Appendix I:
Transportation Supporting Information

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Transportation Impact Study for the Arroyo Lago Residential Project

Prepared for the County of Alameda

Submitted by
W-Trans

November 28, 2023

TRAFFIC ENGINEERING
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Executive Summary

The proposed project includes 194 single-family residential units of which 49 would have accessory dwelling units (ADUs) to be located on the north side of Busch Road in the County of Alameda. The entire off-site study area, including Busch Road along the project frontage, is within the City of Pleasanton. The project would be expected to generate an average of 2,159 trips per day, including 156 morning peak hour trips and 207 evening peak hour trips.

As there are currently no pedestrian facilities between the project site and Ironwood Drive, pedestrians traveling between the project site and other nearby uses would walk in the unpaved shoulder indicating a potentially significant impact. To result in a less-than-significant impact with mitigation, it is recommended that the project applicant coordinate with the City of Pleasanton to build a sidewalk between Ironwood Drive and the west edge of the project site. The project site plan includes the provision of a sidewalk along the project frontage; however, as mitigation of a potentially significant impact, ADA-compliant curb ramps should be installed at the new project intersections with Busch Road. Crosswalks should also be marked across the north legs of the proposed intersections with Busch Road.

Existing bicycle facilities serving the project site are adequate and, consistent with the *East Pleasanton Specific Plan* (EPSP), the project would add six-foot bicycle lanes along its frontage on Busch Road. It is recommended that bicycle racks should be provided at the park in the center of the development.. As there are no transit facilities within a half-mile walking distance of the project site, the project's impact on transit facilities and the transit network would be less than significant.

Based on state guidance provided by the California Governor's Office of Planning and Research (OPR), the proposed project would be expected have a potentially significant impact on VMT as project residents' daily VMT per capita would be greater than the threshold of 15 percent less than the average for the East Planning Area of Alameda County. As such, the project should implement all applicable strategies found in the *Alameda County Vehicle Miles Traveled Reduction Estimator Tool* to result in a VMT reduction of up to 5.7 percent. However, as a reduction of 13.4 percent would be required to reach the threshold of significance, the project's impact on VMT is presumed to be significant and unavoidable.

The project site would be accessed by two new street connections to Busch Road. Sight distances at the proposed street connections are adequate provided that project landscaping, signage, or other structures are designed to avoid blocking sight lines for drivers waiting on the minor street approaches. Channelized eastbound left-turn lanes are warranted and recommended at each of the proposed intersections with Busch Road to result in a less-than-significant impact on site access with mitigation. Under all scenarios evaluated, the Peak Hour Warrant for a traffic signal would not be met at either project intersection.

Project-generated traffic would cause maximum queues to exceed the available stacking space at the two study intersections of Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue indicating a potentially significant impact on queueing. Retiming both of these traffic signals to accommodate project traffic would result in a less-than-significant impact with mitigation.

The proposed site access and on-site circulation are anticipated to function acceptably for emergency response vehicles upon approval by a fire code official as part of the entitlement process. Traffic from the proposed development would be expected to have a less-than-significant impact on emergency response times.

Introduction

This report presents an analysis of the potential transportation impacts that would be associated with development of a proposed residential development to be located on Busch Road in the County of Alameda. The traffic study was completed in accordance with the criteria established by the City of Pleasanton and County of Alameda and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a transportation impact study is to provide City and County staff and policy makers with data that they can use to make an informed decision regarding the potential transportation impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to an acceptable level under CEQA, the City of Pleasanton's or County of Alameda's General Plan, or other policies. This report provides an analysis of those items that are identified as areas of environmental concern under the California Environmental Quality Act (CEQA) and that, if significant, require an Environmental Impact Report (EIR). Impacts associated with access for pedestrians, bicyclists, and to transit; the vehicle miles traveled (VMT) generated by the project; potential safety concerns such as increased queuing in dedicated turn lanes, adequacy of sight distance, need for turn lanes, and need for additional right-of-way controls; and emergency access are addressed in the context of the CEQA criteria.

The report is organized to provide background data that supports the various aspects of the analysis, followed by the assessment of CEQA issues and then evaluation of policy-related issues. The CEQA criteria evaluated are as follows.

Would the project:

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?
b. Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
d. Result in inadequate emergency access?

Project Profile

The proposed Arroyo Lago Residential Project includes 194 single-family residential units of which 49 would have accessory dwelling units (ADUs). The project site is located on Busch Road in the County of Alameda as shown in Figure 1. It is noted that the entire off-site study area including Busch Road along the project frontage is within the City of Pleasanton.

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Transportation Impact Study for the Arroyo Lago Residential Project

Figure 1 – Study Area

Transportation Setting

Study Area and Periods

The study area varies depending on the topic. For pedestrian trips it consists of all streets within a half-mile of the project site that would lie along primary routes of pedestrian travel, or those leading to nearby generators or attractors. For bicycle trips it consists of all streets within one mile of the project site that would lie along primary routes of bicycle travel. For the safety analyses, the study area consists of the following intersections:

1. Santa Rita Road/Valley Avenue
2. Valley Avenue/Busch Road
3. Busch Road/Ironwood Drive
4. Valley Avenue/Boulder Street
5. Stanley Boulevard/Valley Avenue-Bernal Avenue

Study Intersections

Santa Rita Road/Valley Avenue is a four-legged signalized intersection with protected left-turn phasing on all four approaches. There are crosswalks with pedestrian phasing on all legs, and there is a Class II bike lane on Santa Rita Road in the southbound direction. Northbound, southbound, and westbound right-turn lanes are channelized, and pedestrian refuge islands are located at the northeast, northwest, and southeast corners of the intersection.

Valley Avenue/Busch Road is a signalized tee intersection with protected left-turn phasing on the eastbound Valley Avenue approach. One crosswalk with pedestrian phasing exists on the north leg of the intersection as well as Class II bike lanes on all approaches to the intersection.

Busch Road/Ironwood Drive is a three-legged signalized intersection. There is one crosswalk with pedestrian phasing on the north leg of the intersection, and Class II bike lanes are striped on all approaches.

Valley Avenue/Boulder Street is a four-legged signalized intersection with protected left-turn phasing on Valley Avenue and a shared green phase for the Boulder Street approaches. "Triple-four" crosswalks exist on the south and west legs of the intersection. A standard stripped crosswalk exists on the north leg. Where crosswalks exist, there are pedestrian phases.

Stanley Boulevard/Valley Avenue-Bernal Avenue is a signalized intersection with four legs and protected left-turn phasing on all approaches. Class II bicycle lanes are available on all but the westbound approach. There are crosswalks with pedestrian phasing available on the west and south legs, and bicycle crossings are striped parallel to the crosswalks.

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

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2018, through December 31, 2022. As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2019 Collision*

Data on California State Highways, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same environment (urban, suburban, or rural), with the same number of approaches (three or four), and the same controls (all-way stop, two-way stop, or traffic signal). The intersections of Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue have a higher calculated collision rate than the statewide average, so collisions were further reviewed. The collision rate calculations and collision histories are provided in Appendix A.

Table 1 – Collision Rates for the Study Intersections

Study Intersection	Number of Collisions (2018-2022)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Santa Rita Rd/Valley Ave	31	**0.34**	0.24
2. Valley Ave/Busch Rd	8	0.19	0.20
3. Busch Rd/Ironwood Dr	0	0.00	0.20
4. Valley Ave/Boulder St	2	0.03	0.24
5. Stanley Blvd/Valley Ave-Bernal Ave	33	**0.45**	0.24

Note: c/mve = collisions per million vehicles entering; **Bold** text = rates above the statewide average

Among the 31 collisions at Santa Rita Road/Valley Avenue, there were seven collisions that occurred on the north leg of the intersection involving southbound drivers. Five of these seven collisions had a primary collision factor of unsafe speeding and resulted in rear-end collisions, while the other two collisions were sideswipes that were attributed to improper lane changes/merging. In the southbound direction, the segment between Santa Rita Road/Valley Avenue and Santa Rita Road/Mohr Avenue has a posted speed limit of 35 miles per hour (mph) and the proceeding segment north of Santa Rita Road/Mohr Avenue has a posted speed limit of 45 mph. Based on this trend of collisions, it appears that the southbound drivers are not adequately informed of the speed limit reduction. The City may wish to consider installing speed management treatments such as striping the posted speed limit on travel lanes, or speed feedback signs.

At Stanley Boulevard/Valley Avenue-Bernal Avenue, there were a total of 33 reported collisions, where the most common primarily collision factors were speeding and running red lights, with 16 and seven collisions respectively. Among the 16 collisions attributed to unsafe speeds, five collisions involved drivers traveling westbound and rear-ending another vehicle. Additionally, four of the seven collisions associated with red light running were caused by westbound through drivers. Westbound drivers, traveling between Isabel Avenue/Stanley Boulevard and Santa Rita Road/Stanley Boulevard, encounter no notable horizontal or vertical curves and have a posted speed limit of 55 mph, and there are only two traffic signals along this three-mile stretch. Given these conditions, drivers may exceed the posted speed limit and may not be aware of the approaching traffic signal. The City of Pleasanton may wish to consider installing signage to warn drivers of an upcoming signal, potentially accompanied by flashing beacons. Additionally, the City may wish to install supplemental signal heads facing the westbound approach to increase visibility of red indications. Similarly, there were four collisions attributed to unsafe speeds where eastbound drivers also caused a rear-end collision. Supplemental signal heads in the eastbound direction may increase visibility of the signal system for these drivers.

Project Data

The project consists of 194 single-family houses with 49 attached ADUs that would be constructed on 26.6 acres. The project site is currently undeveloped and would be accessed via two new street connections to Busch Road between Ironwood Drive and El Charro Road. The proposed project site plan is shown in Figure 2.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021. Rates for "Single Family Detached Housing" (ITE LU #210) were used for the 194 houses including those that would have ADUs attached, and "Multifamily Housing (Low-Rise)" (ITE LU #220) rates were applied to the 49 ADUs. The proposed project is expected to generate an average of 2,159 trips per day, including 156 trips during the a.m. peak hour and 207 during the p.m. peak hour. These results are summarized in Table 2.

Table 2 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Houses	194 du	9.43	1,829	0.70	136	34	102	0.94	182	115	67
ADUs	49 du	6.74	330	0.40	20	5	15	0.51	25	16	9
Total			**2,159**		**156**	**39**	**117**		**207**	**131**	**76**

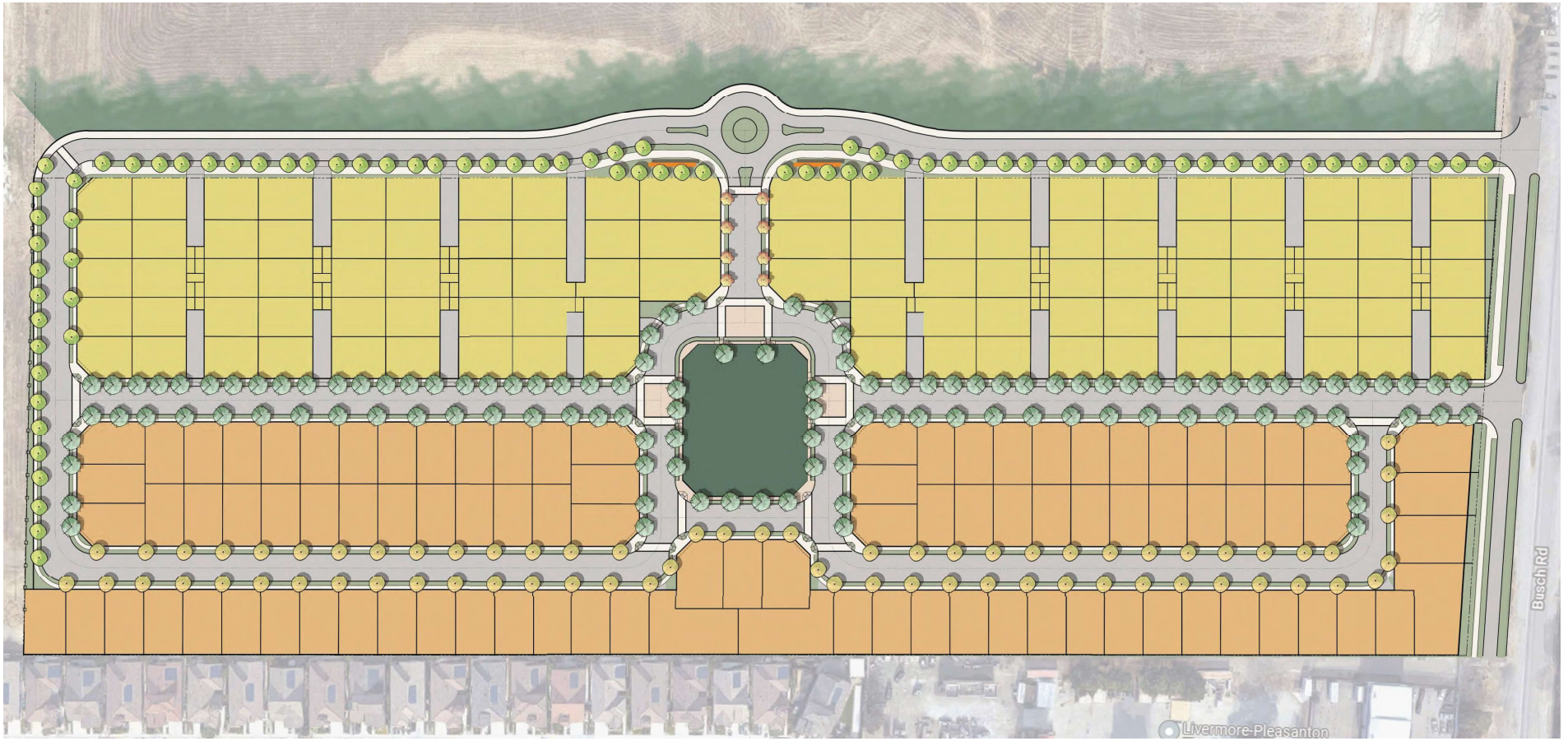
Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network is based on the distribution percentages used in the *East Pleasanton Specific Plan* (EPSP) *Transportation Impact Analysis*, Fehr & Peers, 2015, and consideration of where jobs, services, and schools are located. The applied distribution assumptions are shown in Table 3.

Table 3 – Trip Distribution Assumptions

Route	Percent
Santa Rita Rd North of Valley Ave	40
Valley Ave West of Santa Rita Rd	15
Santa Rita Rd South of Valley Ave	15
Stanley Blvd East of Valley Ave-Bernal Ave	10
Bernal Ave South of Stanley Blvd	5
Stanley Blvd West of Valley Ave-Bernal Ave	15
TOTAL	**100**



SITE PLAN

ARROYO LAGO

ALAMEDA COUNTY CALIFORNIA

SCALE: 1" = 60' DATE: AUGUST 2022

0 60 120 180

JOB NO.: 3435-000

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ROSEVILLE (916) 788-4456
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Transportation Impact Study for the Arroyo Lago Residential Project

Figure 2 – Site Plan

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Circulation System

This section addresses the first transportation bullet point on the CEQA checklist, which relates to the potential for a project to conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Pedestrian Facilities

Existing and Planned Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In the study area, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps generally provides access for pedestrians in the vicinity of existing residential developments; however, there are no or limited pedestrian facilities fronting the existing industrial land uses in the study area.

- **Busch Road** – There are sidewalks on the north side of Busch Road between Valley Avenue and Ironwood Drive; otherwise, there are no existing sidewalks on the street. Lighting is provided by overhead streetlights in front of and west of the City's Operations Service Center at 3333 Busch Road. Busch Road is the lone access point for pedestrians entering and exiting the project site. According to the EPSP, a multi-use trail along Busch Road east of Valley Avenue and sidewalks along Busch Road east of Ironwood are planned.
- **Valley Avenue** – Continuous sidewalks are provided on both sides of Valley Avenue. Streetlights provide nighttime illumination throughout the street. There are no pedestrian phases to cross Valley Avenue at Busch Road, though alternate crossing locations with pedestrian phases are located at Quarry Lane and Boulder Street.

Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. Collision records available from the California Highway Patrol as published in their SWITRS reports were reviewed for the most current five-year period available, which was January 1, 2018, through December 31, 2022 at the time of the analysis. During the five-year study period there were three reported pedestrian collisions; therefore, these collision records were further reviewed. One collision was at Santa Rita Road/Valley Avenue where an eastbound driver turning right collided with a pedestrian, resulting in a visible injury. One other collision at Santa Rita Road/Valley Avenue was reported as being caused by an inattentive pedestrian entering traffic, who was deemed at fault, colliding with a vehicle traveling southbound. The third pedestrian collision was at Stanley Boulevard/Valley Avenue-Bernal Avenue where a left-turning driver collided with a pedestrian who was crossing in the crosswalk when the pedestrian phase was not activated. With the three pedestrian collisions involving different primary factors and details, a discernable trend could not be determined. Further, all three collisions occurred at a walking distance greater than a half-mile from the project site, reducing the likelihood of pedestrian trips generated by the project site using these facilities.

Project Impacts on Pedestrian Facilities

The site plan indicates that sidewalks would be installed along all project streets and along the project frontage on Busch Road, and ADA-compliant curb ramps and crosswalks would be provided at most intersections within the project site. As they are not indicated on the site plan, additional ADA-compliant curb ramps should be constructed at the two new street connections to Busch Road to avoid a potentially significant impact to

pedestrian facilities. Crosswalks across the northern legs of the new intersections of the project streets and Busch Road would provide additional visibility of pedestrians crossing these streets.

As the project site is located within one-half mile of the multi-use Iron Horse Trail and is within a feasible walking distance of other uses, it is reasonable to except that some residents may want to walk between the project site and these destinations. Currently, there is no sidewalk on Busch Road east of Ironwood Drive and project residents would have to walk in the unpaved shoulder to access the project site as a pedestrian. To connect project residents to nearby uses, it is recommended that the project applicant work with the City to install a sidewalk on the north side Busch Road between Ironwood Drive and the project site; this would fill the existing sidewalk gap and be consistent with the City's long-range planning contained in the EPSP. It is noted that the City owns the land on the north side of Busch Road between the project site and Ironwood Drive as this frontage consists of the City's Operations Service Center.

Finding – The proposed project would have adequate on-site pedestrian facilities. Off-site, ADA-compliant curb ramps would be required at street intersections to enable crossing access for all users and avoid a potentially significant impact. Striping crosswalks across the two project streets intersection Busch Road would improve visibility of pedestrians crossing these streets. Pedestrians traveling to and from the project site would walk in the unpaved shoulder of Busch Road east of Ironwood Drive indicating a potentially significant impact. Filling the existing sidewalk gap would result in a less-than-significant impact with mitigation.

Recommendation – ADA-compliant curb ramps should be installed at the new street connections to Busch Road, and crosswalks should be marked across the northern legs of two new intersections with Busch Road. The project applicant should work with the City of Pleasanton to install a sidewalk on the north side of Busch Road between Ironwood Drive and the project site.

Bicycle Facilities

Existing and Planned Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2020, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on nearby roads including Busch Road, Ironwood Drive, Stanley Boulevard, Santa Rita Road, and Valley Avenue. The Iron Horse Trail Class I Multi-Use Path begins approximately 0.4 miles west of the project site and continues north. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 4 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *City of Pleasanton Bicycle & Pedestrian Master Plan* and EPSP.

Table 4 – Bicycle Facility Summary				
Status **Facility**	**Class**	**Length (miles)**	**Begin Point**	**End Point**
Existing				
Iron Horse Trail	I	1.03	Santa Rita Rd	Valley Rd
Busch Rd	II	0.12	Valley Ave	Ironwood Dr
Ironwood Dr	II	0.15	Bradford Way	Busch Rd
Stanley Blvd	II	3.85	Main St	Isabel Ave
Santa Rita Rd	II	2.44	Pimlico Dr	Railroad Tracks
Valley Ave	II	2.89	Koli Center Pkwy	Quarry Ln
Valley Ave	III	0.17	Quarry Ln	Busch Rd
Planned				
Iron Horse Trail	I	0.47	Valley Ave	Stanley Blvd
Busch Rd	I	0.69	Valley Ave	El Charro Rd
El Charro Rd	I	1.80	Stoneridge Dr	Stanley Blvd
Busch Rd	II	0.57	Ironwood Dr	El Charro Rd
El Charro Rd	II	1.80	Stoneridge Dr	Stanley Blvd
Valley Ave	IV	4.54	Sunol Blvd	Boulder St

Source: *City of Pleasanton Bicycle & Pedestrian Master Plan*, Fehr & Peers, 2018, and *East Pleasanton Specific Plan*, Fehr & Peers, 2015

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the five-year study period between January 1, 2018, through December 31, 2022, there were six collisions involving a bicyclist. Five of the six collisions occurred at Santa Rita Road/Valley Avenue; two of these collisions were located at the shopping center driveway approximately 130 feet south of the intersection. The motorist involved in each case turned out of the driveway and collided with a bicyclist; in one case the bicyclist was traveling on the sidewalk and in the other case the bicyclist was in the bicycle lane. One collision occurred where a bicyclist was making a left turn from the east to south leg, and a driver turning right from the west to south leg collided with the bicyclist. One other collision occurred at a driveway approximately 230 feet west of the intersection, where the eastbound driver turning right into the driveway collided with a bicyclist traveling westbound. The fifth collision reported at Santa Rita Road/Valley Avenue was when an eastbound driver making a right-turn collided with a bicyclist crossing the intersection. The one bicycle-involved collision at Valley Avenue/Busch Road occurred when a bicyclist traveling eastbound reportedly violated a driver's right-of-way when making a right-turn, resulting in a broadside collision. While there were several collisions within the study area including five at one intersection, each collision involved different circumstances such as different primary attributed factors, travel in different directions, or driveway movements at separate locations.

