hr	0	0	3	3	0	0	4	0	3	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	71	71	71	71	90	71	90	71	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	624	15	18	220	4	31	0	20	37	0	41

Major/Minor	Major1	Major2	Minor1	Minor2											
Conflicting Flow All	224	0	0	642	0	0	938	915	638	923	920	226			
Stage 1	-	-	-	-	-	-	655	655	-	258	258	-			
Stage 2	-	-	-	-	-	-	283	260	-	665	662	-			
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-			
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318			
Pot Cap-1 Maneuver	1345	-	-	943	-	-	244	273	477	250	271	813			
Stage 1	-	-	-	-	-	-	455	463	-	747	694	-			
Stage 2	-	-	-	-	-	-	724	693	-	449	459	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	1345	-	-	941	-	-	225	265	475	234	263	810			
Mov Cap-2 Maneuver	-	-	-	-	-	-	225	265	-	234	263	-			
Stage 1	-	-	-	-	-	-	450	459	-	742	679	-			
Stage 2	-	-	-	-	-	-	670	678	-	426	455	-			

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	19.4	17.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	475	1345	-	-	941	-	-	375
HCM Lane V/C Ratio	0.138	0.042	0.007	-	-	0.019	-	-	0.207
HCM Control Delay (s)	23.5	12.9	7.7	-	-	8.9	0	-	17.1
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	0	-	-	0.1	-	-	0.8

HCM 6th TWSC  
15: Nova Albion Way & Northgate Drive/Northgate

11/14/2021

Intersection							
Int Delay, s/veh	6						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑	↑
Traffic Vol, veh/h	296	176	4	106	114	69	104
Future Vol, veh/h	296	176	4	106	114	69	104
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	463	275	6	166	178	108	163

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	986
Stage 1	-	-	467
Stage 2	-	-	519
Critical Hdwy	-	-	6.22
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	3.318
Pot Cap-1 Maneuver	-	-	275
Stage 1	-	-	631
Stage 2	-	-	597
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	272
Mov Cap-2 Maneuver	-	-	272
Stage 1	-	-	629
Stage 2	-	-	593

Approach	EB	WB	NB
HCM Control Delay, s	0		30.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	403	-	-	+	-
HCM Lane V/C Ratio	0.671	-	-	-	-
HCM Control Delay (s)	30.3	-	-	-	-
HCM Lane LOS	D	-	-	-	-
HCM 95th %tile Q(veh)	4.8	-	-	-	-

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

HCM 6th Signalized Intersection Summary  
16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑		↑	↑	↑	↑	↑		↑	↑
Traffic Volume (veh/h)	161	0	219	0	0	0	57	84	0	1	136	133
Future Volume (veh/h)	161	0	219	0	0	0	57	84	0	1	136	133
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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	192	0	217	0	0	0	68	100	0	1	162	103
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	615	425	305	0	425	0	236	949	0	107	278	176
Arrive On Green	0.24	0.00	0.20	0.00	0.00	0.00	0.14	0.54	0.00	0.33	0.28	0.31
Sat Flow, veh/h	1680	1772	1494	0	1772	0	1688	1772	0	2	1000	633
Grp Volume(v), veh/h	192	0	217	0	0	0	68	100	0	266	0	0
Grp Sat Flow(s),veh/h/ln	1680	1772	1494	0	1772	0	1688	1772	0	1636	0	0
Q Serve(g_s), s	3.3	0.0	4.6	0.0	0.0	0.0	1.2	0.9	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	4.6	0.0	0.0	0.0	1.2	0.9	0.0	4.6	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		0.39
Lane Grp Cap(c), veh/h	615	425	305	0	425	0	236	949	0	639	0	0
V/C Ratio(X)	0.31	0.00	0.71	0.00	0.00	0.00	0.29	0.11	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	1454	1309	1051	0	1320	0	798	1906	0	1653	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.0	0.0	12.5	0.0	0.0	0.0	13.1	3.9	0.0	10.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.0	0.0	0.0	0.7	0.0	0.0	0.2	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	1.0	0.0	1.3	0.0	0.0	0.0	0.4	0.2	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	13.7	0.0	0.0	0.0	13.7	3.9	0.0	10.5	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h	409			0			168			266		
Approach Delay, s/veh	12.5			0.0			7.9			10.5		
Approach LOS	B						A			B		
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	22.7		11.1		8.7		14.0		11.1			
Change Period (Y+Rc), s	4.6		* 4.2		4.0		4.6		* 4.2			
Max Green Setting (Gmax), s	36.4		* 24		16.0		30.4		* 24			
Max Q Clear Time (g_c+1), s	2.9		6.6		3.2		6.6		0.0			
Green Ext Time (p_c), s	0.1		0.1		0.1		0.5		0.0			

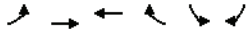
Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

Notes  
 User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
17: Los Ranchitos Road & N. San Pedro Road

11/14/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↖	↔	↖	↗
Traffic Volume (veh/h)	297	370	126	121	388	307
Future Volume (veh/h)	297	370	126	121	388	307
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No		
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	341	425	145	0	446	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	463	936	278		573	
Arrive On Green	0.27	0.51	0.16	0.00	0.34	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	341	425	145	0	446	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	7.2	5.8	3.0	0.0	9.3	0.0
Cycle Q Clear(g_c), s	7.2	5.8	3.0	0.0	9.3	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	463	936	278		573	
V/C Ratio(X)	0.74	0.45	0.52		0.78	
Avail Cap(c_a), veh/h	1374	1500	1443		1374	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.0	6.2	15.2	0.0	11.7	0.0
Incr Delay (d2), s/veh	0.9	0.3	1.1	0.0	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.6	1.1	0.0	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.8	6.4	16.3	0.0	12.5	0.0
LnGrp LOS	B	A	B		B	
Approach Vol, veh/h	766	145	A	446	A	
Approach Delay, s/veh	9.7	16.3		12.5		
Approach LOS	A	B		B		
Timer - Assigned Phs	1	2	4		6	
Phs Duration (G+Y+Rc), s	3.8	9.2	16.3		23.0	
Change Period (Y+Rc), s	4.0	4.6	4.0		4.6	
Max Green Setting (Gmax), s	30.4	30.4	31.0		30.4	
Max Q Clear Time (g_c+1), s	5.0	5.0	11.3		7.8	
Green Ext Time (p_c), s	0.8	0.4	1.1		1.4	

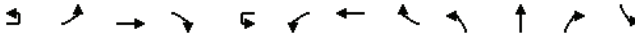
**Intersection Summary**

HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

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

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↗	↖		↔	↗	↖	↔	↗	↖	↔
Traffic Volume (veh/h)	2	41	687	76	24	416	722	228	71	187	181	234
Future Volume (veh/h)	2	41	687	76	24	416	722	228	71	187	181	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00		1.00	1.00	0.99			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No		No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1772	1772	1772		1772	1772	1843	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	48	799	55		484	840	0	83	217	147	272	
Peak Hour Factor	0.86	0.86	0.86		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	108	707	305		457	1453		336	734	607	408	
Arrive On Green	0.06	0.21	0.21		0.54	0.86	0.00	0.41	0.41	0.41	0.41	
Sat Flow, veh/h	1688	3367	1451		1688	3367	1562	987	1772	1465	1011	
Grp Volume(v), veh/h	48	799	55		484	840	0	83	217	147	272	
Grp Sat Flow(s),veh/h/ln	1688	1683	1451		1688	1683	1562	987	1772	1465	1011	
Q Serve(g_s), s	2.7	21.0	3.1		27.1	6.8	0.0	6.7	8.2	6.5	24.6	
Cycle Q Clear(g_c), s	2.7	21.0	3.1		27.1	6.8	0.0	21.5	8.2	6.5	32.7	
Prop In Lane	1.00			1.00	1.00		1.00	1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	108	707	305		457	1453		336	734	607	408	
V/C Ratio(X)	0.44	1.13	0.18		1.06	0.58		0.25	0.30	0.24	0.67	
Avail Cap(c_a), veh/h	236	707	305		457	1453		371	797	659	444	
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00		0.78	0.78	0.00	0.99	0.99	0.99	1.00	
Uniform Delay (d), s/veh	45.1	39.5	32.4		22.9	4.4	0.0	29.3	19.6	19.1	30.5	
Incr Delay (d2), s/veh	3.4	75.7	0.6		53.8	1.3	0.0	0.5	0.3	0.2	3.7	
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	
%ile BackOfQ(50%),veh/ln	1.2	15.9	1.1		13.3	1.6	0.0	1.6	3.4	2.3	6.3	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	115.2	33.0		76.7	5.7	0.0	29.8	19.8	19.3	34.1	
LnGrp LOS	D	F	C		F	A		C	B	B	C	
Approach Vol, veh/h			902				1324	A			447	
Approach Delay, s/veh			106.6				31.6				21.5	
Approach LOS			F				C				C	
Timer - Assigned Phs	1	2	4	5	6		8					
Phs Duration (G+Y+Rc), s	30.6	24.5	44.9	8.4	46.7		44.9					
Change Period (Y+Rc), s	5.5	5.5	5.5	4.0	5.5		5.5					
Max Green Setting (Gmax), s	21.5	19.0	43.0	12.0	30.0		43.0					
Max Q Clear Time (g_c+1), s	29.1	23.0	23.5	4.7	8.8		34.7					
Green Ext Time (p_c), s	0.0	0.0	2.5	0.1	4.1		2.6					

**Intersection Summary**

HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D

**Notes**  
User approved pedestrian interval to be less than phase max green.  
User approved ignoring U-Turning movement.  
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Las Gallinas Avenue & Freitas Parkway