Project Impacts on Bicycle Facilities

Existing bicycle facilities together with shared use of minor streets currently provide adequate access for bicyclists. The Class I Iron Horse Regional Trail would offer residents a low-stress bicycle route from the nearby intersection of Valley Avenue/Busch Road to destinations including the Dublin/Pleasanton Bay Area Rapid Transit (BART) station. According to the project site plan, six-foot bicycle lanes would be installed along the project frontage on Busch Road which is consistent with the cross section shown in the EPSP. Bicycle facilities would further improve

with the completion of the on-street and off-street facilities from the EPSP including bicycle lanes and multi-use paths along both Busch Road and the planned extension of El Charro Road.

Bicycle Storage

The project site plan does not identify the provision of bicycle parking or storage facilities. All single-family homes would have private garages with restricted access; therefore, separate bicycle parking is not required for those residences. While neither the County nor the City maintain bicycle parking requirements, it is recommended that the project install bicycle racks at the park at the center of the development.

Finding – The existing bicycle facilities serving the project site are adequate. Bicycle storage is not indicated on the project site plan.

Recommendation – Bicycle racks should be provided at the park at the center of the development.

Transit Facilities

Existing Transit Facilities

The Livermore Amador Valley Transit Authority (LAVTA) Tri-Valley Wheels bus service provides fixed route bus service in Dublin, Pleasanton, and Livermore. As no transit stops are within a one-half mile walk of the project site, the project is not easily accessed by transit.

Wheels Dial-A-Ride provides paratransit services to eligible people with disabilities who live in Livermore, Pleasanton, or Dublin. Additionally, BART provides paratransit services through lift vans to people with disabilities who cannot ride BART trains, and the City of Pleasanton offers the Pleasanton Paratransit Service (PPS) for transportation within Pleasanton and Sunol. Paratransit services are provided through reservations only.

On-demand private vehicle services, such as Uber and Lyft, are available in the project area 24 hours a day. These private vehicle services can be used for trips both within the local area and to further destinations, including transit stops/stations and local airports.

Impact on Transit Facilities

As there are no transit facilities within a 0.5-mile walking distance of the project site, the proposed residences would not be readily accessible by transit and would therefore have a minimal impact on the surrounding transit network. Wheels Route 10R is approximately one mile from the project site while the Dublin/Pleasanton BART station is three miles from the project site via the Iron Horse Regional Trail; residents could bike from the project site to these transit stops and board with their bikes.

Finding – As there are no transit facilities near the project site, the project would have a less-than-significant impact on the surrounding transit network.

Significance Finding – Generally, the proposed project would not conflict with any plans or policies for transportation facilities and would provide adequate on-site pedestrian and bicycle facilities. However, this finding assumes that curb ramps would be installed on the north side of each of the two proposed intersections between the project streets and Busch Road, and a sidewalk would be constructed on the north side of Busch Road between Ironwood Drive and the project site.

Vehicle Miles Traveled (VMT)

The potential for the project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the project's anticipated Vehicle Miles Traveled (VMT).

Project and Regional VMT

The Vehicle Miles Traveled (VMT) associated with a project is the basis for determining traffic impacts under CEQA. Because the County of Alameda has not yet adopted a standard of significance for evaluating VMT, guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, was used. This document indicates that a residential project generating vehicle travel that is 15 or more percent below the existing regional or citywide residential VMT per capita may indicate a less-than-significant transportation impact.

The Alameda County Transportation Commission (CTC) travel demand model includes thousands of traffic analysis zones (TAZs) within nine Bay Area counties that contain information for the years 2010, 2020, and 2040. The project site is located within TAZ 1080; as TAZ 1080 is modeled to have no residents under conditions without the project, project residents were added to the travel demand model with the demographic characteristics of households in adjacent TAZs. According to the Alameda CTC model, the project would be expected to have a daily VMT of 29.9 miles per capita under existing 2020 conditions. In contrast, the average daily VMT for residents of the East Planning Area of Alameda County (which includes Dublin, Pleasanton, Livermore, and surrounding unincorporated areas) is 30.5 miles per capita. As the project would be expected to have a VMT per capita above the threshold of 25.9 miles per capita which is 15 percent less than the regional average, the project would have a potentially significant impact on VMT based on the OPR's guidance. Transportation demand management (TDM) measures resulting in a reduction in VMT of 13.4 percent or greater would result in a less-than-significant impact with mitigation. The information is summarized in Table 5.

Table 5 – Vehicle Miles Traveled Analysis Summary

VMT Metric	East Planning Area 2020 VMT Rate	Significance Threshold	TAZ 1080 VMT Rate	Resulting Significance	Percent Reduction Required
Total VMT per Capita	30.5	25.9	29.9	Potentially Significant	13.4%

Note: VMT Rate is measured in total VMT/Capita, for the number of daily miles driven per resident

VMT Mitigation Measures

Several potential mitigation measures from the *Alameda County Vehicle Miles Traveled Reduction Estimator Tool*, Alameda CTC, were identified that could reduce the project's VMT. The Alameda CTC tool includes a variety of employer-based or transit-based countermeasures which generally do not apply to the proposed project, as the project would have minimal on-site employees and the project site is located more than a half-mile walking distance to the nearest transit stop.

According to the Alameda CTC, a residential development with density higher than the national average could result in a reduction in VMT up to 30 percent; however, the proposed project would have a density of 9.1 dwelling units per acre which is equal to the national average. Integrating affordable housing into the project would be expected to result in a minor reduction in VMT per capita. For example, converting 10 percent of the units to deed-restricted below-market-rate (BMR) housing would result in an approximately 0.4 percent reduction in VMT while

assigning 30 percent of the units to deed-restricted BMR housing would correlate to a reduction of approximately 1.2 percent.

Limiting parking or unbundling parking costs from property costs was not considered as a mitigation measure because the project would be made up of single-family homes with parking incorporated into the building designs. Alternatively, incorporating carshare spaces into the project (such as through Zipcar) could result in a reduction in VMT up to 0.7 percent by reducing vehicle ownership. Bikeshare spaces within the project site would not be anticipated to result in a project-specific decrease in VMT given that the City of Pleasanton does not participate in a bikeshare program.

While the Alameda CTC tool suggests that increasing the density of intersections would result in a reduction in VMT, this strategy refers to citywide or regional improvements in street connectivity that would not apply on the scale of the proposed project. According to the Alameda CTC tool, traffic calming improvements could result in a reduction in VMT between 0.25 and one percent based on the proportion of project streets and intersections with traffic calming, with a one-percent reduction corresponding to all project streets and intersections being designed with traffic calming features. Additionally, should the project applicant construct sidewalks along Busch Road between Ironwood Drive and the project site as well as along the project frontage, the improved connectivity to nearby commercial facilities would be expected to reduce the VMT per capita by 0.5 percent. The proposed isolated segment of bicycle lanes along the project frontage was incorporated into the analysis and would not be expected to cause a reduction in VMT.

The Alameda CTC tool indicates that establishing a community-based travel planning (CBTP) program could reduce VMT by 2.3 percent with 100 percent of households targeted by the program. The CBTP program could provide residents with information, incentives, and support to encourage alternatives to single-occupancy vehicles; for example, the CBTP program could create a website for residents organizing carpools or offer informational materials on the local bicycle network. According to the Alameda CTC, a CBTP program would be carried out by a team of trained travel advisors reaching out to and communicating with each household individually.

Combined Measures

Combined, the implementation of all potential mitigation measures would be expected to reduce the project's VMT per capita by 4.2 to 5.7 percent below the baseline value for the TAZ. This would translate to a project-specific rate of 28.6 to 28.2 VMT per capita, greater than the applied significance threshold of 25.9 for the East Planning Area of Alameda County. Table 6 summarizes the measures that could result in VMT reductions with the minimum and maximum VMT reductions for each strategy presented separately.

Table 6 – VMT Mitigation Measure Summary			
VMT Mitigation Measure	**VMT Reduction (%)**		**Description of Measure**
	Minimum	**Maximum**	
Affordable Housing	0.4	1.2	10 to 30 percent of units would be made deed-restricted below-market-rate housing
Carshare Spaces	0.7	0.7	Carshare space(s) would be provided
Traffic Calming	0.25	1	25 to 100 percent of project streets and intersections would have traffic calming elements
Sidewalk Improvements	0.5	0.5	Sidewalk would be added along Busch Rd between Ironwood Dr and the east edge of the project site
Community-Based Travel Planning (CBTP)	2.3	2.3	The CBTP program would reach out to households and offer information, incentives, and support for alternatives to single-occupancy vehicles
Total Reduction	**4.2**	**5.7**	
Required Reduction	**13.4**	**13.4**	

Finding – The residents of the proposed project would be expected to generate 29.9 VMT per capita daily which is greater than the threshold of 25.9 VMT per capita, or 15 percent below the average VMT per capita for the Alameda County East Planning Area. Implementing a variety of countermeasures would be expected to result in a reduction of VMT between 4.2 to 5.7 percent.

Recommendation – The project should implement the various countermeasures identified to reduce VMT including designating a portion of the units as affordable, adding carshare spaces, ensuring traffic calming elements are implemented into the design of the project site, and establishing a CBTP program.

Significance Finding - As the project would be expected to have a greater VMT per capita than 15 percent below the regional average, the proposed project would have a potentially significant impact on VMT. To reduce to a less-than-significant impact with mitigation, the VMT generated by the project would have to be reduced by 13.4 percent. Upon testing a variety of countermeasures provided by Alameda CTC, the maximum reduction achievable was 5.7 percent; as a result, the project's impact on VMT is presumed to be significant and unavoidable.

Safety Issues

The potential for the project to impact safety was evaluated in terms of the adequacy of sight distance and need for turn lanes at the project accesses as well as the adequacy of stacking space in dedicated turn lanes at the study intersections to accommodate additional queuing due to adding project-generated trips and need for additional right-of-way controls. This section addresses the third transportation bullet on the CEQA checklist which is whether or not the project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Site Access

The project site would be accessed via two new street connections to Busch Road east of Ironwood Drive. All residences would be accessible from either street connection to Busch Road. Within the project site, internal circulation would include a roundabout on the east side of the project site and a roadway encompassing the park at the center of the development. With the project, Busch Road would be widened along the project frontage in accordance with the EPSP to include an eight-foot sidewalk, six-foot bike lane, seven-foot landscaped buffer between the sidewalk and bike lane, and space for a 12-foot median.

Sight Distance

Sight distances along Busch Road at the project access points were evaluated based on sight distance criteria contained in the *Highway Design Manual* (HDM) published by Caltrans. The recommended sight distance for the intersection of public streets is based on corner sight distances, with more sight distance needed for a left turn versus a right turn.

Field measurements were obtained at the locations of the proposed street connections to Busch Road and the corner sight distance criterion for public street intersections was applied for evaluation purposes. The HDM recommends an equation of D = 1.47 * V * T for corner sight distance, where "D" is corner sight distance, "V" is vehicle speed, and "T" is a time gap dependent on turning movement and design vehicles, which for a single-unit truck correlates to a "T" of 9.5 seconds for left turns and 8.5 seconds for right turns. Applying the posted speed limit of 35 mph, the minimum corner sight distances per the HDM include 489 feet for left turns and 437 feet for right turns. During the field visit sight lines in excess of 500 feet were measured in each direction, satisfying the minimum corner sight distance recommendations for the posted speed limit. To preserve existing sight lines, any new landscaping, signage, or other structures placed near the project entrances should be positioned outside of the vision triangle of a driver waiting on the minor street approach.

Finding – There is adequate corner sight distance available at the project accesses on Busch Road for the posted speed limit of 35 mph provided that no obstructions to sight lines are added to the project frontage.

Recommendation – New landscaping, signage, or other structures should be kept outside of the vision triangle of a driver waiting to turn onto Busch Road from the project streets.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Busch Road into the project site was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as an update of the methodology developed by the Washington State Department of Transportation and published in the *Method For Prioritizing Intersection Improvements*,

January 1997. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes to determine the need for a left-turn pocket based on safety issues.

The need for left-turn channelization in the form of a left-turn pocket Busch Road was evaluated based peak hour volumes as well as safety criteria. Based on the proposed distribution of residential units and on-site street layout, it is assumed that 60 percent of drivers entering the project site would turn left into the western project street and 40 percent would turn left into the eastern project street. Two separate analyses were conducted to review Existing and Future conditions. The Existing conditions scenario reflects Busch Road as a two-lane road with a posted speed limit of 25 mph, whereas the Future conditions scenario represents the planned capacity enhancements to Busch Road as a 45-mph four-lane roadway; both assessed conditions include the traffic associated with the future extension of El Charro Road. Under Existing plus Project conditions, a left-turn lane is warranted on Busch Road at both project streets during the p.m. peak period. Similarly, under Future plus Project conditions, a left-turn lane is warranted during both the a.m. and the p.m. peak periods for the western project street and during the p.m. peak period for the eastern project street. Copies of the warrant spreadsheets are provided in Appendix B.

Finding – Under both Existing and Future conditions, left-turn lanes are warranted at both proposed street connections to Busch Road upon the addition of project traffic as well as traffic associated with the planned future extension to El Charro Road. This represents a potentially significant impact to safety as left-turn lanes would enable turning vehicles to wait out of the way of through traffic, reducing congestion and the likelihood of rear-end collisions.

Recommendation – The proposed Busch Road alignment is recommended to include channelized left-turn lanes to accommodate eastbound drivers turning left into the western project street and eastern project street out of the way of through traffic, resulting in a less-than-significant impact with respect to traffic safety.

Traffic Signal Warrants

A traffic signal warrant analysis was conducted to determine the potential need for traffic signals at each proposed street connection to Busch Road. Although under Future conditions it was presumed that Busch Road would be widened to be four lanes, the analysis was done as the existing alignment of two lanes as a more conservative approach. Additionally, the analysis includes the expectation that El Charro Road would be extended in the future and its associated traffic would increase volumes at the proposed project intersections. Chapter 4C of the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD) provides guidance on when a traffic signal should be considered. For the purposes of this study, Warrant 3, the peak hour warrant, was considered.

Warrant 3 - A traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

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

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

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

A peak hour study was conducted for the worst-case scenario, with all project generated trips using one access point during both the a.m. and p.m. peak periods. The worst-case scenario would also include all project generated trips turning left into the project site and all trips turning left out of the project site. In the a.m. peak hour, the total delays for drivers leaving the project would not meet the delay threshold, so a traffic signal would not be warranted in this case. In the p.m. peak hour, although the increase in pass–by trips in the future would satisfy some criteria, the total generated volumes leaving the project would not exceed 100 vehicles – therefore, the future p.m. peak period also does not warrant a traffic signal at either project street connection to Busch Road. Copies of the Peak Hour Warrant worksheets are included in Appendix C.

Finding – In both the a.m. and p.m. peak periods, the Peak Hour Warrant for a traffic signal is not met even under the assumption that all project generated trips would utilize a single access point and turn left into or out of the site, which generates higher delays than right turns.

Queuing

The City of Pleasanton and County of Alameda do not prescribe thresholds of significance regarding queue lengths. However, an increase in queue length due to project traffic was considered a potentially significant impact if the increase would cause the queue to extend out of a dedicated turn lane into a through traffic lane, or the back of queue into a visually restricted area, such as a blind corner. If queues would already be expected to extend past a dedicated turn lane or into a visually restricted area without project traffic, the addition of project traffic was considered to constitute a potentially adverse effect only if it would cause a new unacceptable condition; in other words, if the queue were already beyond the turn lane and the project would cause it to stack into an adjacent intersection or a visually restricted area, and that would not occur without the project, that would be considered an impact.

Under each scenario, the projected 95th percentile queues in turn pockets at the study intersections were determined using the SIMTRAFFIC application of Synchro and averaging the 95th percentile projected queue for each of ten runs. Summarized in Table 7 are the predicted queue lengths at the study intersections. Copies of the SIMTRAFFIC projections are contained in Appendix D.

Table 7 – 95th Percentile Queues in Dedicated Turn Lanes

Study Intersection	Available Storage	95th Percentile Queues												
		AM Peak Hour							PM Peak Hour					
		E19	E23	E+P	B	B+P	F	F+P	E19	E23	E+P	B	B+P	F	F+P
Santa Rita Rd/Valley Ave															
NB Left Turn	250	**251**	174	248	**339**	**363**	204	206	**397**	**317**	**407**	**453**	**452**	**419**	**412**
SB Right Turn	220	**266**	158	**259**	**337**	**346**	**335**	**341**	97	37	130	209	148	77	91
EB Right Turn	100	**108**	**105**	**101**	**118**	**115**	**150**	**154**	**124**	94	**118**	**147**	**146**	**144**	**140**
WB Left Turn	150	**223**	**205**	**229**	**206**	**208**	**179**	**189**	**186**	140	**186**	**206**	**234**	**227**	**283**
WB Right Turn	100	83	39	**115**	**178**	**157**	**181**	**181**	49	62	68	**104**	**126**	**255**	**254**

Table 7 – 95th Percentile Queues in Dedicated Turn Lanes

Study Intersection	Available Storage	95th Percentile Queues													
		AM Peak Hour							PM Peak Hour						
		E19	E23	E+P	B	B+P	F	F+P	E19	E23	E+P	B	B+P	F	F+P
Valley Ave/Busch Rd															
SB Left Turn	170	57	60	75	54	72	96	166	66	66	81	61	74	144	165
EB (Valley Ave) Left Turn	220	80	85	91	80	102	**259**	**266**	71	63	101	77	101	**270**	**298**
Busch Rd/Ironwood Dr															
SB Left Turn	110	0	0	0	0	0	0	0	0	0	0	24	25	35	30
Valley Ave/Boulder St															
EB (Valley Ave) Left Turn	170	12	8	12	40	26	49	39	7	23	10	34	64	84	71
WB (Valley Ave) Left Turn	225	115	78	122	134	168	193	208	89	80	101	90	104	122	131
Stanley Blvd/Valley Ave-Bernal Ave															
NB Left Turn	210	**252**	152	**267**	101	117	**256**	**273**	132	119	160	87	95	108	85
NB Right Turn	180	172	63	**187**	**227**	**246**	**246**	**243**	**227**	**230**	**245**	**223**	**232**	**292**	**292**
SB Left Turn	300	116	109	123	103	122	102	114	**364**	202	**337**	**357**	**323**	**482**	**467**
EB Left Turn	280	173	137	193	274	**282**	**312**	**323**	178	149	182	**450**	**443**	**507**	**495**
WB Left Turn	290	132	131	131	273	**298**	259	239	91	108	95	103	101	**453**	**448**
WB Right Turn	525	218	163	225	363	391	41	40	66	62	69	55	54	0	0

Notes: 95th Percentile Queue based on the average of the output from ten SIMTRAFFIC runs; all distances are measured in feet; E19 = existing 2019 conditions; E23 = existing 2023 conditions, E+P = existing 2019 plus project conditions; B = baseline conditions; B+P = baseline plus project conditions; F = future conditions; F+P = future plus project conditions; **Bold** text = queue length exceeds available storage

With existing 2019 and 2023 volumes, 95th percentile queues are projected to exceed the available storage space in dedicated turn lanes at Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue during both the a.m. and p.m. peak hours. Adding project traffic to the existing 2019 volumes, which results in a conservative analysis as the 2019 volumes are generally higher than 2023 volumes, would increase the 95th percentile queue length in the 100-foot westbound right-turn lane at Santa Rita Road/Valley Avenue during the a.m. peak hour from 83 feet to 115 feet; however, retiming the signal to accommodate project traffic would be expected to reduce the westbound right-turn queue from 115 feet to 98 feet which would not exceed the available storage space.

Similarly, the addition of project traffic to existing 2019 volumes would increase the northbound right-turn queue at Stanley Boulevard/Valley Avenue-Bernal Avenue during the a.m. peak hour from 172 feet to 187 feet, exceeding the 180-foot pocket length. Retiming the signal for project traffic would be expected to reduce the northbound right-turn queue to 127 feet.