11/14/2021

Movement	SBT	SBR
Lane Configurations	↑	↑
Traffic Volume (veh/h)	306	36
Future Volume (veh/h)	306	36
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.97
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1772	1772
Adj Flow Rate, veh/h	356	35
Peak Hour Factor	0.86	0.86
Percent Heavy Veh, %	2	2
Cap, veh/h	734	603
Arrive On Green	0.41	0.41
Sat Flow, veh/h	1772	1455
Grp Volume(v), veh/h	356	35
Grp Sat Flow(s),veh/h/ln	1772	1455
Q Serve(g_s), s	14.7	1.4
Cycle Q Clear(g_c), s	14.7	1.4
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	734	603
V/C Ratio(X)	0.49	0.06
Avail Cap(c_a), veh/h	797	655
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	21.5	17.6
Incr Delay (d2), s/veh	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.5
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	22.1	17.6
LnGrp LOS	C	B
Approach Vol, veh/h	663	
Approach Delay, s/veh	26.8	
Approach LOS	C	

Timer - Assigned Phs	
Phs Duration (G+Y+Rc), s	68.9
Change Period (Y+Rc), s	5.0
Max Green Setting (Gmax), s	34.0
Max Q Clear Time (g_c+I), s	37.1
Green Ext Time (p_c), s	0.4

HCM 6th Signalized Intersection Summary  
2: Northgate Drive & Freitas Parkway

11/14/2021

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑			↑	↑			↑	↑		↑	↑
Traffic Volume (veh/h)	3	19	1176	18	16	269	1252	85	42	4	74	44	11	17
Future Volume (veh/h)	3	19	1176	18	16	269	1252	85	42	4	74	44	11	17
Initial Q (Qb), veh	0	0	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	0.98		1.00		1.00	0.99	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	1.00
Work Zone On Approach	No		No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1740	1772		1673	1772	1772	1575	1740	1772	1575	1638	1772	
Adj Flow Rate, veh/h	21	1292	0		296	1376	0	46	4	0	48	12	0	
Peak Hour Factor	0.91	0.91	0.91		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2	2	
Cap, veh/h	55	2180			405	2551		213	16		229	196		
Arrive On Green	0.01	0.22	0.00		0.13	0.76	0.00	0.12	0.12	0.00	0.12	0.12	0.00	
Sat Flow, veh/h	1688	3394	0		3092	3455	0	1200	130	1502	1237	1638	0	
Grp Volume(v), veh/h	21	1292	0		296	1376	0	50	0	0	48	12	0	
Grp Sat Flow(s),veh/h/ln	1688	1653	0		1546	1683	0	1329	0	1502	1237	1638	0	
Q Serve(g_s), s	1.2	35.1	0.0		9.2	16.8	0.0	3.1	0.0	0.0	0.0	0.6	0.0	
Cycle Q Clear(g_c), s	1.2	35.1	0.0		9.2	16.8	0.0	3.8	0.0	0.0	3.0	0.6	0.0	
Prop In Lane	1.00		0.00		1.00		0.00	0.92		1.00	1.00		0.00	
Lane Grp Cap(c), veh/h	55	2180			405	2551		228	0		229	196		
V/C Ratio(X)	0.38	0.59			0.73	0.54		0.22	0.00		0.21	0.06		
Avail Cap(c_a), veh/h	186	2180			526	2551		587	0		559	632		
HCM Platoon Ratio	0.33	0.33	0.33		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.18	0.18	0.00		0.91	0.91	0.00	0.90	0.00	0.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	48.5	27.1	0.0		41.7	5.0	0.0	40.6	0.0	0.0	40.0	39.0	0.0	
Incr Delay (d2), s/veh	0.3	0.2	0.0		2.8	0.7	0.0	0.4	0.0	0.0	0.2	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	15.4	0.0		3.6	4.5	0.0	1.2	0.0	0.0	1.1	0.3	0.0	
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	48.7	27.3	0.0		44.6	5.7	0.0	41.0	0.0	0.0	40.2	39.1	0.0	
LnGrp LOS	D	C			D	A		D	A		D	D		
Approach Vol, veh/h				1313	A			1672	A	50	A		60	A
Approach Delay, s/veh				27.6				12.6		41.0			40.0	
Approach LOS				C				B		D			D	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	68.9		15.0	6.3	78.8	15.0
Change Period (Y+Rc), s	5.0		4.6	4.5	5.0	* 4.6
Max Green Setting (Gmax), s	34.0		36.4	9.5	40.0	* 37
Max Q Clear Time (g_c+I), s	37.1		5.8	3.2	18.8	5.0
Green Ext Time (p_c), s	0.4		0.1	0.0	7.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

Notes  
User approved ignoring U-Turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 3: Del Presidio Boulevard/101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑↑↑	↑↑↑			↑	↑	↑↑	↑↑	
Traffic Volume (veh/h)	0	1069	258	0	972	0	5	0	349	112	301	638
Future Volume (veh/h)	0	1069	258	0	972	0	5	0	349	112	301	638
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
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	0	1843	1772	0	1772	0	1772	1843	1772	1772	1843	
Adj Flow Rate, veh/h	0	1149	0	0	1045	0	5	0	0	120	324	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	0	2	0	2	2	2	2	2	2
Cap, veh/h	0	2577	0	0	3560	0	159	0	394	312		
Arrive On Green	0.00	1.00	0.00	0.00	0.74	0.00	0.20	0.00	0.00	0.20	0.20	0.00
Sat Flow, veh/h	0	3686	0	0	5156	0	427	0	1562	822	2458	0
Grp Volume(v), veh/h	0	1149	0	0	1045	0	5	0	0	242	202	0
Grp Sat Flow(s), veh/h/ln	0	1751	0	0	1612	0	427	0	1562	1667	1532	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	7.3	0.0	0.4	0.0	0.0	0.4	12.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	7.3	0.0	12.6	0.0	0.0	13.0	12.1	0.0
Prop In Lane	0.00		0.00	0.00	1.00		1.00	0.50		0.50		0.00
Lane Grp Cap(c), veh/h	0	2577	0	0	3560	0	159	0	394	312		
V/C Ratio(X)	0.00	0.45	0.00	0.29	0.00	0.03	0.00		0.61	0.65		
Avail Cap(c_a), veh/h	0	2577	0	0	3560	0	408	0	765	674		
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.09	0.00	0.00	1.00	0.00	0.99	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	4.4	0.0	43.1	0.0	0.0	36.8	36.5	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	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	0.0	0.0	0.0	0.0	1.9	0.0	0.1	0.0	0.0	5.5	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.1	0.0	0.0	4.5	0.0	43.1	0.0	0.0	37.4	37.4	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	D	
Approach Vol, veh/h	1149	A		1045		5	A		444	A		
Approach Delay, s/veh	0.1			4.5		43.1			37.4			
Approach LOS	A			A		D			D			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	76.6		23.4		76.6		23.4					
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0					
Max Green Setting (Gmax), s	47.0		41.0		47.0		41.0					
Max Q Clear Time (g_c+1), s	2.0		15.0		9.3		14.6					
Green Ext Time (p_c), s	6.9		1.0		5.9		0.0					

Intersection Summary		
HCM 6th Ctrl Delay	8.2	
HCM 6th LOS	A	

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

HCM Unsignalized Intersection Capacity Analysis  
 4: 101 SB Ramp & Freitas Parkway

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑							
Traffic Volume (veh/h)	0	687	849	0	975	250	0	0	0	0	0	0
Future Volume (Veh/h)	0	687	849	0	975	250	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	0	723	894	0	1026	263	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		353										
pX, platoon unblocked												
vC, conflicting volume	1289			1617			1236	2012	362	1519	2774	644
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1289			1617			1236	2012	362	1519	2774	644
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	534			399			132	58	635	82	19	415
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2							
Volume Total	362	362	894	684	605							
Volume Left	0	0	0	0	0							
Volume Right	0	0	894	0	263							
eSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.21	0.21	0.53	0.40	0.36							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS												
Approach Delay (s)	0.0			0.0								
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			58.8%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 5: Redwood Highway & 101 NB Ramp

11/14/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↖	↗	↘	↙
Traffic Volume (veh/h)	0	0	120	626	526	69
Future Volume (Veh/h)	0	0	120	626	526	69
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	132	688	578	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1568	616	578			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1568	616	578			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	87			
cM capacity (veh/h)	106	491	996			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	132	688	654			
Volume Left	132	0	0			
Volume Right	0	0	76			
cSH	996	1700	1700			
Volume to Capacity	0.13	0.40	0.38			
Queue Length 95th (ft)	11	0	0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	1.5		0.0			
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.8			
Intersection Capacity Utilization			52.9%	ICU Level of Service	A	
Analysis Period (min)			15			

SimTraffic Performance Report

11/14/2021

6: US 101 On-/Off-Ramps & Manuel T Freitas Pkwy Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.8	0.0	0.4
Total Del/Veh (s)	4.2	1.8	25.7	8.9

7: Civic Center Dr/Redwood Hwy & Manuel T Freitas Pkwy /Private Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	1.2	12.7	10.8	6.5