Under Baseline and Future conditions, 95th percentile queues would continue to exceed the storage space in dedicated turn lanes at Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley-Bernal Avenue during the a.m. and p.m. peak hours, with and without project traffic. Additionally, the available storage space in the

eastbound left-turn lane at Valley Avenue/Busch Road would be exceeded under Future and Future plus Project conditions during the a.m. and p.m. peak hours. Upon the addition of project traffic to Baseline volumes during the a.m. peak hour, the queues in the 280-foot-long eastbound left-turn lane and 290-foot-long westbound left-turn lane at Stanley Boulevard/Valley Avenue-Bernal Avenue would exceed the available storage by two and eight feet respectively. Modifying the signal timing at Stanley Boulevard/Valley Avenue-Bernal Avenue under Baseline conditions to account for project traffic would decrease queues in the eastbound and westbound left-turn lanes to 272 feet and 239 feet respectively which would remain within the available storage space.

Finding – With existing volumes, the addition of project traffic would create a potentially significant impact on queues in the westbound right-turn lane at Santa Rita Road/Valley Avenue and northbound right-turn lane at Stanley Boulevard/Valley Avenue-Bernal Avenue during the a.m. peak hour. Traffic associated with the project would also create a potentially significant impact under Baseline conditions in the eastbound and westbound left-turn lanes at Stanley Boulevard/Valley Avenue-Bernal Avenue during the a.m. peak hour. Retiming the traffic signals at Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue would reduce queues under conditions with trips anticipated to be generated by the project such that the project traffic would not cause queues to exceed the available storage space, reducing the impacts to less-than-significant with mitigation.

Significance Finding – The proposed project would have potentially significant impacts on site access as well as potentially significant impacts on queueing at the intersections of Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue. Installing channelized eastbound left-turn lanes at both project street connections to Busch Road and retiming the traffic signals at Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue to accommodate project traffic would result in a less-than-significant impact on safety with mitigation.

Emergency Access

The final transportation bullet on the CEQA checklist requires an evaluation as to whether the project would result in inadequate emergency access or not.

Adequacy of Site Access

The project's driveways and internal circulation network would be designed to meet current City and County standards and can therefore be expected to accommodate the access requirements for passenger vehicles. The California Fire Code, Section 503.2.1, states that roads shall have an unobstructed width of not less than 20 feet to accommodate fire apparatus access, and vehicle access throughout the project site would be provided via a network of connected 20- to 36-foot-wide roadways. Additionally, Section 503.2.5 of the California Fire Code requires a turnaround for a fire apparatus at the end of dead-end roads longer than 150 feet; as the private drive aisles on the site plan labeled "Parcel B", "Parcel C", etc. would be less than 150 feet in length, these aisles would be exempt from the Code's requirement for turnarounds. The widths and curves appear to be appropriate for fire access, though review and approval from the fire code official would be required as part of the entitlement process.

Finding – As the site plan would be reviewed and approved by a fire code official as part of the entitlement process, it is assumed that adequate roadway widths and curves would be provided to conclude a less-than-significant impact on emergency access internal to the site.

Off-Site Impacts

As detailed in the "Capacity Analysis" section of the *Traffic Operations Study for the Arroyo Lago Residential Project*, W-Trans, July 2023, the addition of project traffic to Existing, Baseline, and Future volumes would cause minor increases in delay and/or continued acceptable operation of the signalized study intersections, except for at the intersection of Santa Rita Road/Valley Avenue under Baseline plus Project conditions. At this location, under Baseline p.m. peak hour volumes the addition of project traffic would increase delay by approximately 5.4 seconds. As emergency vehicles have lights and sirens to bypass queued traffic and minimize the effects of intersection delay, the project can be presumed to have a nominal to no effect on emergency response times.

Finding – The project would have a less-than-significant impact on emergency response times.

Significance Finding – The proposed project would be designed to accommodate emergency response vehicles and would not impede emergency access, resulting in a less-than-significant impact on emergency response.

Conclusions and Recommendations

Conclusions

- The project would be expected to generate an average of 2,159 trips per day, including 156 a.m. peak hour trips and 207 trips during the p.m. peak hour.
- The project site plan identifies pedestrian facilities such as sidewalks, crosswalks, and curb ramps within the project site, while curb ramps and crosswalks are not indicated at the two new street connections to Busch Road. Pedestrians traveling to and from the west of the project site would be required to walk in the unpaved shoulder on Busch Road, resulting in a potentially significant impact.
- Existing bicycle and transit facilities serving the project site are adequate. Bicycle storage at the park at the center of the development is not indicated.
- There would be a potentially significant impact on VMT as the proposed project would be expected to have a per capita daily VMT greater than the threshold of 15 percent below the regional average. As the countermeasures provided by the Alameda CTC would result in a maximum reduction in VMT of 5.7 percent, less than the 13.4 percent required to mitigate the project's impact, the project would be presumed to have a significant and unavoidable impact on VMT.
- Sight lines at the two proposed street connections to Busch Road are adequate to accommodate all turns into and out of the project site provided that no obstructions to sight lines are added with the project.
- Left-turn lanes are warranted at both proposed street connections to Busch Road upon the addition of project traffic, presenting a potentially significant impact if not constructed. The Peak Hour Warrant for a traffic signal is not met at either street connection to Busch Road for any scenario evaluated.
- With the addition of project traffic to Existing volumes, there would be a potentially significant impact on queueing at Santa Rita Road/Valley Avenue in the westbound right-turn lane and at Stanley Boulevard/Valley Avenue-Bernal Avenue in the northbound right-turn lane during the a.m. peak hour. Adding project traffic to Baseline volumes would have a similar impact to queues in the eastbound and westbound left-turn lanes at Stanley Boulevard/Valley Avenue-Bernal Avenue during the a.m. peak hour. These impacts could be reduced to less-than-significant with mitigation by retiming the signals to accommodate project traffic.
- A less-than-significant impact on emergency response is anticipated given that turn radii and street widths would be reviewed and approved by the fire code official prior to issuance of entitlements. Traffic generated by the project's effect on emergency response times would be minimized as emergency vehicles have lights and sirens to bypass queued traffic.

Recommendations

- Curb ramps should be installed at the new street connections to Busch Road to mitigate this potentially significant impact to pedestrian facilities to less than significant. Crosswalks are recommended to be marked across the northern legs of the two new intersections with Busch Road.
- To mitigate a potentially significant impact, the project applicant should work with the City of Pleasanton to install a sidewalk on the north side of Busch Road between Ironwood Drive and the project site.

- Bicycle racks should be provided at the park at the center of the development.

- A variety of countermeasures to reduce VMT should be implemented such as designating units as affordable, adding carshare spaces to the project site, ensuring streets and intersections are designed with traffic calming, and establishing a community-based travel planning program.

- New landscaping, signage, or other structures should be positioned outside the sight triangle of a driver waiting to turn onto Busch Road from the project streets.

- Left-turn lanes should be installed on Busch Road at each of the two proposed street connections to mitigate a potentially significant safety impact to less than significant.

- The intersections of Santa Rita Road/Valley Avenue and Stanley Boulevard/Valley Avenue-Bernal Avenue should be retimed to accommodate project traffic as mitigation of a potentially significant impact with respect to queuing.

Study Participants and References

Study Participants

Principal in Charge	Mark E. Spencer, PE (Traffic)
Traffic Engineer	Kevin Carstens, PE (Civil, Traffic)
Assistant Engineer	Nathan Sharafian, EIT
Graphics	Cameron Wong
Editing/Formatting	Jessica Bender
Quality Control	Dalene J. Whitlock, PE (Civil, Traffic), PTOE

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Appendix A

Collision Rate Calculations and Collision Histories

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Intersection Collision Rate Worksheet

Arroyo Lago Residential Development

Intersection # 1: Santa Rita Road & Valley Avenue
Date of Count: Wednesday, February 15, 2023

Number of Collisions: 31
Number of Injuries: 17
Number of Fatalities: 0
Average Daily Traffic (ADT): 49700
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

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

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{31 \times 1{,}000{,}000}{49{,}700 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.34 c/mve**	**0.0%**	**54.8%**
Statewide Average*	**0.24 c/mve**	**0.5%**	**46.9%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 2: Valley Avenue & Busch Road
Date of Count: Wednesday, February 15, 2023

Number of Collisions: 8
Number of Injuries: 6
Number of Fatalities: 0
Average Daily Traffic (ADT): 23500
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{8 \times 1{,}000{,}000}{23{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.19 c/mve**	**0.0%**	**75.0%**
Statewide Average*	**0.20 c/mve**	**0.5%**	**46.8%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Arroyo Lago Residential Development

Intersection # 3: Busch Road & Ironwood Drive
Date of Count: Wednesday, February 15, 2023

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 2500
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times \text{Days per Year} \times \text{Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{2{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.20 c/mve**	**0.5%**	**46.8%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection # 4: Valley Avenue & Boulder Street
Date of Count: Thursday, March 2, 2023

Number of Collisions: 2
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 32200
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

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

$$\text{Collision Rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times \text{Days per Year} \times \text{Number of Years}}$$

$$\text{Collision Rate} = \frac{2 \times 1{,}000{,}000}{32{,}200 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.03 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.24 c/mve**	**0.5%**	**46.9%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Arroyo Lago Residential Development

Intersection # 5: Stanley Blvd & Valley Ave
Date of Count: Wednesday, February 15, 2023

Number of Collisions: 33
Number of Injuries: 18
Number of Fatalities: 0
Average Daily Traffic (ADT): 39800
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

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

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{33 \times 1{,}000{,}000}{39{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.45 c/mve**	**0.0%**	**54.5%**
Statewide Average*	**0.24 c/mve**	**0.5%**	**46.9%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

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Appendix B

Turn Lane Warrant Spreadsheets

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Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/East Driveway
Study Scenario: AM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)
Through Volume = 514
Right Turn Volume = 0

Westbound Speed Limit: 25 mph
Westbound Configuration: 2 Lanes - Undivided

East Driveway

Busch Rd

Eastbound Volumes (veh/hr)
681 = Through Volume
16 = Left Turn Volume

Eastbound Speed Limit: 25 mph
Eastbound Configuration: 2 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1050.1
Advancing Volume	Va =	514
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

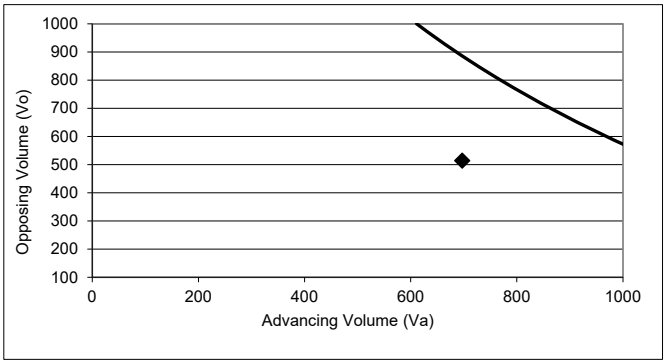
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	514
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Percentage Left Turns %lt 2.3 %
Advancing Volume Threshold AV 1069 veh/hr
If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/East Driveway
Study Scenario: PM Future + Project

Direction of Analysis Street: East/West

Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)

Through Volume = 923

Right Turn Volume = 0

Westbound Speed Limit: 25 mph

Westbound Configuration: 2 Lanes - Undivided

East Driveway

Busch Rd

Eastbound Volumes (veh/hr)

389 = Through Volume

53 = Left Turn Volume

Eastbound Speed Limit: 25 mph

Eastbound Configuration: 2 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1050.1
Advancing Volume	Va =	923
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	923
If AV<Va then warrant is met		-

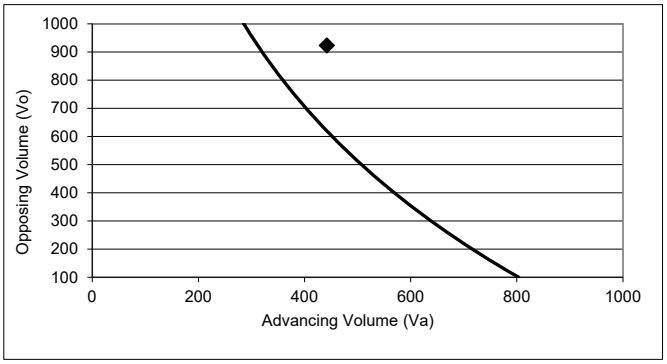
Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Percentage Left Turns %lt 12.0 %

Advancing Volume Threshold AV 312 veh/hr

If AV<Va then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 25 mph

Turn lane warranted if point falls to right of warrant threshold line

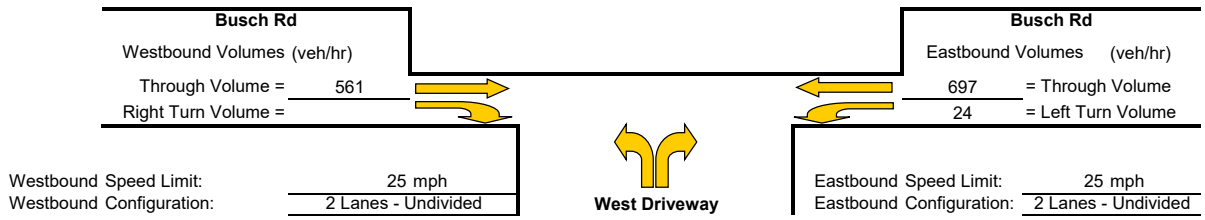
Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/West Driveway
Study Scenario: AM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North



Westbound Speed Limit: 25 mph
Westbound Configuration: 2 Lanes - Undivided

Eastbound Speed Limit: 25 mph
Eastbound Configuration: 2 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1050.1
Advancing Volume	Va =	561
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

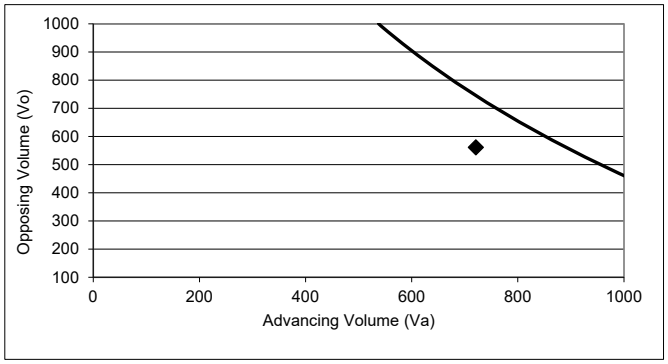
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	561
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Percentage Left Turns	%lt	3.3 %
Advancing Volume Threshold	AV	891 veh/hr

If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/West Driveway
Study Scenario: PM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)
Through Volume = 953
Right Turn Volume =

Westbound Speed Limit: 25 mph
Westbound Configuration: 2 Lanes - Undivided

West Driveway

Busch Rd

Eastbound Volumes (veh/hr)
442 = Through Volume
79 = Left Turn Volume

Eastbound Speed Limit: 25 mph
Eastbound Configuration: 2 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1050.1
Advancing Volume	Va =	953
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

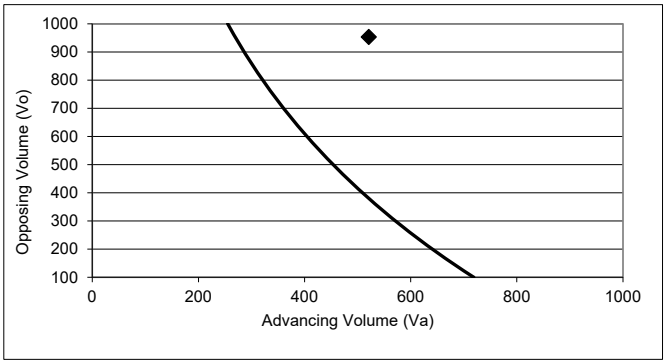
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	953
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Percentage Left Turns %lt 15.2 %
Advancing Volume Threshold AV 269 veh/hr
If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 25 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/East Driveway
Study Scenario: AM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)

Through Volume = 514
Right Turn Volume = 0

Westbound Speed Limit: 35 mph
Westbound Configuration: 4 Lanes

East Driveway

Busch Rd

Eastbound Volumes (veh/hr)

681 = Through Volume
16 = Left Turn Volume

Eastbound Speed Limit: 35 mph
Eastbound Configuration: 4 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	514
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

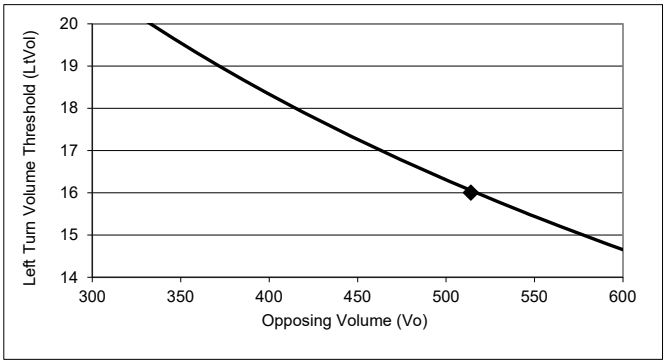
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	1333.33333
Advancing Volume	Va =	514
If AV<Va then warrant is met		No

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Left Turn Volume Threshold LtVol 17.0 veh/hr
Left Turn Volume Vl = 16 veh/hr
If Vl>LtVol then warrant is met



◆ Study Intersection
——— Four lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/East Driveway
Study Scenario: PM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)

Through Volume = 923
Right Turn Volume = 0

Westbound Speed Limit: 35 mph
Westbound Configuration: 4 Lanes

East Driveway

Busch Rd

Eastbound Volumes (veh/hr)

389 = Through Volume
53 = Left Turn Volume

Eastbound Speed Limit: 35 mph
Eastbound Configuration: 4 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	923
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

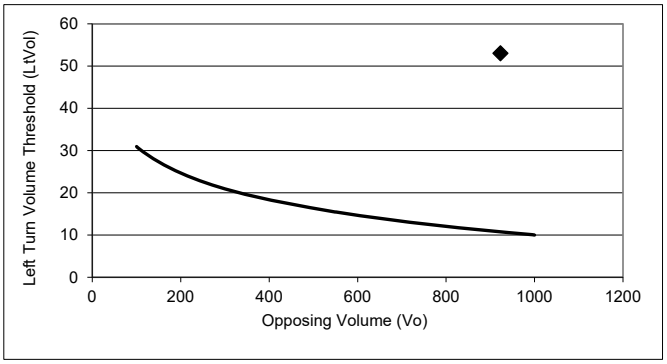
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	1333.33333
Advancing Volume	Va =	923
If AV<Va then warrant is met		No

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Left Turn Volume Threshold LtVol 9.9 veh/hr
Left Turn Volume Vl = 53 veh/hr
If Vl>LtVol then warrant is met



◆ Study Intersection
Four lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

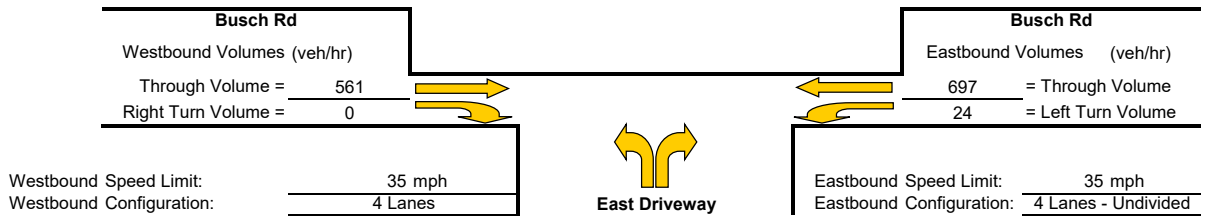
Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/West Driveway
Study Scenario: AM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North



Westbound Speed Limit: 35 mph
Westbound Configuration: 4 Lanes

Eastbound Speed Limit: 35 mph
Eastbound Configuration: 4 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	561
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

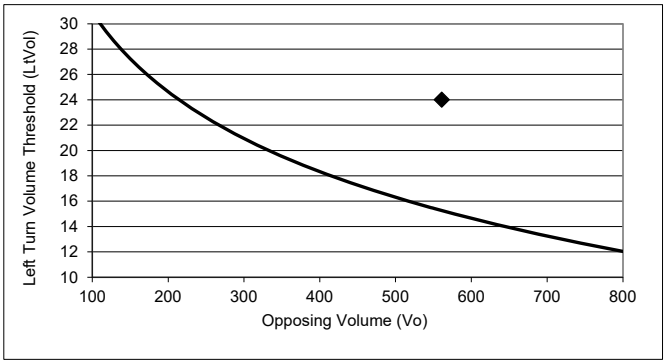
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	1333.33333
Advancing Volume	Va =	561
If AV<Va then warrant is met		No

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Left Turn Volume Threshold LtVol 16.0 veh/hr
Left Turn Volume Vl = 24 veh/hr
If Vl>LtVol then warrant is met



◆ Study Intersection
Four lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Busch Road/West Driveway
Study Scenario: PM Future + Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the North

Busch Rd

Westbound Volumes (veh/hr)