Total Zone Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	1010.3

HCM 6th Signalized Intersection Summary  
8: Las Gallinas Avenue & Nova Albion Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕			↕	↕
Traffic Volume (veh/h)	287	1	203	4	29	0	139	155	1	2	282	425
Future Volume (veh/h)	287	1	203	4	29	0	139	155	1	2	282	425
Initial Q (Qb), veh	0	0	3	0	3	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	346	1	165	5	35	0	167	187	1	2	340	478
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	1	344	20	160	0	204	1140	6	29	888	1076
Arrive On Green	0.22	0.22	0.22	0.09	0.09	0.00	0.11	0.62	0.61	0.48	0.48	0.48
Sat Flow, veh/h	1776	5	1557	232	1626	0	1781	1858	10	2	1867	1535
Grp Volume(v), veh/h	347	0	165	40	0	0	167	0	188	342	0	478
Grp Sat Flow(s),veh/h/ln	1782	0	1557	1859	0	0	1781	0	1868	1869	0	1535
Q Serve(g_s), s	24.5	0.0	12.0	2.6	0.0	0.0	11.9	0.0	5.5	0.0	0.0	17.6
Cycle Q Clear(g_c), s	24.5	0.0	12.0	2.6	0.0	0.0	11.9	0.0	5.5	15.1	0.0	17.6
Prop In Lane	1.00		1.00	0.12		0.00	1.00		0.01	0.01		1.00
Lane Grp Cap(c), veh/h	393	0	344	176	0	0	204	0	1146	917	0	1076
V/C Ratio(X)	0.88	0.00	0.48	0.23	0.00	0.00	0.82	0.00	0.16	0.37	0.00	0.44
Avail Cap(c_a), veh/h	411	0	359	415	0	0	219	0	1159	930	0	1086
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	0.00	1.00	0.00	1.00	0.09	0.00	0.09
Uniform Delay (d), s/veh	49.0	0.0	44.6	54.8	0.0	0.0	56.2	0.0	10.9	21.9	0.0	8.9
Incr Delay (d2), s/veh	19.1	0.0	1.0	0.2	0.0	0.0	18.1	0.0	0.3	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.1	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	0.0	5.3	1.8	0.0	0.0	6.4	0.0	2.5	6.8	0.0	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	46.7	57.8	0.0	0.0	74.3	0.0	11.2	22.0	0.0	9.0
LnGrp LOS	E	A	D	E	A	A	E	A	B	C	A	A
Approach Vol, veh/h		512			40			355			820	
Approach Delay, s/veh		61.3			57.8			40.9			14.5	
Approach LOS		E			E			D			B	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		83.6		31.6	17.9	65.7		14.8				
Change Period (Y+Rc), s		4.9		4.6	4.0	4.9		4.2				
Max Green Setting (Gmax), s		60.1		28.4	15.0	41.1		27.8				
Max Q Clear Time (g_c+1), s		7.5		26.5	13.9	19.6		4.6				
Green Ext Time (p_c), s		0.8		0.5	0.0	4.1		0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			34.8									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary  
9: Northgate Drive & Las Gallinas Avenue

11/14/2021


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (veh/h)	23	262	217	168	200	54	56	89	91	82	83	48
Future Volume (veh/h)	23	262	217	168	200	54	56	89	91	82	83	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1575	1575	1701	1512	1575	1772
Adj Flow Rate, veh/h	28	323	240	207	247	52	69	110	0	101	102	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	762	1303	942	617	912	192	130	168		136	342	
Arrive On Green	0.71	0.71	0.71	0.71	0.71	0.71	0.09	0.11	0.00	0.09	0.11	0.00
Sat Flow, veh/h	1078	1838	1329	768	1287	271	1500	1575	1442	1440	3071	0
Grp Volume(v), veh/h	28	295	268	207	0	299	69	110	0	101	102	0
Grp Sat Flow(s),veh/h/ln	1078	1683	1484	768	0	1558	1500	1575	1442	1440	1496	0
Q Serve(g_s), s	1.0	6.2	6.4	11.5	0.0	6.9	4.4	6.7	0.0	6.8	3.1	0.0
Cycle Q Clear(g_c), s	7.9	6.2	6.4	18.0	0.0	6.9	4.4	6.7	0.0	6.8	3.1	0.0
Prop In Lane	1.00		0.90	1.00		0.17	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	762	1193	1052	617	0	1105	130	168		136	342	
V/C Ratio(X)	0.04	0.25	0.25	0.34	0.00	0.27	0.53	0.66		0.74	0.30	
Avail Cap(c_a), veh/h	762	1193	1052	617	0	1105	300	520		346	1107	
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	0.79	0.00	0.79	1.00	1.00	0.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	6.7	5.1	5.2	8.4	0.0	5.2	43.7	42.9	0.0	44.1	40.6	0.0
Incr Delay (d2), s/veh	0.1	0.5	0.6	0.1	0.0	0.0	1.2	1.6	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.1	2.0	2.0	0.0	2.0	1.7	2.7	0.0	2.5	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.8	5.6	5.8	8.5	0.0	5.3	45.0	44.5	0.0	44.4	40.6	0.0
LnGrp LOS	A	A	A	A	A	A	D	D		D	D	
Approach Vol, veh/h		591			506			179	A		203	A
Approach Delay, s/veh		5.8			6.6			44.7			42.5	
Approach LOS		A			A			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.7	14.4		73.9	12.5	13.6		73.9				
Change Period (Y+Rc), s	4.0	4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s	19.6	35.4		* 33	23.0	31.4		* 33				
Max Q Clear Time (g_c+1), s	11.4	5.1		9.9	8.8	8.7		20.0				
Green Ext Time (p_c), s	0.1	0.2		1.6	0.2	0.2		0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay							15.8					
HCM 6th LOS							B					

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 10: Mall Entrance/Del Presidio Boulevard & Las Gallinas Avenue

11/14/2021




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	218	200	4	0	139	109	0	0	0	210	22	277
Future Volume (veh/h)	218	200	4	0	139	109	0	0	0	210	22	277
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96				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
Work Zone On Approach	No			No						No		
Adj Sat Flow, veh/h/ln	1772	1772	1772	0	1772	1772				1772	1772	1772
Adj Flow Rate, veh/h	248	227	5	0	158	108				257	0	218
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	0	2	2				2	2	2
Cap, veh/h	1917	1301	29	0	246	470				627	0	278
Arrive On Green	0.98	1.00	1.00	0.00	0.14	0.13				0.19	0.00	0.19
Sat Flow, veh/h	3274	1726	38	0	1772	1446				3375	0	1497
Grp Volume(v), veh/h	248	0	232	0	158	108				257	0	218
Grp Sat Flow(s), veh/h/ln	1637	0	1764	0	1772	1446				1688	0	1497
Q Serve(g_s), s	0.2	0.0	0.0	0.0	8.4	5.5				6.7	0.0	13.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	0.0	8.4	5.5				6.7	0.0	13.9
Prop In Lane	1.00		0.02	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	1917	0	1330	0	246	470				627	0	278
V/C Ratio(X)	0.13	0.00	0.17	0.00	0.64	0.23				0.41	0.00	0.78
Avail Cap(c_a), veh/h	1917	0	1330	0	638	790				1114	0	494
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	0.00	1.00	1.00				0.29	0.00	0.29
Uniform Delay (d), s/veh	0.5	0.0	0.0	0.0	40.7	25.2				35.9	0.0	38.8
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.0	1.1	0.1				0.0	0.0	0.5
Initial Q Delay(d3), s/veh	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	0.1	0.0	3.8	2.5				2.8	0.0	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.5	0.0	0.3	0.0	41.8	25.3				35.9	0.0	39.3
LnGrp LOS	A	A	A	A	D	C				D	A	D
Approach Vol, veh/h	480			266						475		
Approach Delay, s/veh	0.4			35.1						37.5		
Approach LOS	A			D						D		
Timer - Assigned Phs	2		4		5		6					
Phs Duration (G+Y+Rc), s	78.4		21.6		61.5		16.9					
Change Period (Y+Rc), s	4.9		* 4.2		4.0		4.9					
Max Green Setting (Gmax), s	59.1		* 32		21.0		34.1					
Max Q Clear Time (g_c+I1), s	2.0		15.9		2.2		10.4					
Green Ext Time (p_c), s	0.5		1.3		0.3		0.6					

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes  
 User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 11: Las Gallinas Avenue & Merrydale Road/Merrydale Overpass

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔				↔	↔	↔
Traffic Volume (veh/h)	15	10	5	135	11	87	0	133	149	189	189	1
Future Volume (veh/h)	15	10	5	135	11	87	0	133	149	189	189	1
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No						No		
Adj Sat Flow, veh/h/ln	1575	1673	1673	1575	1673	1673	1575	1673	1673	1575	1673	1673
Adj Flow Rate, veh/h	18	12	5	159	13	61	0	156	120	222	222	-3
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	88	54	23	296	48	224	3	222	171	339	922	0
Arrive On Green	0.06	0.05	0.04	0.20	0.19	0.18	0.00	0.26	0.24	0.23	0.55	0.00
Sat Flow, veh/h	1500	1120	467	1500	255	1198	1500	865	665	1500	1673	0
Grp Volume(v), veh/h	18	0	17	159	0	74	0	0	276	222	219	0
Grp Sat Flow(s), veh/h/ln	1500	0	1587	1500	0	1454	1500	0	1530	1500	1673	0
Q Serve(g_s), s	0.5	0.0	0.5	4.2	0.0	1.9	0.0	0.0	7.3	5.9	3.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	0.5	4.2	0.0	1.9	0.0	0.0	7.3	5.9	3.0	0.0
Prop In Lane	1.00		0.29	1.00		0.82	1.00		0.43	1.00		0.00
Lane Grp Cap(c), veh/h	88	0	77	296	0	272	3	0	393	339	922	0
V/C Ratio(X)	0.21	0.00	0.22	0.54	0.00	0.27	0.00	0.00	0.70	0.65	0.24	0.00
Avail Cap(c_a), veh/h	576	0	789	576	0	887	576	0	934	746	1021	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	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.8	0.0	20.3	15.9	0.0	15.5	0.0	0.0	15.1	15.5	5.1	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.5	0.6	0.0	0.2	0.0	0.0	0.9	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	0.2	0.0	0.2	1.3	0.0	0.6	0.0	0.0	2.3	1.9	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.3	0.0	20.8	16.5	0.0	15.7	0.0	0.0	15.9	16.4	5.2	0.0
LnGrp LOS	C	A	C	B	A	B	A	A	B	B	A	A
Approach Vol, veh/h	35			233			276			441		
Approach Delay, s/veh	20.5			16.2			15.9			10.8		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	1.7	5.1	0.0	27.4	5.6	11.3	13.0	14.4				
Change Period (Y+Rc), s	4.0	* 4.2	4.0	4.9	4.0	* 4.2	4.0	4.9				
Max Green Setting (Gmax), s	1.6	* 21	16.0	25.1	16.0	* 26	21.0	25.1				
Max Q Clear Time (g_c+I1), s	2.5	0.0	5.0	2.5	3.9	7.9	9.3					
Green Ext Time (p_c), s	0.1	0.0	0.0	0.2	0.0	0.1	0.2	0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