Through Volume = 953
Right Turn Volume = 0

Westbound Speed Limit: 35 mph
Westbound Configuration: 4 Lanes

East Driveway

Busch Rd

Eastbound Volumes (veh/hr)

442 = Through Volume
79 = Left Turn Volume

Eastbound Speed Limit: 35 mph
Eastbound Configuration: 4 Lanes - Undivided

Westbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED - Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	953
If AV<Va then warrant is met		-

Right Turn Lane Warranted: **NO**

Westbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

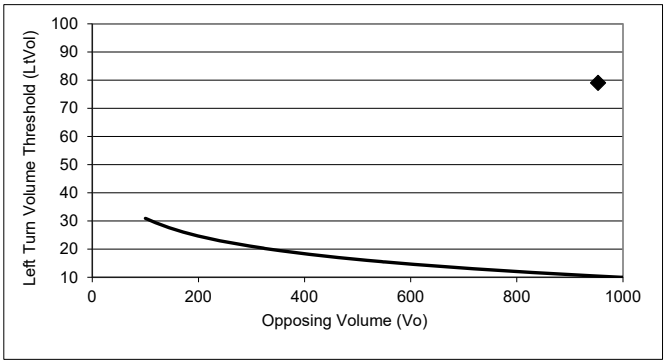
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	1333.33333
Advancing Volume	Va =	953
If AV<Va then warrant is met		No

Right Turn Taper Warranted: **NO**

Eastbound Left Turn Lane Warrants

Left Turn Volume Threshold LtVol 9.5 veh/hr
Left Turn Volume Vl = 79 veh/hr
If Vl>LtVol then warrant is met



◆ Study Intersection
Four lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **YES**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Appendix C

Peak-Hour Signal Warrant Worksheets

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Warrant 3: Peak-Hour Volumes and Delay

Busch Road & Driveway
Alameda County

Project Name: ALX045

Intersection: B

	Major Street	Minor Street
Street Name	Busch Road	Driveway
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: N/A
Scenario: AM Peak Period

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

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

Condition A1 — Not Met

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

Minor Approach Delay: 3.3 vehicle-hours

Condition A2 — Met

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

Minor Approach Volume: 117 vph

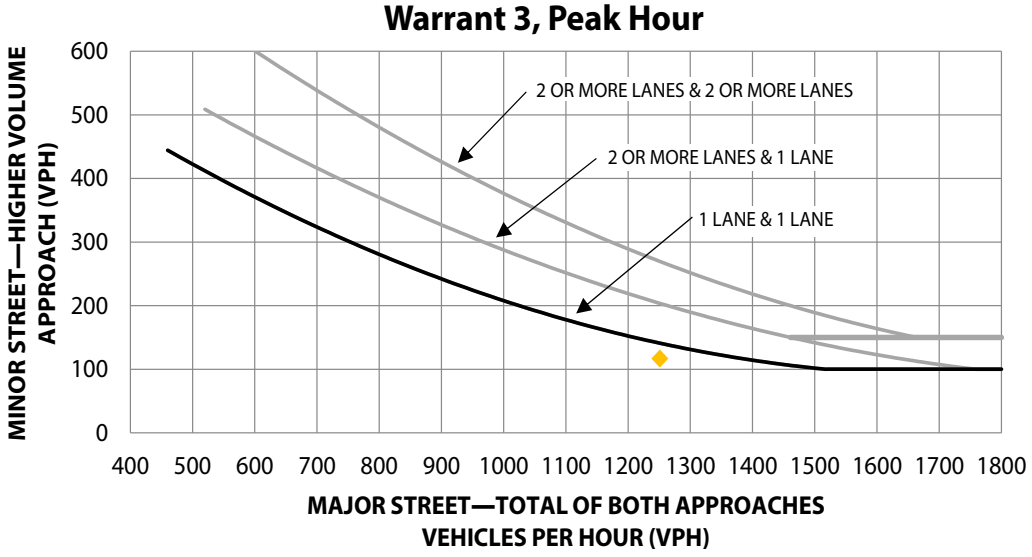
Condition A3 — Met

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

Total Entering Volume: 1368 vph

Condition B — Not Met

The plotted point falls above the curve



Warrant 3: Peak-Hour Volumes and Delay

Busch Road & East Driveway
Alameda County

Project Name: ALX045

Intersection: East Driveway

	Major Street	Minor Street
Street Name	Busch Road	East Driveway
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	25	25

Population less than 10,000? No
Date of Count: N/A
Scenario: PM Peak Period

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

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

Condition A1 — Met

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

Minor Approach Delay: 5.48 vehicle-hours

Condition A2 — Not Met

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

Minor Approach Volume: 76 vph

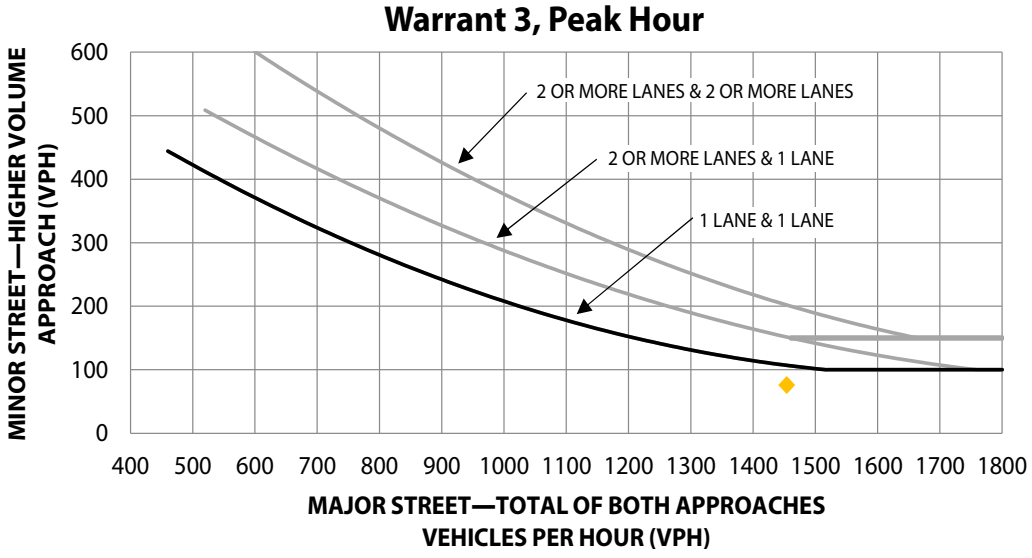
Condition A3 — Met

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

Total Entering Volume: 1530 vph

Condition B — Not Met

The plotted point falls above the curve



Appendix D

Queueing Calculations

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Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	199	238	183	176	123	199	361	346	157	142	304	407
Average Queue (ft)	97	150	113	61	58	147	135	101	12	37	120	244
95th Queue (ft)	194	216	170	147	108	223	292	230	83	113	251	376
Link Distance (ft)		838	838	838			3078	3078				768
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	1		1	2	16	1	6			0	10
Queuing Penalty (veh)	0	2		1	2	30	3	51			0	15

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	380	337	430	533	487	320
Average Queue (ft)	231	223	274	328	288	60
95th Queue (ft)	355	339	431	492	447	266
Link Distance (ft)	768		856	856	856	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		3	8		16	
Queuing Penalty (veh)		8	21		38	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	88	88	142	147	314	344	75	109	90
Average Queue (ft)	32	45	40	47	151	187	21	54	41
95th Queue (ft)	70	80	105	116	278	317	57	92	73
Link Distance (ft)			3078	3078	1114	1114		535	535
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)								0	
Queuing Penalty (veh)								0	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	69	54	75	71
Average Queue (ft)	32	9	19	40
95th Queue (ft)	60	35	55	63
Link Distance (ft)	535	535	1366	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	20	212	226	143	212	230	93	27
Average Queue (ft)	2	60	72	61	38	52	35	3
95th Queue (ft)	12	143	158	115	135	160	71	16
Link Distance (ft)		1114	1114		1162	1162	1673	430
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		1			0			
Queuing Penalty (veh)		0			0			

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	154	177	135	123	137	155	288	291	248	269	415	360
Average Queue (ft)	80	111	57	48	57	82	163	183	131	137	244	204
95th Queue (ft)	154	173	110	96	110	132	242	258	218	252	372	322
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)							0			0	18	14
Queuing Penalty (veh)							0			1	25	18

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	232	119	140	266	309
Average Queue (ft)	63	52	71	153	189
95th Queue (ft)	172	101	116	249	285
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

Network Summary

Network wide Queuing Penalty: 216

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	223	256	291	255	125	199	242	214	84	84	325	787
Average Queue (ft)	113	154	183	152	52	109	94	80	4	22	176	494
95th Queue (ft)	210	232	248	225	124	186	171	152	49	58	397	974
Link Distance (ft)		837	837	837			3047	3047				1591
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	2		12	0	7	0	4			0	45
Queuing Penalty (veh)	0	4		11	1	11	1	25			0	46

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	754	375	1846	1646	1295	161
Average Queue (ft)	488	370	1248	743	489	10
95th Queue (ft)	951	398	2226	1952	1272	97
Link Distance (ft)	1591		3214	3214	3214	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		53	58		5	
Queuing Penalty (veh)		250	275		11	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	84	73	192	161	133	163	82	87	63
Average Queue (ft)	36	23	97	73	48	76	28	41	27
95th Queue (ft)	71	60	178	147	111	146	66	75	53
Link Distance (ft)			3047	3047	1151	1151		544	544
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)			0						
Queuing Penalty (veh)			0						

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	77	6	66	61
Average Queue (ft)	39	0	17	26
95th Queue (ft)	68	5	48	51
Link Distance (ft)	544	544	1378	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	14	305	242	116	81	105	212	30
Average Queue (ft)	1	137	98	43	19	31	107	6
95th Queue (ft)	7	252	198	89	57	79	185	24
Link Distance (ft)		1151	1151		1162	1162	1673	606
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		5						
Queuing Penalty (veh)		0						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	137	251	367	348	83	98	131	143	91	175	314	288
Average Queue (ft)	52	101	235	220	36	54	70	75	28	50	201	170
95th Queue (ft)	109	178	328	317	70	91	116	126	66	132	291	265
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)		0	3							0	10	6
Queuing Penalty (veh)		0	5							0	5	16

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	242	351	398	412	235
Average Queue (ft)	135	222	239	129	131
95th Queue (ft)	227	344	364	321	216
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	5	2	3	0	
Queuing Penalty (veh)	11	5	9	2	

Network Summary

Network wide Queuing Penalty: 688

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	207	250	209	182	125	199	304	214	85	136	235	342
Average Queue (ft)	100	150	130	84	53	126	84	56	3	24	90	200
95th Queue (ft)	195	222	190	173	105	205	209	132	39	84	174	295
Link Distance (ft)		838	838	838			3078	3078				768
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	2		2	1	8	0	2			0	3
Queuing Penalty (veh)	0	2		3	1	11	0	11			0	4

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	327	310	359	421	384	279
Average Queue (ft)	183	194	233	272	237	24
95th Queue (ft)	299	292	334	385	350	158
Link Distance (ft)	768		856	856	856	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		0	2		8	
Queuing Penalty (veh)		1	6		21	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	107	96	126	117	232	266	75	110	76
Average Queue (ft)	44	47	31	33	102	134	22	50	36
95th Queue (ft)	84	85	89	90	198	236	60	87	64
Link Distance (ft)			3078	3078	1114	1114		535	535
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	88	41	61	75
Average Queue (ft)	40	6	15	37
95th Queue (ft)	70	27	47	62
Link Distance (ft)	535	535	1366	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	L	T	TR	L	T	TR	LTR
Maximum Queue (ft)	17	150	161	105	94	120	84
Average Queue (ft)	1	45	54	37	10	15	29
95th Queue (ft)	8	114	123	78	48	66	64
Link Distance (ft)		1114	1114		1162	1162	1673
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	170			225			
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	153	177	134	120	159	174	271	275	200	208	278	229
Average Queue (ft)	67	103	64	41	72	96	155	170	85	80	176	138
95th Queue (ft)	137	161	116	92	131	149	239	249	163	152	249	212
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)							0			0	4	2
Queuing Penalty (veh)							0			0	3	3

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	75	121	138	253	276
Average Queue (ft)	37	58	75	119	152
95th Queue (ft)	63	109	121	213	244
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Network Summary

Network wide Queuing Penalty: 67

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	231	262	242	204	125	172	195	179	120	94	322	534
Average Queue (ft)	121	162	153	104	37	71	86	76	7	16	130	335
95th Queue (ft)	214	233	215	193	94	140	147	138	62	59	317	563
Link Distance (ft)		838	838	838			3048	3048				767
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	3		5	0	1	0	3			0	27
Queuing Penalty (veh)	0	5		4	0	1	1	21			0	26

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	510	364	488	312	262	57
Average Queue (ft)	306	238	282	179	144	2
95th Queue (ft)	517	361	424	270	238	37
Link Distance (ft)	767		856	856	856	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		1	7		1	
Queuing Penalty (veh)		3	25		1	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	70	73	143	148	106	140	87	83	65
Average Queue (ft)	30	22	64	55	36	60	28	39	24
95th Queue (ft)	63	58	133	126	89	121	66	74	51
Link Distance (ft)			3048	3048	1151	1151		544	544
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	70	25	50	53
Average Queue (ft)	35	1	12	25
95th Queue (ft)	62	11	39	49
Link Distance (ft)	544	544	1378	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	36	179	170	103	87	105	151	33
Average Queue (ft)	6	64	51	36	13	22	72	7
95th Queue (ft)	23	148	122	80	52	70	131	27
Link Distance (ft)		1151	1151		1162	1162	1673	606
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	129	174	329	317	102	126	158	186	90	203	344	348
Average Queue (ft)	44	94	204	187	47	69	75	82	26	44	199	171
95th Queue (ft)	102	149	286	278	87	108	131	143	62	119	291	281
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)			1							0	9	6
Queuing Penalty (veh)			2							0	4	18

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	249	219	235	182	213
Average Queue (ft)	132	114	123	85	109
95th Queue (ft)	230	192	202	157	184
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	5				
Queuing Penalty (veh)	12				

Network Summary

Network wide Queuing Penalty: 124

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	194	226	185	163	119	199	412	394	173	136	324	414
Average Queue (ft)	92	143	112	55	54	152	152	119	22	34	118	247
95th Queue (ft)	187	206	169	135	101	229	332	282	115	105	248	372
Link Distance (ft)		838	838	838			3078	3078				768
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	1		1	1	19	1	7			0	10
Queuing Penalty (veh)	0	1		1	2	37	4	63			0	16

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	376	334	472	559	541	320
Average Queue (ft)	232	231	283	335	302	59
95th Queue (ft)	358	344	451	499	475	259
Link Distance (ft)	768		856	856	856	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		3	9		17	
Queuing Penalty (veh)		9	25		40	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	77	105	140	142	380	414	94	121	106
Average Queue (ft)	32	53	43	48	187	222	33	66	54
95th Queue (ft)	67	91	111	117	331	365	75	105	91
Link Distance (ft)			3078	3078	1114	1114		535	535
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)								0	
Queuing Penalty (veh)								0	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	68	64	95	73
Average Queue (ft)	33	13	36	38
95th Queue (ft)	60	45	79	62
Link Distance (ft)	535	535	1366	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	23	217	215	152	172	201	94	27
Average Queue (ft)	2	67	76	63	36	50	37	3
95th Queue (ft)	12	158	167	122	122	148	74	16
Link Distance (ft)		1114	1114		1162	1162	1673	430
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		1		0	0			
Queuing Penalty (veh)		0		0	0			

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	190	211	133	136	132	159	260	281	249	267	417	366
Average Queue (ft)	92	124	58	50	55	82	161	182	131	146	242	205
95th Queue (ft)	173	193	110	103	105	131	240	258	225	267	364	319
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)							0			1	17	14
Queuing Penalty (veh)							0			2	25	18

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	250	120	138	284	311
Average Queue (ft)	69	58	77	159	192
95th Queue (ft)	187	104	123	260	291
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)				1	
Queuing Penalty (veh)				1	

Network Summary

Network wide Queuing Penalty: 245

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	189	227	189	176	119	200	379	496	157	155	308	393
Average Queue (ft)	94	143	118	66	58	157	148	117	16	48	130	230
95th Queue (ft)	190	210	177	155	106	227	317	325	98	136	248	341
Link Distance (ft)		838	838	838			3068	3068				756
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	1		1	1	21	2	6			0	6
Queuing Penalty (veh)	0	2		2	1	41	5	54			0	9

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	365	375	675	540	465	288
Average Queue (ft)	214	287	392	327	282	41
95th Queue (ft)	334	421	694	589	517	214
Link Distance (ft)	756		856	856	856	
Upstream Blk Time (%)			4	3	0	
Queuing Penalty (veh)			0	0	0	
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		19	32		11	
Queuing Penalty (veh)		53	90		26	

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	188	201	127	125	154	165	272	289	252	269	356	319
Average Queue (ft)	76	113	58	51	57	85	173	193	134	125	213	173
95th Queue (ft)	159	178	106	99	118	143	252	269	229	230	309	267
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)							0			1	9	5
Queuing Penalty (veh)							0			2	12	7

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	181	126	148	284	316
Average Queue (ft)	50	57	79	153	191
95th Queue (ft)	127	108	126	245	291
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Zone Summary

Zone wide Queuing Penalty: 306

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	230	272	286	260	125	190	242	529	120	82	324	744
Average Queue (ft)	116	162	193	157	50	110	102	100	8	27	185	511
95th Queue (ft)	219	239	262	240	118	186	192	403	68	66	407	894
Link Distance (ft)		837	837	837			3047	3047				1591
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	4		12	0	8	1	5			0	50
Queuing Penalty (veh)	0	6		11	1	12	1	38			0	51

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	744	375	3134	3096	2957	223
Average Queue (ft)	503	373	2093	1785	966	16
95th Queue (ft)	873	378	3451	3564	2413	130
Link Distance (ft)	1591		3214	3214	3214	
Upstream Blk Time (%)			6	1	0	
Queuing Penalty (veh)			0	0	0	
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		58	63		5	
Queuing Penalty (veh)		287	314		12	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	99	122	197	178	160	197	100	104	82
Average Queue (ft)	38	58	112	87	76	109	39	52	37
95th Queue (ft)	80	101	182	158	141	178	81	88	65
Link Distance (ft)			3047	3047	1151	1151		544	544
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)			0						
Queuing Penalty (veh)			0						

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	82	74	69	55
Average Queue (ft)	40	11	26	26
95th Queue (ft)	72	47	61	48
Link Distance (ft)	544	544	1378	769
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	18	342	288	128	87	111	215	30
Average Queue (ft)	1	149	107	46	21	34	101	6
95th Queue (ft)	10	276	219	101	65	88	176	25
Link Distance (ft)		1151	1151		1162	1162	1673	606
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		7						
Queuing Penalty (veh)		0						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	147	234	362	354	90	111	138	128	94	263	370	367
Average Queue (ft)	61	111	234	221	33	55	69	73	30	57	209	179
95th Queue (ft)	127	182	333	320	70	95	119	120	69	160	316	309
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)		0	4							0	12	9
Queuing Penalty (veh)		0	7							0	6	25

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	247	335	361	300	245
Average Queue (ft)	142	210	229	110	132
95th Queue (ft)	245	315	337	230	210
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	6	1	2	0	
Queuing Penalty (veh)	15	2	4	1	

Network Summary

Network wide Queuing Penalty: 793

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	222	274	203	187	124	174	1267	1429	125	148	275	833
Average Queue (ft)	133	172	120	74	65	139	516	835	108	50	178	453
95th Queue (ft)	217	241	180	161	118	206	1455	1879	178	114	339	908
Link Distance (ft)		837	837	837			3053	3053				1526
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	4		1	3	13	8	8	5		0	32
Queuing Penalty (veh)	0	6		2	3	28	22	80	11		0	58

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	780	312	438	439	471	245
Average Queue (ft)	442	220	253	266	301	138
95th Queue (ft)	868	331	426	394	443	337
Link Distance (ft)	1526		3238	3238	3238	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		3	7		17	0
Queuing Penalty (veh)		9	19		43	1

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	88	92	124	127	466	490	69	117	95
Average Queue (ft)	36	44	33	40	233	264	19	54	44
95th Queue (ft)	73	80	89	100	415	440	54	93	76
Link Distance (ft)			3053	3053	1131	1131		541	541
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	72	65	88	65
Average Queue (ft)	37	14	23	38
95th Queue (ft)	64	48	61	59
Link Distance (ft)	541	541	1366	768
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	67	210	234	179	249	283	66	41
Average Queue (ft)	8	75	89	73	65	85	28	14
95th Queue (ft)	40	164	183	134	187	217	56	39
Link Distance (ft)		1131	1131		1162	1162	1673	557
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		1		0	0			
Queuing Penalty (veh)		0		0	1			

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	250	268	255	215	155	314	418	415	377	233	403	372
Average Queue (ft)	156	177	87	74	77	134	269	295	251	20	280	240
95th Queue (ft)	264	274	263	214	137	273	385	394	363	101	413	380
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)	1	5				0	5				29	20
Queuing Penalty (veh)	1	5				0	12				3	25

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	205	98	114	214	230
Average Queue (ft)	98	44	62	88	115
95th Queue (ft)	227	86	103	177	204
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	0			0	
Queuing Penalty (veh)	0			0	

Network Summary

Network wide Queuing Penalty: 331

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	245	363	324	295	125	196	300	312	156	87	325	1560
Average Queue (ft)	170	212	214	180	70	126	138	116	18	34	258	1270
95th Queue (ft)	256	317	290	264	147	206	281	255	104	75	453	1822
Link Distance (ft)		837	837	837			3077	3077				1524
Upstream Blk Time (%)												41
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	3	16		20	0	16	2	8			0	77
Queuing Penalty (veh)	5	30		22	1	30	4	57			0	100

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	1563	375	3171	3142	3078	320
Average Queue (ft)	1249	373	2604	2482	1780	38
95th Queue (ft)	1818	380	3684	3856	3491	209
Link Distance (ft)	1524		3206	3206	3206	
Upstream Blk Time (%)	38		29	12	7	
Queuing Penalty (veh)	0		0	0	0	
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		58	63		11	
Queuing Penalty (veh)		295	322		23	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	95	70	191	166	164	210	71	95	74
Average Queue (ft)	41	26	98	77	68	97	26	38	31
95th Queue (ft)	77	63	177	152	140	180	61	74	56
Link Distance (ft)			3077	3077	1125	1125		517	517
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)			0						
Queuing Penalty (veh)			0						

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	84	21	53	31	61
Average Queue (ft)	40	1	15	6	29
95th Queue (ft)	73	11	43	24	50
Link Distance (ft)	517	517	1378		774
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				110	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	56	277	211	115	72	102	240	52
Average Queue (ft)	7	137	93	43	18	25	106	17
95th Queue (ft)	34	243	181	90	52	72	188	45
Link Distance (ft)		1125	1125		1162	1162	1673	568
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		5						
Queuing Penalty (veh)		1						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	158	380	814	784	111	123	74	96	73	128	248	288
Average Queue (ft)	71	227	465	446	42	62	27	36	23	36	158	133
95th Queue (ft)	136	450	799	762	83	103	60	77	55	87	234	232
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)		0	36							0	2	1
Queuing Penalty (veh)		0	73							0	1	3

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	241	345	391	374	231
Average Queue (ft)	135	225	241	114	125
95th Queue (ft)	223	336	357	276	201
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	6	1	3	0	
Queuing Penalty (veh)	12	4	7	1	

Network Summary

Network wide Queuing Penalty: 990

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	218	256	203	177	125	175	2309	2412	125	144	275	1008
Average Queue (ft)	132	171	121	70	65	147	1230	1545	121	52	216	646
95th Queue (ft)	219	235	184	160	115	208	2631	2769	157	114	363	1229
Link Distance (ft)		837	837	837			3053	3053				1526
Upstream Blk Time (%)							0	0				1
Queuing Penalty (veh)							0	3				0
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	0	4		1	2	16	10	9	7	0	0	48
Queuing Penalty (veh)	0	6		3	3	35	28	95	15	0	0	86

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	975	317	431	481	508	245
Average Queue (ft)	627	219	240	294	326	152
95th Queue (ft)	1192	319	375	446	487	346
Link Distance (ft)	1526		3238	3238	3238	
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		1	4		22	0
Queuing Penalty (veh)		3	10		54	1

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	93	114	136	144	841	863	101	133	132
Average Queue (ft)	37	56	45	52	493	524	31	71	65
95th Queue (ft)	76	102	113	122	905	919	72	112	107
Link Distance (ft)			3053	3053	1131	1131		541	541
Upstream Blk Time (%)					1	1			
Queuing Penalty (veh)					5	5			
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)								0	
Queuing Penalty (veh)								0	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	91	75	113	73
Average Queue (ft)	38	15	41	38
95th Queue (ft)	71	54	91	61
Link Distance (ft)	541	541	1366	768
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	29	182	206	219	381	484	73	45
Average Queue (ft)	7	68	81	80	94	116	27	13
95th Queue (ft)	26	145	163	168	362	412	57	38
Link Distance (ft)		1131	1131		1162	1162	1673	557
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						0		
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		0		0	2			
Queuing Penalty (veh)		0		0	5			

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	267	277	226	200	151	314	443	440	427	216	485	452
Average Queue (ft)	167	189	86	77	79	147	278	304	265	25	312	273
95th Queue (ft)	271	282	259	211	138	298	401	414	391	117	463	433
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)	2	5	0			0	6	0	0	0	38	29
Queuing Penalty (veh)	2	6	0			0	14	0	0	0	4	38

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	205	122	150	223	251
Average Queue (ft)	111	51	73	99	130
95th Queue (ft)	246	100	122	192	225
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Network Summary

Network wide Queuing Penalty: 422

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	261	281	279	210	163	314	417	402	376	196	529	503
Average Queue (ft)	153	177	81	66	73	120	256	283	246	27	372	336
95th Queue (ft)	260	272	227	170	131	239	362	378	353	133	568	541
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)											4	3
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)	0	4	0			0	3				52	46
Queuing Penalty (veh)	0	4	0			0	8				5	59

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	205	103	123	200	243
Average Queue (ft)	135	45	66	92	122
95th Queue (ft)	267	89	109	171	208
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	0			0	
Queuing Penalty (veh)	1			0	

Zone Summary

Zone wide Queuing Penalty: 78

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	249	372	319	292	125	200	412	507	175	96	325	1570
Average Queue (ft)	179	219	218	186	72	159	198	165	25	34	256	1296
95th Queue (ft)	266	323	292	268	146	234	399	402	126	75	452	1849
Link Distance (ft)		837	837	837			3077	3077				1524
Upstream Blk Time (%)												44
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200				100	150			100	250	250	
Storage Blk Time (%)	4	19		20	1	40	3	10			0	76
Queuing Penalty (veh)	8	36		23	2	73	5	79			0	99

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	TR	L	L	T	T	R
Maximum Queue (ft)	1561	375	3252	3246	3235	286
Average Queue (ft)	1278	374	2852	2757	2272	20
95th Queue (ft)	1841	377	3785	3965	4005	148
Link Distance (ft)	1524		3206	3206	3206	
Upstream Blk Time (%)	41		47	27	15	
Queuing Penalty (veh)	0		0	0	0	
Storage Bay Dist (ft)		300				220
Storage Blk Time (%)		57	63		9	
Queuing Penalty (veh)		307	338		18	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	95	122	188	163	212	237	95	112	87
Average Queue (ft)	38	56	108	85	98	132	33	49	38
95th Queue (ft)	76	101	177	149	180	218	74	89	66
Link Distance (ft)			3077	3077	1125	1125		517	517
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)			0						
Queuing Penalty (veh)			0						

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	89	67	76	28	56
Average Queue (ft)	42	13	27	6	28
95th Queue (ft)	75	48	62	25	51
Link Distance (ft)	517	517	1378		774
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				110	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	111	288	214	130	101	107	225	57
Average Queue (ft)	12	141	94	49	23	32	106	17
95th Queue (ft)	64	253	184	104	69	82	188	45
Link Distance (ft)		1125	1125		1162	1162	1673	568
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		6						
Queuing Penalty (veh)		1						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	TR	R	L	T	T
Maximum Queue (ft)	168	380	658	627	105	115	84	91	72	148	290	311
Average Queue (ft)	85	234	412	392	40	61	30	39	24	37	166	141
95th Queue (ft)	156	443	657	623	83	101	64	76	54	95	242	254
Link Distance (ft)			1271	1271			3694	3694			554	554
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)		0	31								3	1
Queuing Penalty (veh)		0	68								1	3

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	248	329	354	261	227
Average Queue (ft)	137	211	224	95	123
95th Queue (ft)	232	310	323	198	204
Link Distance (ft)				1162	1162
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	8	1	1	0	
Queuing Penalty (veh)	15	1	3	1	

Network Summary

Network wide Queuing Penalty: 1083

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	211	232	258	262	125	143	174	225	249	125	140	259
Average Queue (ft)	113	139	155	144	88	66	99	140	165	94	42	99
95th Queue (ft)	180	199	221	225	150	121	179	218	266	181	109	204
Link Distance (ft)		1819	1819	1819				216	216			
Upstream Blk Time (%)								1	2			
Queuing Penalty (veh)								9	21			
Storage Bay Dist (ft)	200				100	150	150			100	250	250
Storage Blk Time (%)	0	1		15	2	0	0	6	7	3		
Queuing Penalty (veh)	0	1		28	4	0	1	17	76	6		

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	TR	L	L	L	T	T	R
Maximum Queue (ft)	342	348	248	262	284	437	475	245
Average Queue (ft)	193	201	170	178	186	266	295	136
95th Queue (ft)	301	316	239	249	257	395	444	335
Link Distance (ft)	1482	1482			3206	3206	3206	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300	300				220
Storage Blk Time (%)	3		0	0	0		17	0
Queuing Penalty (veh)	5		0	0	0		43	1

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	232	244	381	163	820	849	155	228	239
Average Queue (ft)	166	179	81	54	548	579	35	124	133
95th Queue (ft)	255	259	268	137	935	950	96	197	205
Link Distance (ft)			2787	2787	1132	1132		551	551
Upstream Blk Time (%)					1	1			
Queuing Penalty (veh)					6	9			
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)	1	4					0	2	
Queuing Penalty (veh)	2	11					0	1	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	EB	WB	WB	SB
Directions Served	L	T	T	T	TR	R
Maximum Queue (ft)	90	108	122	91	104	84
Average Queue (ft)	41	22	36	40	41	40
95th Queue (ft)	71	72	94	76	85	65
Link Distance (ft)		551	551	3497	3497	775
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100					
Storage Blk Time (%)	0	0				0
Queuing Penalty (veh)	1	0				0

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	B261	B261	B261	NB	SB
Directions Served	L	T	TR	L	T	TR	T	T		LTR	LTR
Maximum Queue (ft)	70	192	217	221	325	333	630	639	517	83	62
Average Queue (ft)	17	68	85	104	93	113	107	126	34	35	21
95th Queue (ft)	49	148	167	193	266	289	484	530	271	68	49
Link Distance (ft)		1132	1132		516	516	602	602	602	1684	788
Upstream Blk Time (%)					0	0	0	1	0		
Queuing Penalty (veh)					1	1	2	4	1		
Storage Bay Dist (ft)	170			225							
Storage Blk Time (%)		1		0	2						
Queuing Penalty (veh)		0		1	4						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	R	L	T	T
Maximum Queue (ft)	280	290	436	401	169	314	396	602	95	235	501	502
Average Queue (ft)	180	201	213	193	78	134	228	233	6	157	247	252
95th Queue (ft)	303	312	429	383	143	259	348	491	41	256	449	481
Link Distance (ft)			1271	1271			2665	2665			554	554
Upstream Blk Time (%)								0			1	4
Queuing Penalty (veh)								0			0	0
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)	2	10	0			0	3			2	14	12
Queuing Penalty (veh)	6	29	1			0	7			6	29	57

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	205	117	127	246	300
Average Queue (ft)	172	50	60	145	186
95th Queue (ft)	246	95	102	227	275
Link Distance (ft)				602	602
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	15			0	
Queuing Penalty (veh)	38			0	

Intersection: 6: Lane Drop E of Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	WB	WB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	147	137	99	336	517
Average Queue (ft)	16	46	35	38	199
95th Queue (ft)	79	106	83	207	487
Link Distance (ft)	216	216	216	2787	2787
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 429

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	250	670	524	496	125	139	200	249	270	175	147	325
Average Queue (ft)	225	433	335	250	69	60	119	198	207	133	30	207
95th Queue (ft)	288	834	740	561	144	117	227	268	288	255	89	419
Link Distance (ft)		832	832	832				226	226			
Upstream Blk Time (%)		15	10	0				7	8			
Queuing Penalty (veh)		0	0	0				64	74			
Storage Bay Dist (ft)	200				100	150	150			100	250	250
Storage Blk Time (%)	35	59		20	0	0	0	22	33			0
Queuing Penalty (veh)	67	113		22	1	0	1	49	305			0

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	TR	L	L	L	T	T	R
Maximum Queue (ft)	705	691	266	332	472	503	333	135
Average Queue (ft)	496	481	158	203	240	235	201	7
95th Queue (ft)	833	809	240	298	363	376	294	77
Link Distance (ft)	758	758			854	854	854	
Upstream Blk Time (%)	10	10			0	0		
Queuing Penalty (veh)	0	0			0	0		
Storage Bay Dist (ft)			300	300				220
Storage Blk Time (%)	51		0	0	1		3	
Queuing Penalty (veh)	66		0	0	8		7	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	182	270	508	729	341	374	208	294	302
Average Queue (ft)	86	142	225	208	187	218	62	156	168
95th Queue (ft)	150	270	456	531	296	328	144	249	266
Link Distance (ft)			2815	2815	1103	1103		524	524
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)	0	0	7				0	6	
Queuing Penalty (veh)	0	0	30				0	4	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	87	68	81	132	142	41	66
Average Queue (ft)	42	6	16	57	65	10	31
95th Queue (ft)	74	32	58	107	118	35	58
Link Distance (ft)		524	524	3509	3509		778
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	100					110	
Storage Blk Time (%)	0	0					
Queuing Penalty (veh)	0	0					

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	165	746	710	154	120	138	278	73
Average Queue (ft)	16	279	226	66	31	49	146	24
95th Queue (ft)	84	674	610	122	85	109	247	61
Link Distance (ft)		1103	1103		518	518	1686	818
Upstream Blk Time (%)		0	0					
Queuing Penalty (veh)		3	2					
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		21						
Queuing Penalty (veh)		2						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	L	T	T	R
Maximum Queue (ft)	147	380	1309	1294	340	390	1284	1206	149	528	596	250
Average Queue (ft)	74	333	1064	1037	318	358	715	624	39	276	437	236
95th Queue (ft)	122	507	1543	1528	390	453	1749	1657	108	524	736	292
Link Distance (ft)			1271	1271			2665	2665		554	554	
Upstream Blk Time (%)			35	28			3	1		0	38	
Queuing Penalty (veh)			0	0			0	0		0	0	
Storage Bay Dist (ft)	280	280			290	290			210			180
Storage Blk Time (%)		0	72		41	54		0	0	5	2	74
Queuing Penalty (veh)		0	144		94	125		0	0	2	9	135

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	SB	SB	SB	SB	B241	B241
Directions Served	L	L	T	TR	T	T
Maximum Queue (ft)	362	425	706	545	536	520
Average Queue (ft)	350	407	567	231	256	72
95th Queue (ft)	405	482	902	446	634	342
Link Distance (ft)			602	602	518	518
Upstream Blk Time (%)			37	0	7	0
Queuing Penalty (veh)			276	0	49	2
Storage Bay Dist (ft)	300	300				
Storage Blk Time (%)	43	57	7			
Queuing Penalty (veh)	112	148	56			

Intersection: 6: Lane Drop E of Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	WB	WB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	135	139	107	449	694
Average Queue (ft)	20	60	43	66	134
95th Queue (ft)	90	122	93	298	465
Link Distance (ft)	226	226	226	2815	2815
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 1972

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	204	233	268	274	125	151	174	223	245	125	140	262
Average Queue (ft)	111	139	163	152	91	72	107	145	169	93	43	103
95th Queue (ft)	187	202	239	242	154	128	189	230	270	181	110	206
Link Distance (ft)		1819	1819	1819				216	216			
Upstream Blk Time (%)								2	2			
Queuing Penalty (veh)								15	21			
Storage Bay Dist (ft)	200				100	150	150			100	250	250
Storage Blk Time (%)	0	1		17	3	0	0	7	6	3		0
Queuing Penalty (veh)	1	2		31	6	0	1	22	68	7		0

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	TR	L	L	L	T	T	R
Maximum Queue (ft)	365	357	251	264	298	474	501	245
Average Queue (ft)	201	211	167	177	183	282	313	143
95th Queue (ft)	314	327	231	242	259	438	478	341
Link Distance (ft)	1482	1482			3206	3206	3206	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			300	300				220
Storage Blk Time (%)	3		0	0	0		19	0
Queuing Penalty (veh)	6		0	0	0		48	1

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	232	244	441	773	1129	1126	193	269	267
Average Queue (ft)	171	183	103	80	838	862	66	153	158
95th Queue (ft)	261	266	326	468	1232	1240	166	237	238
Link Distance (ft)			2787	2787	1132	1132		551	551
Upstream Blk Time (%)				0	3	4			
Queuing Penalty (veh)				0	24	27			
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)	1	6	0				0	6	
Queuing Penalty (veh)	4	18	1				0	3	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	EB	WB	WB	SB
Directions Served	L	T	T	T	TR	R
Maximum Queue (ft)	99	113	126	105	106	73
Average Queue (ft)	43	26	42	47	47	38
95th Queue (ft)	78	82	104	86	90	63
Link Distance (ft)		551	551	3497	3497	775
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100					
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	1	0				

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	B261	B261	B261	NB	SB
Directions Served	L	T	TR	L	T	TR	T	T		LTR	LTR
Maximum Queue (ft)	48	184	206	230	334	352	591	624	432	85	58
Average Queue (ft)	14	66	79	109	120	136	124	152	38	32	20
95th Queue (ft)	39	140	155	208	365	376	513	577	283	66	48
Link Distance (ft)		1132	1132		516	516	602	602	602	1684	788
Upstream Blk Time (%)					3	4	0	1	0		
Queuing Penalty (veh)					25	31	1	4	1		
Storage Bay Dist (ft)	170			225							
Storage Blk Time (%)		0		0	5						
Queuing Penalty (veh)		0		1	12						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	R	L	T	T
Maximum Queue (ft)	277	292	453	419	161	305	382	352	76	235	483	518
Average Queue (ft)	189	211	223	200	75	127	234	231	5	170	270	273
95th Queue (ft)	311	323	441	399	140	239	335	329	40	273	468	514
Link Distance (ft)			1271	1271			2665	2665			554	554
Upstream Blk Time (%)											1	3
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	280	280			290	290			525	210		
Storage Blk Time (%)	2	10	1			0	3			4	19	14
Queuing Penalty (veh)	5	30	2			0	6			9	38	68

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	205	117	146	263	321
Average Queue (ft)	177	51	62	148	186
95th Queue (ft)	243	96	114	235	280
Link Distance (ft)				602	602
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	16			0	
Queuing Penalty (veh)	40			0	

Intersection: 6: Lane Drop E of Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	WB	WB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	151	130	98	402	636
Average Queue (ft)	14	39	30	60	266
95th Queue (ft)	75	97	78	295	607
Link Distance (ft)	216	216	216	2787	2787
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 581

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	250	772	735	589	125	137	200	247	277	175	120	325
Average Queue (ft)	235	521	338	252	65	62	123	199	205	135	31	204
95th Queue (ft)	283	921	736	556	140	121	226	269	292	254	87	412
Link Distance (ft)		832	832	832				226	226			
Upstream Blk Time (%)		13	8	0				8	9			
Queuing Penalty (veh)		0	0	0				75	80			
Storage Bay Dist (ft)	200				100	150	150			100	250	250
Storage Blk Time (%)	47	71		19	0	0	0	23	32			0
Queuing Penalty (veh)	90	135		21	1	0	1	54	308			0

Intersection: 1: Santa Rita Rd & Valley Ave

Movement	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	TR	L	L	L	T	T	R
Maximum Queue (ft)	717	697	295	344	505	409	345	159
Average Queue (ft)	494	481	185	221	261	224	197	9
95th Queue (ft)	830	815	275	317	423	344	303	91
Link Distance (ft)	758	758			854	854	854	
Upstream Blk Time (%)	14	14			0	0		
Queuing Penalty (veh)	0	0			0	0		
Storage Bay Dist (ft)			300	300				220
Storage Blk Time (%)	50		0	0	2		4	
Queuing Penalty (veh)	65		1	1	16		8	

Intersection: 2: Valley Ave & Busch Rd

Movement	EB	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	TR	L	LR	R
Maximum Queue (ft)	203	270	918	993	375	390	219	333	341
Average Queue (ft)	108	176	332	306	213	244	74	173	188
95th Queue (ft)	174	298	840	881	328	353	165	283	295
Link Distance (ft)			2815	2815	1103	1103		524	524
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)	220	220					170		
Storage Blk Time (%)	0	0	15				0	10	
Queuing Penalty (veh)	1	1	79				0	7	

Intersection: 3: Busch Rd & Ironwood Dr

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	93	80	101	148	146	35	64
Average Queue (ft)	45	13	23	62	70	8	31
95th Queue (ft)	80	50	74	119	128	30	56
Link Distance (ft)		524	524	3509	3509		778
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	100					110	
Storage Blk Time (%)	0	0					
Queuing Penalty (veh)	1	0					

Intersection: 4: Boulder St & Valley Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	110	880	838	162	115	139	301	73
Average Queue (ft)	15	412	363	72	33	55	148	25
95th Queue (ft)	71	1055	1021	131	87	117	258	59
Link Distance (ft)		1103	1103		518	518	1686	818
Upstream Blk Time (%)		4	2					
Queuing Penalty (veh)		25	17					
Storage Bay Dist (ft)	170			225				
Storage Blk Time (%)		29						
Queuing Penalty (veh)		3						

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	L	T	T	R
Maximum Queue (ft)	161	380	1309	1303	340	390	874	760	111	508	594	250
Average Queue (ft)	85	347	1051	1019	298	333	435	364	36	287	455	237
95th Queue (ft)	136	495	1479	1455	392	448	1067	949	85	548	742	292
Link Distance (ft)			1271	1271			2665	2665		554	554	
Upstream Blk Time (%)			25	18						0	45	
Queuing Penalty (veh)			0	0						0	0	
Storage Bay Dist (ft)	280	280			290	290			210			180
Storage Blk Time (%)			74		30	41	0	0		4	2	76
Queuing Penalty (veh)			162		69	95	0	0		2	9	141

Intersection: 5: Bernal Ave/Valley Ave & Stanley Blvd

Movement	SB	SB	SB	SB	B241	B241
Directions Served	L	L	T	TR	T	T
Maximum Queue (ft)	362	425	700	546	482	459
Average Queue (ft)	356	415	596	221	317	100
95th Queue (ft)	389	467	869	411	704	423
Link Distance (ft)			602	602	518	518
Upstream Blk Time (%)			42	0	12	1
Queuing Penalty (veh)			322	0	90	6
Storage Bay Dist (ft)	300	300				
Storage Blk Time (%)	45	59	7			
Queuing Penalty (veh)	116	155	61			

Intersection: 6: Lane Drop E of Santa Rita Rd & Valley Ave

Movement	EB	EB	EB	WB	WB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	163	169	129	567	731
Average Queue (ft)	34	74	58	90	170
95th Queue (ft)	121	138	112	366	542
Link Distance (ft)	226	226	226	2815	2815
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2216

Traffic Operations Study for the Arroyo Lago Residential Project

Prepared for the County of Alameda

Submitted by
W-Trans

November 28, 2023

TRAFFIC ENGINEERING
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Table of Contents

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Executive Summary

The proposed project includes 194 single-family residential units of which 49 would have accessory dwelling units (ADUs) to be located on the north side of Busch Road in the County of Alameda. It is noted that the entire off-site study area including Busch Road along the project frontage is within the City of Pleasanton. The project would be expected to generate an average of 2,159 trips per day, including 156 morning peak hour trips and 207 evening peak hour trips.