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

HCM 6th Signalized Intersection Summary  
 12: Civic Center Drive & Merrydale Overpass/Merrydale Road

11/14/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	154	16	171	7	17	27	62	256	19	1	26	580
Future Volume (veh/h)	154	16	171	7	17	27	62	256	19	1	26	580
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	171	18	163	8	19	21	69	284	20	29	644	126
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	258	32	293	81	80	89	203	871	61	140	712	139
Arrive On Green	0.15	0.20	0.18	0.05	0.10	0.08	0.11	0.50	0.49	0.08	0.47	0.45
Sat Flow, veh/h	1781	163	1477	1781	812	897	1781	1726	122	1781	1518	297
Grp Volume(v), veh/h	171	0	181	8	0	40	69	0	304	29	0	770
Grp Sat Flow(s), veh/h/ln	1781	0	1640	1781	0	1709	1781	0	1848	1781	0	1815
Q Serve(g_s), s	6.3	0.0	6.9	0.3	0.0	1.5	2.5	0.0	6.8	1.1	0.0	27.1
Cycle Q Clear(g_c), s	6.3	0.0	6.9	0.3	0.0	1.5	2.5	0.0	6.8	1.1	0.0	27.1
Prop In Lane	1.00		0.90	1.00		0.52	1.00		0.07	1.00		0.16
Lane Grp Cap(c), veh/h	258	0	325	81	0	169	203	0	932	140	0	851
V/C Ratio(X)	0.66	0.00	0.56	0.10	0.00	0.24	0.34	0.00	0.33	0.21	0.00	0.90
Avail Cap(c_a), veh/h	309	0	759	257	0	790	566	0	988	309	0	971
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	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	25.4	31.7	0.0	29.0	28.3	0.0	10.2	29.9	0.0	17.0
Incr Delay (d2), s/veh	2.4	0.0	0.6	0.2	0.0	0.3	0.4	0.0	0.1	0.3	0.0	10.0
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	2.8	0.0	2.7	0.1	0.0	0.6	1.1	0.0	2.5	0.5	0.0	12.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.4	0.0	26.0	31.9	0.0	29.3	28.6	0.0	10.3	30.1	0.0	27.1
LnGrp LOS	C	A	C	C	A	C	C	A	B	C	A	C
Approach Vol, veh/h	352			48			373			799		
Approach Delay, s/veh	28.1			29.7			13.7			27.2		
Approach LOS	C			C			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.7	10.9	35.4	13.0	9.8	8.4	37.9					
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gmax), s	30.0	20.0	35.0	10.0	30.0	10.0	35.0					
Max Q Clear Time (g_c+I), s	8.9	4.5	29.1	8.3	3.5	3.1	8.8					
Green Ext Time (p_c), s	0.0	0.5	0.1	1.4	0.1	0.1	0.0	0.7				

Intersection Summary												
HCM 6th Ctrl Delay	24.3											
HCM 6th LOS	C											

Notes  
 User approved ignoring U-Turning movement.

HCM 6th TWSC  
 13: Northgate Drive/Northgate & Thorndale Drive/Northgate Mall

11/14/2021

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	11	0	8	0	0	0	6	192	0	0	439	35
Future Vol, veh/h	11	0	8	0	0	0	6	192	0	0	439	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	11	0	0	0	8	259	0	0	593	47

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	893	895	618	899
Stage 1	618	618	-	277
Stage 2	275	277	-	622
Critical Hdwy	7.12	6.52	6.22	7.12
Critical Hdwy Stg 1	6.12	5.52	-	6.12
Critical Hdwy Stg 2	6.12	5.52	-	6.12
Follow-up Hdwy	3.518	4.018	3.318	3.518
Pot Cap-1 Maneuver	262	280	489	260
Stage 1	477	481	-	729
Stage 2	731	681	-	474
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	260	276	489	252
Mov Cap-2 Maneuver	260	276	-	252
Stage 1	472	481	-	720
Stage 2	724	673	-	464

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	0	0.3	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	942	-	-	324	-	-	-
HCM Lane V/C Ratio	0.009	-	-	0.079	-	-	-
HCM Control Delay (s)	8.9	-	-	17.1	0	-	-
HCM Lane LOS	A	-	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	-	-



Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Vol, veh/h	0	437	11	13	145	0	22	0	14	24	0	31
Future Vol, veh/h	0	437	11	13	145	0	22	0	14	24	0	31
Conflicting Peds, #/hr	0	0	3	3	0	0	4	0	3	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	615	15	18	204	0	31	0	20	34	0	44

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	204	0	633	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1368	-	950	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1368	-	948	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	18.4	15.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	480	1368	-	-	948	-	-	416
HCM Lane V/C Ratio	0.127	0.041	-	-	-	0.019	-	-	0.186
HCM Control Delay (s)	21.9	12.8	0	-	-	8.9	0	-	15.6
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0.1	0	-	-	0.1	-	-	0.7