The addition of project traffic would result in an adverse effect on operations at the intersection of Santa Rita Road/Valley Avenue under Baseline conditions during the p.m. peak hour, as well as at the intersection of Stanley Boulevard/Valley-Bernal Avenue under Future conditions during the p.m. peak hour. It is recommended that the project applicant contribute to Transportation Development Fees that would be used to address unacceptable operations at these intersections.

The proposed parking supply for the project would comply with both City of Pleasanton and County of Alameda requirements, as each single-family home would include two parking spaces and no parking requirements apply to the ADUs.

Introduction

This report presents an analysis of the potential traffic operational effects that would be associated with development of a proposed residential development to be located on Busch Road in the County of Alameda. The traffic study was completed in accordance with the criteria established by the City of Pleasanton and the County of Alameda, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic operations study is to provide City and County staff and policy makers with data that they can use to make an informed decision regarding the project's adherence to City and County 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 use 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 proposed Arroyo Lago Residential Project includes 194 single-family residential units of which 49 would have accessory dwelling units (ADUs). The project site is located on Busch Road in the County of Alameda as shown in Figure 1. The entire off-site study area including Busch Road along the project frontage is within the City of Pleasanton.

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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 1 – Study Area and Existing Lane Configurations

W-Trans

Transportation Setting

Operational Analysis

Study Area and Periods

For the operational analysis, the study area consists of the following intersections:

1. Santa Rita Road/Valley Avenue
2. Valley Avenue/Busch Road
3. Busch Road/Ironwood Drive
4. Valley Avenue/Boulder Street
5. Stanley Boulevard/Valley Avenue-Bernal Avenue

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. Counts were obtained for the study intersections in both 2019 and 2023 during February, March, and April during the a.m. and p.m. peak periods.

Study Intersections

Santa Rita Road/Valley Avenue is a four-legged signalized intersection with protected left-turn phasing on all four approaches. There are crosswalks with pedestrian phasing on all legs, and there is a Class II bike lane on Santa Rita Road in the southbound direction. Northbound, southbound, and westbound right-turn lanes are channelized, and pedestrian refuge islands are located at the northeast, northwest, and southeast corners of the intersection.

Valley Avenue/Busch Road is a signalized tee intersection with protected left-turn phasing on the eastbound Valley Avenue approach. One crosswalk with pedestrian phasing exists on the north leg of the intersection as well as Class II bike lanes on all approaches to the intersection.

Busch Road/Ironwood Drive is a three-legged signalized intersection. There is one crosswalk with pedestrian phasing on the north leg of the intersection, and Class II bike lanes are striped on all approaches.

Valley Avenue/Boulder Street is a four-legged signalized intersection with protected left-turn phasing with protected left-turn phasing on Valley Avenue and a shared green phase for the Boulder Street approaches. "Triple-four" crosswalks exist on the south and west legs of the intersection. A standard stripped crosswalk exists on the north leg. Where crosswalks exist, there are pedestrian phases.

Stanley Boulevard/Valley Avenue-Bernal Avenue is a signalized intersection with four legs and protected left-turn phasing on all approaches. Class II bicycle lanes are available on all but the westbound approach. There are crosswalks with pedestrian phasing available on the west and south legs, and bicycle crossings are striped parallel to the crosswalks.

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

Capacity Analysis

Intersection Level of Service Methodologies

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

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM) *Sixth Edition*, Transportation Research Board, 2018. 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 study intersections that are currently controlled by a traffic signal were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether 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 Pleasanton. Minor adjustments were made to signal timing under Future conditions to account for changes in demand patterns that would be typically addressed by periodic retiming.

The ranges of delay associated with the various levels of service are indicated in Table 1.

Table 1 – Signalized Intersection Level of Service Criteria	
LOS A	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
LOS B	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
LOS C	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
LOS D	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
LOS E	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
LOS F	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, 2018

Traffic Operation Standards

The County of Alameda's adopted standard for Level of Service for the East County Area is contained in the *East County Area Plan*, 2000. The plan establishes a standard of LOS D on major arterial segments within unincorporated areas but not does not specify criteria for intersections. For this reason, and because all five study intersections are under the City of Pleasanton's jurisdiction, adequacy of operation was therefore evaluated using the City of Pleasanton's standards.

The City of Pleasanton's adopted LOS standard is contained in Policy 2 of the *Pleasanton General Plan 2005-2025*, City of Pleasanton, 2009. The City maintains a minimum acceptable LOS D at major intersections outside of the boundaries of the Downtown Specific Plan and apart from "gateway intersections" specified in the General Plan. The standard of LOS D would apply to four of the five study intersections while the intersection of Santa Rita Road/Valley Avenue is conditionally exempt from the City's standard. Developers would not be required to improve the intersection of Santa Rita Road/Valley Avenue to address an adverse effect on operations, but they would still be expected to contribute towards Transportation Development Fees.

Based on the City's Policy, the following criteria were applied in order to determine if the project would have an adverse effect on operation of the surrounding roadway network.

- Project traffic would cause LOS at a study intersection to degrade from LOS D or better to LOS E or F. This applies to the overall operation of signalized intersections.
- Project traffic would exacerbate the no-project LOS at a study intersection already operating at LOS E or F by adding ten or more peak hour trips. This criterion is consistent with that used in the *East Pleasanton Specific Plan* (EPSP) *Transportation Impact Analysis*, Fehr & Peers, 2015, and in the *Lund Ranch II Transportation Assessment*, Fehr & Peers, 2013.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected in both 2019 and 2023 during February, March, and April while local schools were in session, and existing operations for 2019 and 2023 were analyzed separately to reflect conditions before and after the changes to travel patterns caused by the COVID-19 pandemic.

Intersection Levels of Service

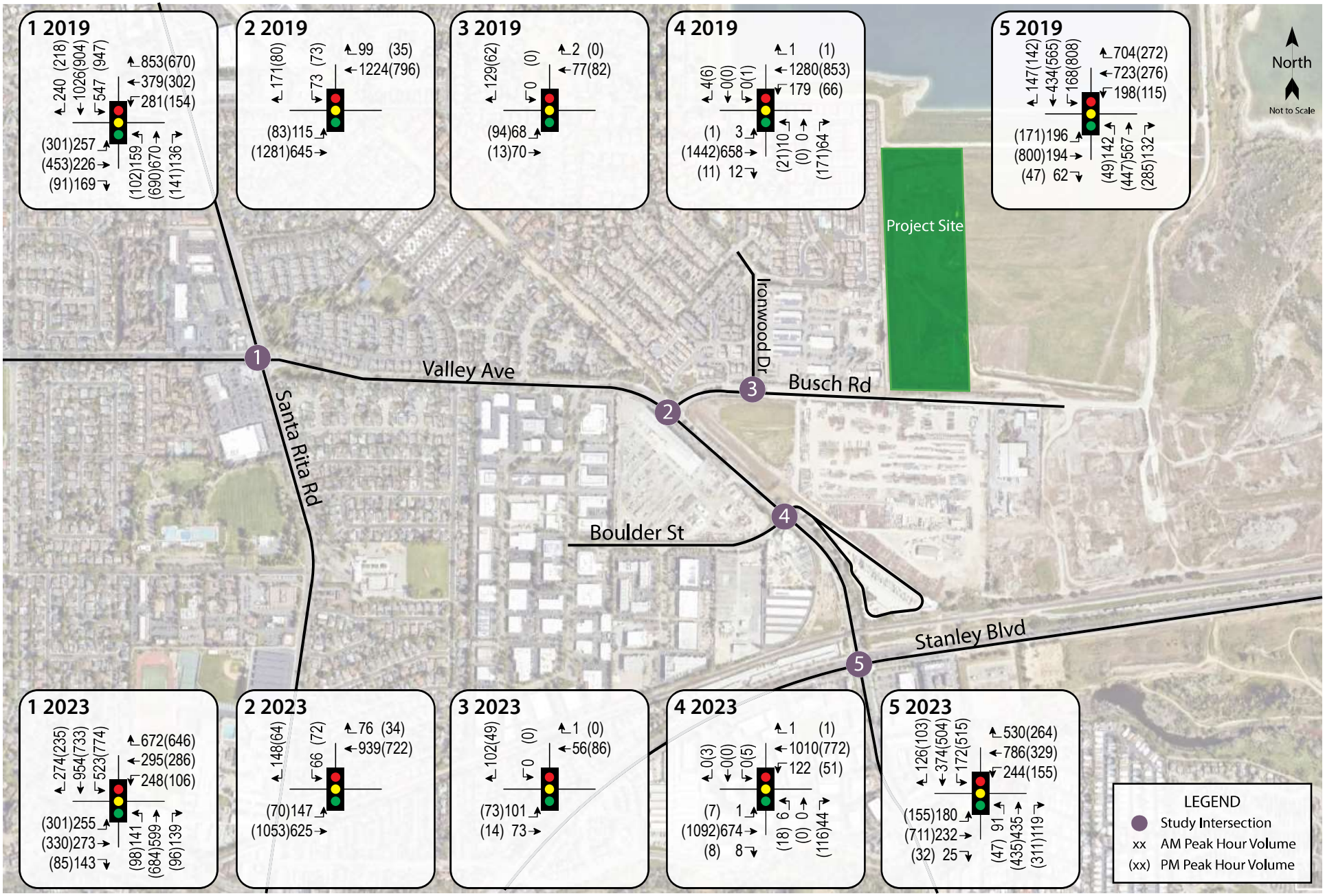
Under existing conditions based on 2019 and 2023 volumes, all study intersections are operating acceptably except for the intersection of Santa Rita Road/Valley Avenue which operates unacceptably at LOS E in 2023 during the p.m. peak hour. A summary of the intersection level of service calculations is contained in Table 2. The existing 2019 and 2023 traffic volumes are shown in Figure 2, and copies of the Level of Service calculations are provided in Appendix A.

Table 2 – Existing (2019 and 2023) Peak Hour Intersection Levels of Service

Study Intersection		Existing Conditions 2019				Existing Conditions 2023			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	Santa Rita Rd/Valley Ave	50.5	D	49.6	D	50.3	D	**55.3**	**E**
	Retiming to Add EBL Green Time	-	-	-	-	-	-	49.7	D
2.	Valley Ave/Busch Rd	8.5	A	8.9	A	7.9	A	9.0	A
3.	Busch Rd/Ironwood Dr	6.8	A	6.6	A	7.8	A	6.1	A
4.	Valley Ave/Boulder St	5.9	A	9.2	A	5.3	A	10.1	B
5.	Stanley Blvd/Valley Ave-Bernal Ave	42.1	D	51.7	D	39.1	D	51.8	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

To address deficient operations at Santa Rita Road/Valley Avenue during the p.m. peak hour under existing 2023 volumes, the City of Pleasanton may wish to retime the signal to add green time to the eastbound left-turn phase. This change would be expected to result in acceptable LOS D operation at Santa Rita Road/Valley Avenue.



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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 2 – Existing 2019 and 2023 Traffic Volumes

W-Trans

Baseline Conditions

Baseline operating conditions were determined with traffic for approved projects by the City of Pleasanton added to the existing volumes contained in materials provided by the City. Under these conditions, the intersection of Santa Rita Road/Valley Avenue would operate unacceptably at LOS E during the p.m. peak hour. All other intersections would operate acceptably. These results are summarized in Table 3, and Baseline volumes are shown in Figure 3.

Table 3 – Baseline Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Santa Rita Rd/Valley Ave	54.7	D	**62.5**	**E**
Add SBL and WBL Lane and Optimize Splits	43.1	D	53.2	D
2. Valley Ave/Busch Rd	12.8	B	9.2	A
3. Busch Rd/Ironwood Dr	4.6	A	9.7	A
4. Valley Ave/Boulder St	9.0	A	10.3	B
5. Stanley Blvd/Valley Ave-Bernal Ave	45.8	D	53.9	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with planned modifications

The addition of a southbound left-turn lane and a westbound left-turn lane as well as optimization of signal timing splits at Santa Rita Road/Valley Avenue would result in acceptable LOS D operation during the p.m. peak hour. These changes are consistent with the materials provided by the City, as they indicate that these modifications to the intersection are planned as a future project. Although adding left-turn lanes would be expected to reduce average delays, it is noted that roadway widenings are typically counter to sustainability efforts and a more comprehensive study should be conducted before adding capacity.

Future Conditions

Future p.m. peak hour volume projections were taken from a build out analysis which is contained in materials provided from the City; this scenario represents future traffic conditions that would be expected upon build out of the land uses identified in the *Pleasanton General Plan 2005-2025*. As 106 single family homes are assumed to be developed on the project parcel in the City's model, trips generated by the homes included in the General Plan were estimated using the rate for "Single-Family Detached Housing" published by the Institute of Transportation Engineers in *Trip Generation Manual*, 11th Edition, 2021. Trips that would be generated by the 106 homes were distributed to the local roadway network and then subtracted from the City's volume projections to approximate Future volumes without development at the project site.

The following modifications at the study intersections were included in traffic microsimulation models provided by the City for planning purposes and were therefore assumed to be implemented under Future Conditions.

- One southbound left-turn lane and one westbound left-turn lane were assumed to be added at Santa Rita Road/Valley Avenue.
- Busch Road was modeled to be widened from two lanes to four lanes east of Ironwood Drive. The eastbound approach to Busch Road/Ironwood Drive was modeled to have an additional through lane in addition to the existing left-turn lane.
- The westbound right-turn lane at Stanley Boulevard/Valley Avenue-Bernal Avenue was assumed to be converted into a channelized right-turn lane. The existing westbound shared through/right lane would be converted into a dedicated through lane.

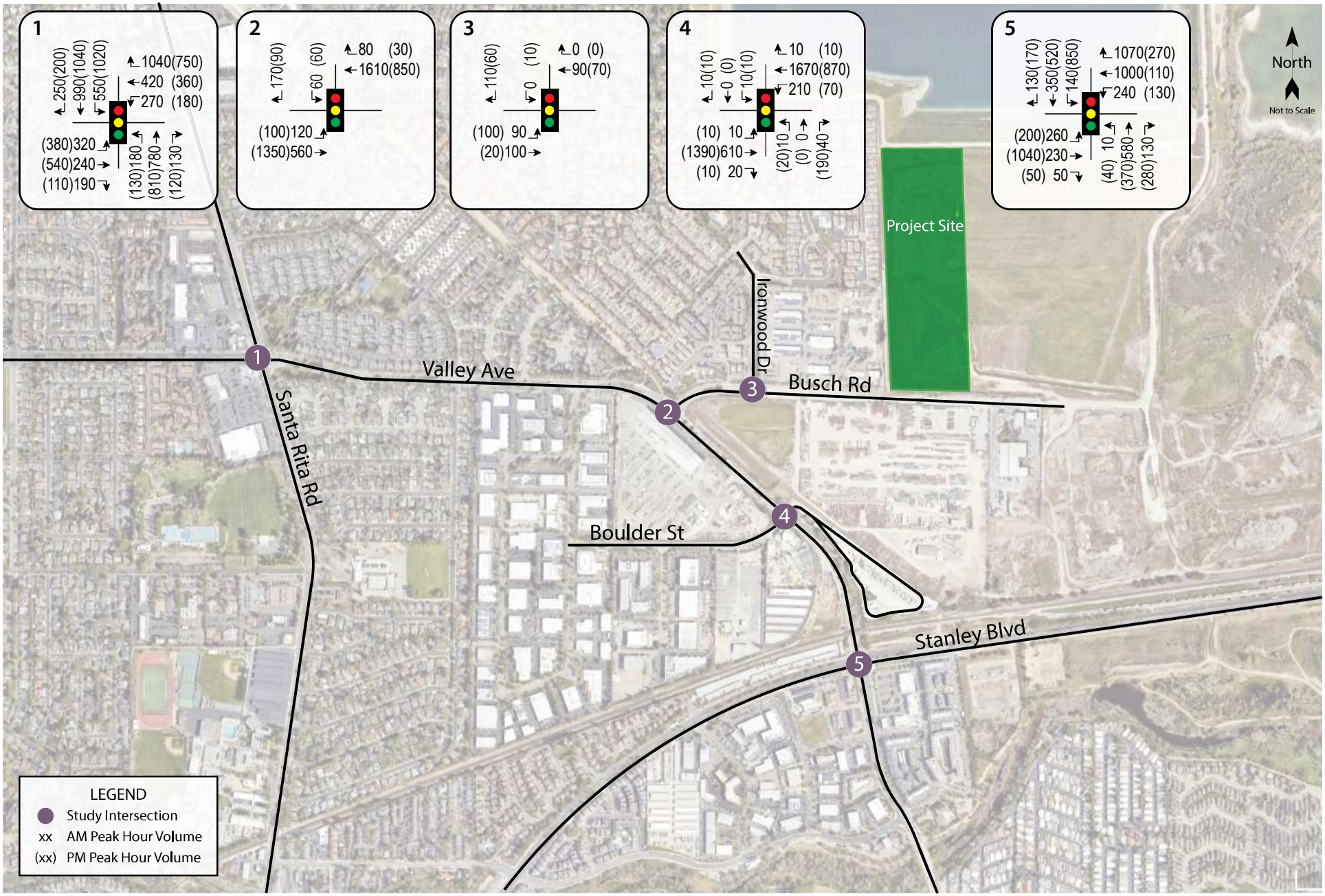

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Figure 3 – Baseline Traffic Volumes

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Under the anticipated Future volumes, and with the addition of the previously mentioned modifications, the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue is expected to operate unacceptably at LOS E during the p.m. peak hour. The remaining study intersections are expected to operate acceptably. Operating conditions are summarized in Table 4, and future volumes are shown in Figure 4.

Table 4 – Future Peak Hour Intersection Levels of Service

Study Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Santa Rita Rd/Valley Ave	47.6	D	52.1	D
2. Valley Ave/Busch Rd	24.3	C	29.0	C
3. Busch Rd/Ironwood Dr	2.5	A	5.4	A
4. Valley Ave/Boulder St	7.4	A	11.0	B
5. Stanley Blvd/Valley Ave-Bernal Ave	50.9	D	**58.3**	**E**
Add NBR Overlap Phase	40.6	D	49.2	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

The City may wish to install a northbound right-turn overlap phase to the traffic signal at the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue to reduce delay during the p.m. peak hour to an acceptable level under Future conditions.