Intersection							
Int Delay, s/veh	5.6						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↓	↑	↓	
Traffic Vol, veh/h	283	174	4	110	97	67	106
Future Vol, veh/h	283	174	4	110	97	67	106
Conflicting Peds, #/hr	0	4	0	4	0	9	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	100	-	100	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	64	64	64	64	64	64	64
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	442	272	6	172	152	105	166

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	718
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	883
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-29
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0		27.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	423	-	-	+	-
HCM Lane V/C Ratio	0.639	-	-	-	-
HCM Control Delay (s)	27.4	-	-	-	-
HCM Lane LOS	D	-	-	-	-
HCM 95th %tile Q(veh)	4.3	-	-	-	-

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

HCM 6th Signalized Intersection Summary

16: Los Ranchitos Road/Las Gallinas Avenue & Northgate Drive

11/14/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↘		↙	↔	↔	↙	↘		↙	↘
Traffic Volume (veh/h)	155	0	213	0	0	0	49	89	0	1	151	131
Future Volume (veh/h)	155	0	213	0	0	0	49	89	0	1	151	131
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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	185	0	210	0	0	0	58	106	0	1	180	101
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	617	420	299	0	420	0	211	943	0	110	301	168
Arrive On Green	0.24	0.00	0.20	0.00	0.00	0.00	0.13	0.53	0.00	0.33	0.29	0.32
Sat Flow, veh/h	1680	1772	1494	0	1772	0	1688	1772	0	2	1054	589
Grp Volume(v), veh/h	185	0	210	0	0	0	58	106	0	282	0	0
Grp Sat Flow(s),veh/h/ln	1680	1772	1494	0	1772	0	1688	1772	0	1645	0	0
Q Serve(g_s), s	3.1	0.0	4.3	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	4.3	0.0	0.0	0.0	1.0	1.0	0.0	4.7	0.0	0.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00	1.00	0.36
Lane Grp Cap(c), veh/h	617	420	299	0	420	0	211	943	0	660	0	0
V/C Ratio(X)	0.30	0.00	0.70	0.00	0.00	0.00	0.27	0.11	0.00	0.43	0.00	0.00
Avail Cap(c_a), veh/h	1496	1346	1081	0	1357	0	821	1960	0	1709	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	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.8	0.0	12.2	0.0	0.0	0.0	13.0	3.8	0.0	9.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.0	0.0	0.0	0.7	0.0	0.0	0.2	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	0.9	0.0	1.2	0.0	0.0	0.0	0.4	0.2	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	13.4	0.0	0.0	0.0	13.7	3.8	0.0	10.1	0.0	0.0
LnGrp LOS	B	A	B	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		395			0			164			282	
Approach Delay, s/veh		12.2			0.0			7.3			10.1	
Approach LOS		B						A			B	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		22.1		10.8	8.1	14.0		10.8				
Change Period (Y+Rc), s		4.6		* 4.2	4.0	4.6		* 4.2				
Max Green Setting (Gmax), s		36.4		* 24	16.0	30.4		* 24				
Max Q Clear Time (g_c+I1), s		3.0		6.3	3.0	6.7		0.0				
Green Ext Time (p_c), s		0.1		0.1	0.1	0.5		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		10.5
HCM 6th LOS		B

Notes  
 User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

17: Los Ranchitos Road & N. San Pedro Road

11/14/2021

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↘	↙	↙	↘
Traffic Volume (veh/h)	302	374	124	121	388	306
Future Volume (veh/h)	302	374	124	121	388	306
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00				1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1772	1843	1772	1843	1772	1843
Adj Flow Rate, veh/h	347	430	143	0	446	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	469	938	275		572	
Arrive On Green	0.28	0.51	0.16	0.00	0.34	0.00
Sat Flow, veh/h	1688	1843	1772	0	1688	1562
Grp Volume(v), veh/h	347	430	143	0	446	0
Grp Sat Flow(s),veh/h/ln	1688	1843	1772	0	1688	1562
Q Serve(g_s), s	7.4	5.9	2.9	0.0	9.4	0.0
Cycle Q Clear(g_c), s	7.4	5.9	2.9	0.0	9.4	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	469	938	275		572	
V/C Ratio(X)	0.74	0.46	0.52		0.78	
Avail Cap(c_a), veh/h	1366	1492	1434		1366	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.0	6.2	15.3	0.0	11.7	0.0
Incr Delay (d2), s/veh	0.9	0.3	1.1	0.0	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.6	1.1	0.0	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.8	6.5	16.5	0.0	12.6	0.0
LnGrp LOS	B	A	B		B	
Approach Vol, veh/h	777	143	A	446	A	
Approach Delay, s/veh	9.8	16.5		12.6		
Approach LOS	A	B		B		
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.0	9.1		16.4		23.1
Change Period (Y+Rc), s	4.0	4.6		4.0		4.6
Max Green Setting (Gmax), s	4.0	30.4		31.0		30.4
Max Q Clear Time (g_c+I1), s	4.9	4.9		11.4		7.9
Green Ext Time (p_c), s	0.8	0.4		1.1		1.4

Intersection Summary		
HCM 6th Ctrl Delay		11.4
HCM 6th LOS		B

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