Project Description

The project consists of 194 single-family houses with 49 attached ADUs that would be constructed on 26.6 acres. The project site is currently undeveloped and would be accessed via two new street connections to Busch Road between Ironwood Drive and El Charro Road. The proposed project site plan is shown in Figure 5.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021. Rates for "Single Family Detached Housing" (ITE LU #210) were used for the 194 houses including those that would have ADUs attached, and "Multifamily Housing (Low-Rise)" (ITE LU #220) rates were applied to the 49 ADUs. The proposed project is expected to generate an average of 2,159 trips per day, including 156 trips during the a.m. peak hour and 207 during the p.m. peak hour. These results are summarized in Table 5.

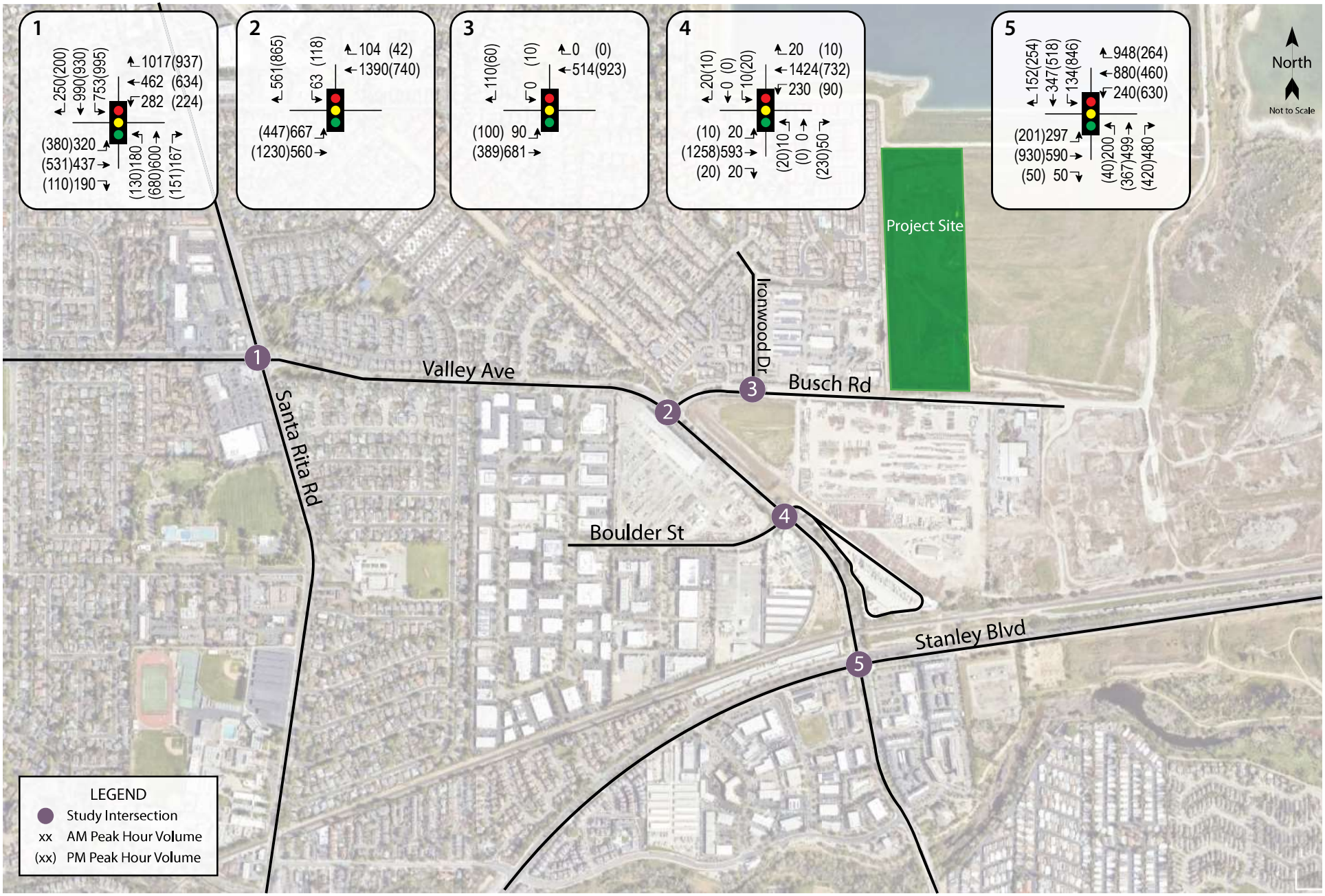

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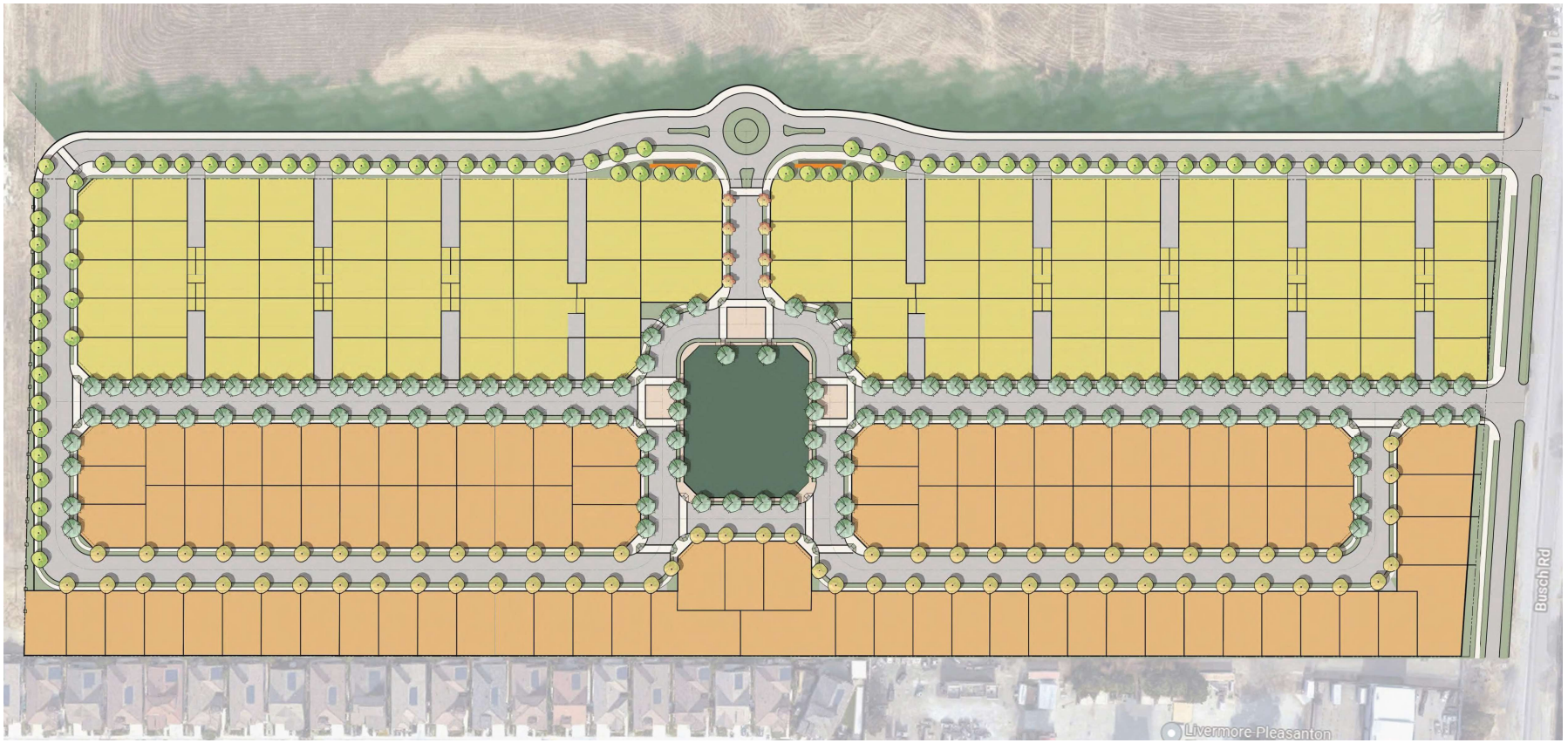
Figure 4 – Future Traffic Volumes



SITE PLAN
ARROYO LAGO

ALAMEDA COUNTY CALIFORNIA

SCALE: 1" = 60' DATE: AUGUST 2022

0 60 120 180

JOB NO.: 3435-000

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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 5 – Site Plan

Table 5 – Trip Generation Summary											
Land Use	**Units**	**Daily**		**AM Peak Hour**				**PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**	**Rate**	**Trips**	**In**	**Out**
Houses	194 du	9.43	1,829	0.70	136	34	102	0.94	182	115	67
ADUs	49 du	6.74	330	0.40	20	5	15	0.51	25	16	9
Total			**2,159**		**156**	**39**	**117**		**207**	**131**	**76**

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network is based on the distribution percentages used in the EPSP, and consideration of where jobs, services, and schools are located. The applied distribution assumptions are shown in Table 6 and overlayed on a map of the region in Figure 6.

Table 6 – Trip Distribution Assumptions	
Route	**Percent**
Santa Rita Rd North of Valley Ave	40
Valley Ave West of Santa Rita Rd	15
Santa Rita Rd South of Valley Ave	15
Stanley Blvd East of Valley Ave-Bernal Ave	10
Bernal Ave South of Stanley Blvd	5
Stanley Blvd West of Valley Ave-Bernal Ave	15
TOTAL	**100**

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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 6 – Project Traffic Volumes and Trip Distributions

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing 2019 volumes, the study intersections are expected to operate acceptably at LOS D or better. Project trips were added to 2019 volumes as more vehicles were counted in 2019 than 2023 at the study intersections, which should result in a conservative analysis as the study intersections are closer to exceeding capacity before adding project trips. These results are summarized in Table 7. Project traffic volumes are shown in Figure 6 and Existing plus Project volumes are shown in Figure 7.

Table 7 – Existing (2019) and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection	Existing Conditions 2019				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Santa Rita Rd/Valley Ave	50.5	D	49.6	D	50.5	D	54.2	D
2. Valley Ave/Busch Rd	8.5	A	8.9	A	10.1	B	12.5	B
3. Busch Rd/Ironwood Dr	6.8	A	6.6	A	6.2	A	4.1	A
4. Valley Ave/Boulder St	5.9	A	9.2	A	6.0	A	9.4	A
5. Stanley Blvd/Valley Ave-Bernal Ave	42.1	D	51.7	D	43.0	D	51.8	D

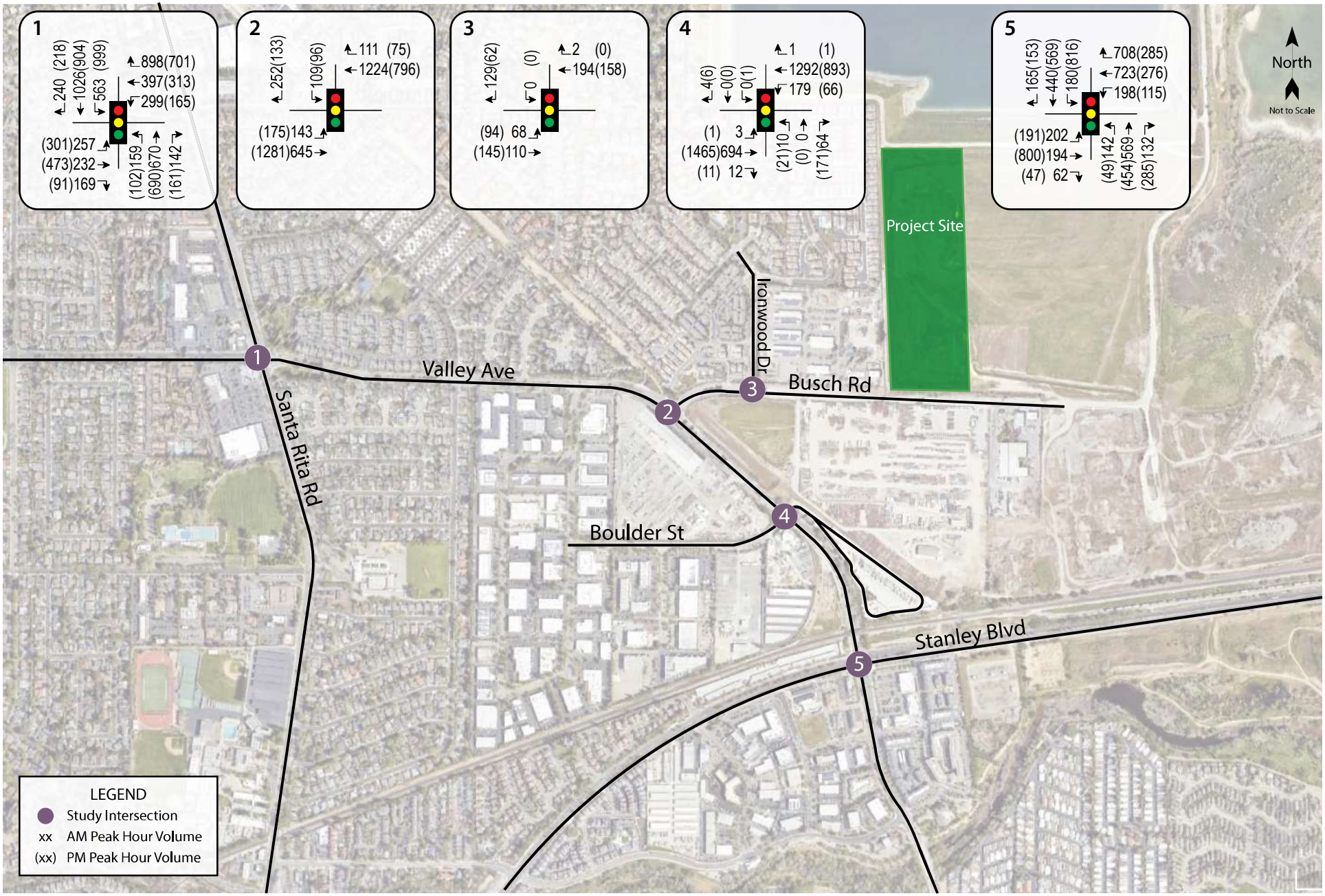
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

It should be noted that with the addition of project-related traffic volumes, average delay at the intersection of Busch Road/Ironwood Drive decreases during the a.m. and p.m. peak hours. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project would add traffic to the eastbound and westbound through movements during the a.m. and p.m. peak hours, both of which have an average delay that is lower than the average for the intersection as a whole, resulting in a reduction in the overall average delay.

Finding – The study intersections are expected to continue operating acceptably upon the addition of project-generated traffic to Existing 2019 volumes.

Baseline plus Project Conditions

With project-generated traffic added to Baseline volumes, four of the five study intersections are expected to operate acceptably while the intersection of Santa Rita Road/Valley Avenue would continue operating unacceptably at LOS E during the p.m. peak hour. These results are summarized in Table 8 and Baseline plus Project traffic volumes are shown in Figure 8.



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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 7 – Existing plus Project Traffic Volumes

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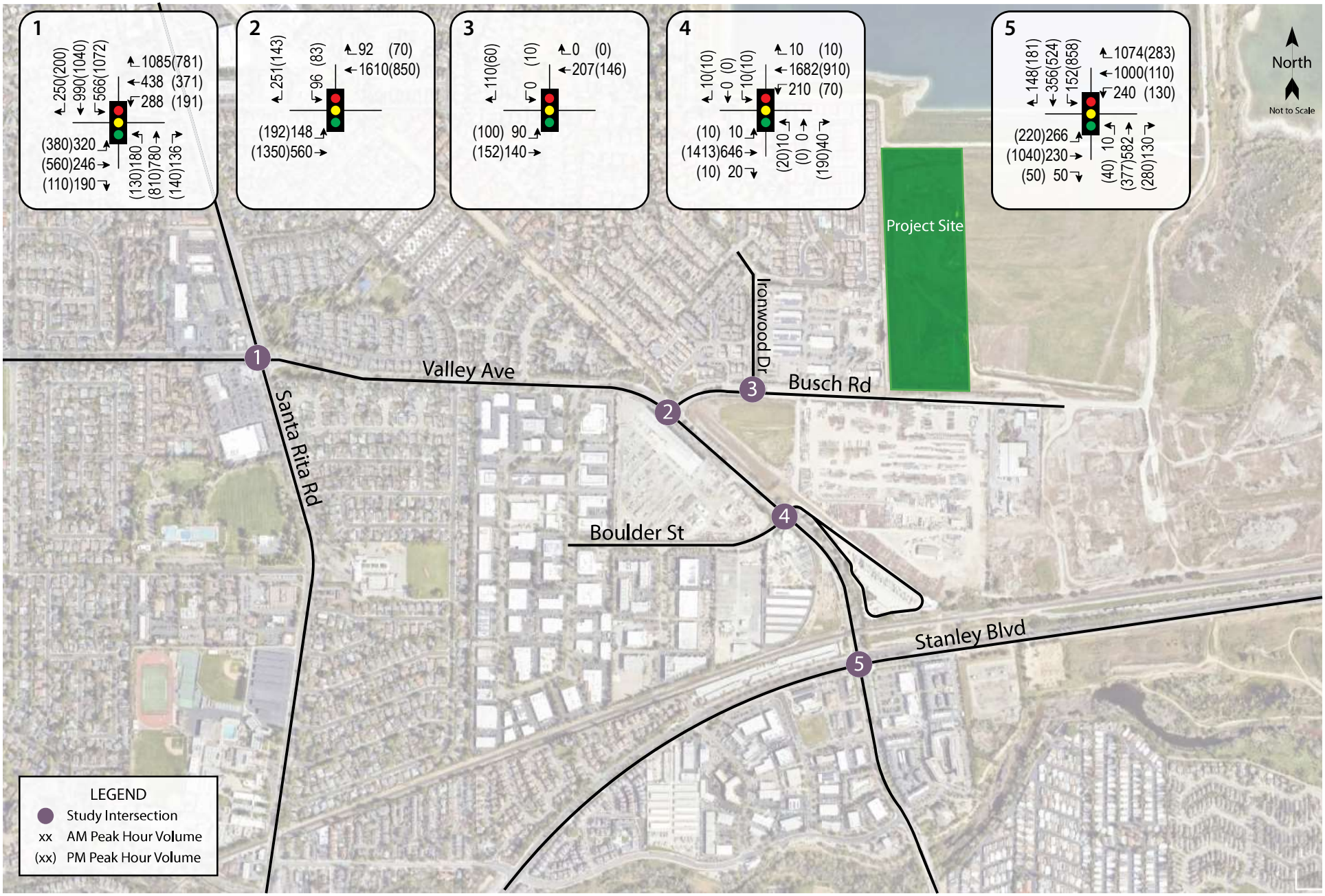

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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 8 – Baseline plus Project Traffic Volumes

W-Trans

Table 8 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service								
Study Intersection	**Baseline Conditions**				**Baseline plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Santa Rita Rd/Valley Ave	54.7	D	**62.5**	**E**	54.5	D	**67.9**	**E**
Add SBL and WBL Lane and Optimize Splits	43.1	D	53.2	D	43.3	D	51.9	D
2. Valley Ave/Busch Rd	12.8	B	9.2	A	15.6	B	12.6	B
3. Busch Rd/Ironwood Dr	4.6	A	9.7	A	4.1	A	6.6	A
4. Valley Ave/Boulder St	9.0	A	10.3	B	9.1	A	10.4	B
5. Stanley Blvd/Valley Ave-Bernal Ave	45.8	D	53.9	D	47.1	D	53.8	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with planned modifications

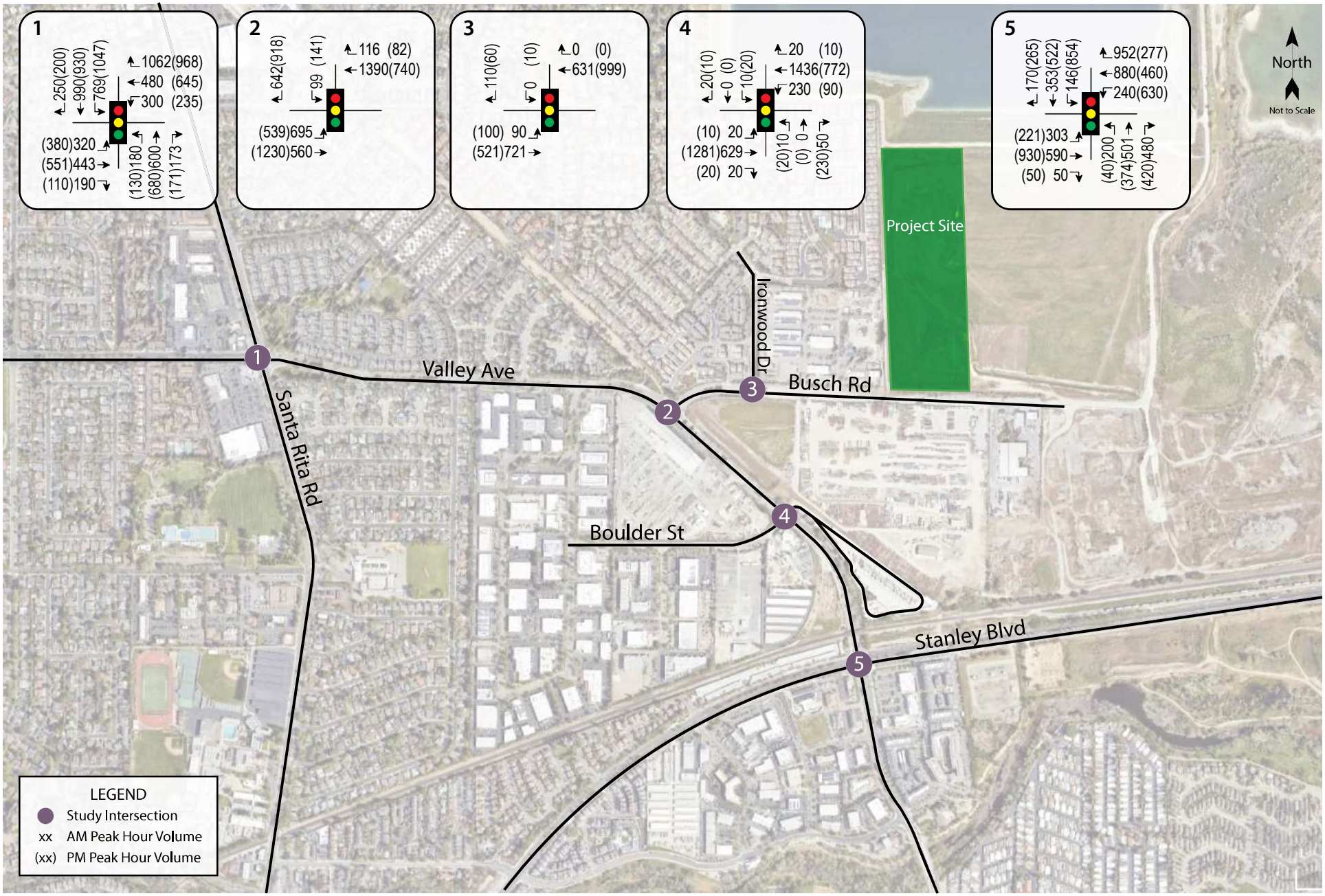
The project would add over ten trips to the intersection of Santa Rita Road/Valley Avenue which operates unacceptably with and without the project during the p.m. peak hour; as a result; this is considered an adverse project impact. As developers are not required to improve the intersection of Santa Rita Road/Valley Avenue to address adverse effects, it is recommended that the project applicant contribute towards City of Pleasanton Transportation Development Fees that would be used to address operations at the intersection of Santa Rita Road/Valley Avenue. The addition of a southbound and a westbound left-turn lane as well as optimizing signal timing splits would be expected to result in LOS D during the p.m. peak hour without or with the project; this change is consistent with the materials provided by the City.

Finding – Four of the five study intersections would be expected to operate acceptably with the addition of project trips to Baseline volumes while the intersection of Santa Rita Road/Valley Avenue would operate unacceptably without or with the project. The project would add more than ten trips to Santa Rita Road/Valley Avenue during the p.m. peak hour, resulting in an adverse effect.

Recommendation – The project applicant should contribute to City of Pleasanton Transportation Development Fees that would be used to address unacceptable operations at Santa Rita Road/Valley Avenue.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, and with the modifications to the study intersections indicated, four of the five study intersections are expected to operate acceptably while the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue would be expected to operate unacceptably at LOS E without or with the project. Figure 9 shows the Future plus Project volumes, and the Future plus Project operating conditions are summarized in Table 9.



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Traffic Operations Study for the Arroyo Lago Residential Project

Figure 9 – Future plus Project Traffic Volumes

Table 9 – Future and Future plus Project Peak Hour Intersection Levels of Service								
Study Intersection	**Future Conditions**				**Future plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Santa Rita Rd/Valley Ave	47.6	D	52.1	D	47.6	D	52.0	D
2. Valley Ave/Busch Rd	24.3	C	29.0	C	29.7	C	37.8	D
3. Busch Rd/Ironwood Dr	2.5	A	5.4	A	2.5	A	5.2	A
4. Valley Ave/Boulder St	7.4	A	11.0	B	7.4	A	11.0	B
5. Stanley Blvd/Valley Ave-Bernal Ave	50.9	D	**58.3**	**E**	52.1	D	**59.1**	**E**
Add NBR Overlap Phase	40.6	D	49.2	D	41.2	D	48.6	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

As the project would add over ten trips to the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue during the p.m. peak hour and the intersection would operate unacceptably, the project would result in an adverse impact. It is recommended that project contribute to Transportation Development Fees that would be used to install a northbound right-turn overlap phase at the intersection; installation of the overlap phase would be expected to result in LOS D during the p.m. peak hour.

Finding – Four of the five study intersections would be expected to operate acceptably with the addition of project trips to Future volumes while the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue would operate unacceptably with and without the project. The project would cause an adverse effect on operations at Stanley Boulevard/Valley Avenue-Bernal Avenue by adding more than ten trips during the p.m. peak hour.

Recommendation – To address the project's adverse effect on operations, the project should contribute toward City of Pleasanton Transportation Development Fees that would be used to add a northbound right-turn overlap phase to Stanley Boulevard/Valley Avenue-Bernal Avenue.

Parking

County of Alameda and City of Pleasanton parking supply requirements are respectively based on the Alameda County Municipal Code, *Chapter 17.52.910; Parking Spaces Required—Residential Buildings* and Pleasanton Municipal Code, *Chapter 18.88.030; Off-Street Parking Facilities*. The County of Alameda requires a dwelling unit to have at least two parking spaces; dwellings can be described as single, two-family, and multiple residences. The ADUs are not considered as a residential dwelling unit per Alameda County Municipal Code, *Chapter 17.04.010; Definitions*, and therefore the accessory dwellings are not counted in the parking requirements. Similarly, the City of Pleasanton requires single-family homes to have at least two parking spaces such that at least one parking space is located within a garage or carport. According to the most recent site plans, all off-site parking spaces are covered. The optional junior ADUs do not have a required parking minimum per the Pleasanton Municipal Code, *Chapter 18.106.070; Required standards for all junior accessory dwelling units*. Based on both of these requirements, the project is required to provide 388 parking spaces. As each unit has a two-car garage, a total of 388 covered spaces would be provided. The parking requirements are summarized in Table 10 .

Table 10 – Parking Requirement

Land Use	Units	Rate	Parking Spaces
Required Parking			
Single Family Home	194 du	2 spaces/du	388
Junior Accessory Dwelling Unit	49 du	0 space/du	0
Required Parking Total			*388*
Proposed Parking Supply			**388**

Notes: du = dwelling unit

Finding – The proposed parking supply for the project would be in compliance with County of Alameda and City of Pleasanton requirements.

Conclusions and Recommendations

Conclusions

- The project is expected to generate an average of 2,159 trips per day, including 156 a.m. peak hour trips and 207 trips during the p.m. peak hour.

- The study intersections would be expected to operate acceptably by the City of Pleasanton's standard of LOS D or better without or with project trips added to Existing 2019 volumes. With Existing 2023 volumes, the intersection of Santa Rita Road/Valley Avenue operates unacceptably at LOS E during the p.m. peak hour but would operate at LOS D with additional green time assigned to the eastbound left-turn phase for the evening peak period.

- Under Baseline conditions, four of the five study intersections would operate acceptably at LOS D or better without or with project traffic. The intersection of Santa Rita Road/Valley Avenue would operate unacceptably at LOS E without or with project traffic added to Baseline volumes. Adding southbound and westbound left-turn lanes at the intersection, as is planned in materials provided by the City, and optimizing signal timing splits would result in acceptable operations at Santa Rita Road/Valley Avenue.

- Under Future and Future plus Project conditions and with the planned modifications to the intersections indicated in the materials provided by the City, four study intersections are expected operate acceptably while the intersection of Stanley Boulevard/Valley Avenue-Bernal Avenue would operate unacceptably at LOS E during the p.m. peak hour. A northbound right-turn overlap phase at the intersection would result in an acceptable Level of Service at Stanley Boulevard/Valley Avenue-Bernal Avenue.

- The proposed parking supply for the project would comply with both City of Pleasanton and County of Alameda requirements.

Recommendations

- The project should contribute to City of Pleasanton Transportation Development Fees that would be used to address unacceptable operations at Santa Rita Road/Valley Avenue, as well as to add a northbound right-turn overlap phase at Stanley Boulevard/Valley Avenue-Bernal Avenue.

Study Participants and References

Study Participants

Principal in Charge	Mark E. Spencer, PE (Traffic)
Traffic Engineer	Kevin Carstens, PE (Civil, Traffic)
Assistant Engineer	Nathan Sharafian, EIT
Graphics	Cameron Wong
Editing/Formatting	Jessica Bender
Quality Control	Dalene J. Whitlock, PE (Civil, Traffic), PTOE

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Appendix A

Intersection Level of Service Calculations

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HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	257	226	169	281	379	853	159	670	136	547	1026	240
Future Volume (veh/h)	257	226	169	281	379	853	159	670	136	547	1026	240
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		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	240	174	299	403	0	169	713	0	582	1091	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	603	262	325	942		228	829		636	1289	
Arrive On Green	0.10	0.17	0.17	0.18	0.27	0.00	0.07	0.23	0.00	0.18	0.36	0.00
Sat Flow, veh/h	3456	3554	1545	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	273	240	174	299	403	0	169	713	0	582	1091	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1545	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	9.3	7.2	9.2	19.8	11.3	0.0	5.8	23.1	0.0	19.8	33.9	0.0
Cycle Q Clear(g_c), s	9.3	7.2	9.2	19.8	11.3	0.0	5.8	23.1	0.0	19.8	33.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	603	262	325	942		228	829		636	1289	
V/C Ratio(X)	0.82	0.40	0.66	0.92	0.43		0.74	0.86		0.92	0.85	
Avail Cap(c_a), veh/h	490	888	386	341	1066		432	829		662	1289	
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	0.67	0.67	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.1	44.4	24.5	48.2	36.5	0.0	55.0	44.1	0.0	48.0	35.1	0.0
Incr Delay (d2), s/veh	4.2	0.2	1.1	21.0	0.4	0.0	1.8	11.3	0.0	16.6	7.0	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	4.2	3.2	3.4	10.6	4.9	0.0	2.5	11.3	0.0	9.9	15.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	44.5	25.6	69.2	37.0	0.0	56.8	55.4	0.0	64.6	42.1	0.0
LnGrp LOS	E	D	C	E	D		E	E		E	D	
Approach Vol, veh/h		687			702			882			1673	
Approach Delay, s/veh		44.8			50.7			55.7			50.0	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.5	32.0	27.1	24.4	11.9	47.5	15.6	35.8
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	21.8	25.1	21.8	11.2	7.8	35.9	11.3	13.3
Green Ext Time (p_c), s	0.2	0.9	0.1	0.9	0.2	0.0	0.3	3.6

Intersection Summary	
HCM 6th Ctrl Delay	50.5
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	645	1224	99	73	171
Future Volume (veh/h)	115	645	1224	99	73	171
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	129	725	1375	103	88	44
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	302	2559	1827	136	344	170
Arrive On Green	0.09	0.72	0.55	0.52	0.11	0.11
Sat Flow, veh/h	3456	3647	3437	249	3196	1585
Grp Volume(v), veh/h	129	725	728	750	88	44
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1816	1598	1585
Q Serve(g_s), s	1.6	3.3	14.6	14.9	1.2	1.2
Cycle Q Clear(g_c), s	1.6	3.3	14.6	14.9	1.2	1.2
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	302	2559	971	993	344	170
V/C Ratio(X)	0.43	0.28	0.75	0.76	0.26	0.26
Avail Cap(c_a), veh/h	2756	2781	1390	1421	1440	714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	2.3	8.1	8.2	19.0	19.0
Incr Delay (d2), s/veh	0.7	0.1	1.4	1.4	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.2	3.5	3.6	0.4	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.8	2.3	9.5	9.6	19.1	19.3
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		854	1478		132	
Approach Delay, s/veh		5.1	9.6		19.2	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.1	29.3		9.0		37.4
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	3.6	16.9		3.2		5.3
Green Ext Time (p_c), s	0.4	6.9		0.3		3.6

Intersection Summary	
HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	70	77	2	0	129
Future Volume (veh/h)	68	70	77	2	0	129
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	1870	1811	1722	1870	1870	1870
Adj Flow Rate, veh/h	78	80	89	2	0	2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	6	12	2	2	2
Cap, veh/h	126	1057	513	12	9	8
Arrive On Green	0.07	0.58	0.31	0.21	0.00	0.00
Sat Flow, veh/h	1781	1811	1678	38	1781	1585
Grp Volume(v), veh/h	78	80	0	91	0	2
Grp Sat Flow(s),veh/h/ln	1781	1811	0	1715	1781	1585
Q Serve(g_s), s	0.8	0.4	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.4	0.0	0.8	0.0	0.0
Prop In Lane	1.00			0.02	1.00	1.00
Lane Grp Cap(c), veh/h	126	1057	0	524	9	8
V/C Ratio(X)	0.62	0.08	0.00	0.17	0.00	0.24
Avail Cap(c_a), veh/h	1845	2898	0	2745	922	821
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	8.7	1.8	0.0	4.9	0.0	9.6
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.2	0.0	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	1.8	0.0	5.1	0.0	15.2
LnGrp LOS	B	A	A	A	A	B
Approach Vol, veh/h		158	91		2	
Approach Delay, s/veh		7.6	5.1		15.2	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.4	9.9				15.3	4.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.8	2.8				2.4	2.0
Green Ext Time (p_c), s	0.2	0.3				0.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	658	12	179	1280	1	10	0	64	0	0	4
Future Volume (veh/h)	3	658	12	179	1280	1	10	0	64	0	0	4
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		0.97	0.97		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	3	739	10	201	1438	1	11	0	0	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	7	1695	23	306	2331	2	222	0	0	0	27	0
Arrive On Green	0.00	0.47	0.44	0.17	0.64	0.60	0.04	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	3588	49	1781	3644	3	1171	0	0	0	1870	0
Grp Volume(v), veh/h	3	366	383	201	701	738	11	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1860	1781	1777	1870	1171	0	0	0	1870	0
Q Serve(g_s), s	0.1	4.8	4.8	3.7	8.2	8.2	0.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	4.8	4.8	3.7	8.2	8.2	0.3	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h	7	839	878	306	1137	1196	255	0	0	0	27	0
V/C Ratio(X)	0.41	0.44	0.44	0.66	0.62	0.62	0.04	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	761	2089	2187	1014	1583	1666	738	0	0	0	799	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.4	6.2	6.2	13.6	3.8	3.8	16.7	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	13.1	0.4	0.3	0.9	0.5	0.5	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.0	1.1	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	6.5	6.5	14.5	4.3	4.3	16.7	0.0	0.0	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		752			1640			11			0	
Approach Delay, s/veh		6.6			5.5			16.7			0.0	
Approach LOS		A			A			B				

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.1	26.5		4.5	10.0	20.6		4.5				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.1	10.2		2.3	5.7	6.8		0.0				
Green Ext Time (p_c), s	0.0	6.7		0.0	0.3	3.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	196	194	62	198	723	704	142	567	132	168	434	147
Future Volume (veh/h)	196	194	62	198	723	704	142	567	132	168	434	147
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	220	218	46	222	921	442	160	637	138	189	488	162
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1326	274	285	1713	876	186	921	403	256	568	187
Arrive On Green	0.08	0.45	0.45	0.08	0.46	0.46	0.10	0.26	0.26	0.07	0.22	0.21
Sat Flow, veh/h	3456	2927	606	3563	3741	1585	1781	3554	1557	3428	2606	859
Grp Volume(v), veh/h	220	131	133	222	921	442	160	637	138	189	332	318
Grp Sat Flow(s),veh/h/ln	1728	1777	1756	1781	1870	1585	1781	1777	1557	1714	1777	1687
Q Serve(g_s), s	7.5	5.2	5.4	7.3	21.2	20.8	10.6	19.4	8.6	6.5	21.5	21.8
Cycle Q Clear(g_c), s	7.5	5.2	5.4	7.3	21.2	20.8	10.6	19.4	8.6	6.5	21.5	21.8
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	259	805	795	285	1713	876	186	921	403	256	388	368
V/C Ratio(X)	0.85	0.16	0.17	0.78	0.54	0.50	0.86	0.69	0.34	0.74	0.86	0.86
Avail Cap(c_a), veh/h	259	805	795	386	1713	876	193	921	403	514	415	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	54.8	19.4	19.4	54.2	23.4	16.7	52.8	40.1	36.1	54.4	45.1	45.5
Incr Delay (d2), s/veh	22.4	0.4	0.5	6.9	1.2	2.1	29.3	2.2	0.5	3.6	13.6	15.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	2.2	2.2	3.4	8.9	7.6	6.2	8.6	3.3	2.9	10.7	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	77.2	19.8	19.9	61.1	24.6	18.7	82.1	42.4	36.6	58.0	58.7	60.8
LnGrp LOS	E	B	B	E	C	B	F	D	D	E	E	E
Approach Vol, veh/h		484			1585			935			839	
Approach Delay, s/veh		45.9			28.1			48.3			59.3	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	59.0	17.9	30.2	13.6	58.3	12.9	35.1
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7
Max Q Clear Time (g_c+I1), s	9.5	23.2	12.6	23.8	9.3	7.4	8.5	21.4
Green Ext Time (p_c), s	0.0	6.8	0.0	0.8	0.3	1.0	0.5	0.1

Intersection Summary	
HCM 6th Ctrl Delay	42.1
HCM 6th LOS	D

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.

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	453	91	154	302	670	102	690	141	947	904	218
Future Volume (veh/h)	301	453	91	154	302	670	102	690	141	947	904	218
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	314	472	91	160	315	0	106	719	0	986	942	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	424	667	294	178	586		160	829		1008	1742	
Arrive On Green	0.12	0.19	0.19	0.10	0.16	0.00	0.05	0.23	0.00	0.29	0.49	0.00
Sat Flow, veh/h	3456	3554	1570	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	314	472	91	160	315	0	106	719	0	986	942	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1570	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	10.5	14.9	4.7	10.7	9.7	0.0	3.6	23.3	0.0	33.9	22.1	0.0
Cycle Q Clear(g_c), s	10.5	14.9	4.7	10.7	9.7	0.0	3.6	23.3	0.0	33.9	22.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	424	667	294	178	586		160	829		1008	1742	
V/C Ratio(X)	0.74	0.71	0.31	0.90	0.54		0.66	0.87		0.98	0.54	
Avail Cap(c_a), veh/h	424	859	379	178	918		403	829		1008	1742	
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	0.96	0.96	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.8	45.7	25.8	53.4	45.9	0.0	56.3	44.2	0.0	42.1	21.2	0.0
Incr Delay (d2), s/veh	6.0	1.1	0.2	38.0	1.6	0.0	1.7	11.8	0.0	23.0	1.2	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	4.9	6.6	2.3	6.6	4.4	0.0	1.6	11.5	0.0	17.4	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.8	46.8	26.1	91.4	47.5	0.0	58.0	56.0	0.0	65.1	22.4	0.0
LnGrp LOS	E	D	C	F	D		E	E		E	C	
Approach Vol, veh/h		877			475			825			1928	
Approach Delay, s/veh		48.2			62.3			56.3			44.3	
Approach LOS		D			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.4	32.0	16.0	26.5	9.6	62.8	18.7	23.8
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	10.0	29.8
Max Q Clear Time (g_c+I1), s	35.9	25.3	12.7	16.9	5.6	24.1	12.5	11.7
Green Ext Time (p_c), s	0.0	0.7	0.0	1.1	0.1	9.7	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	1281	796	35	73	80
Future Volume (veh/h)	83	1281	796	35	73	80
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	86	1321	821	35	75	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	140	2843	2518	107	168	75
Arrive On Green	0.04	0.80	0.73	0.72	0.05	0.05
Sat Flow, veh/h	3456	3647	3562	148	3563	1585
Grp Volume(v), veh/h	86	1321	421	435	75	16
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1839	1781	1585
Q Serve(g_s), s	2.9	14.2	10.2	10.2	2.5	1.2
Cycle Q Clear(g_c), s	2.9	14.2	10.2	10.2	2.5	1.2
Prop In Lane	1.00			0.08	1.00	1.00
Lane Grp Cap(c), veh/h	140	2843	1290	1335	168	75
V/C Ratio(X)	0.61	0.46	0.33	0.33	0.45	0.21
Avail Cap(c_a), veh/h	749	2843	1290	1335	475	211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.37	0.37	0.96	0.96	1.00	1.00
Uniform Delay (d), s/veh	56.6	3.8	5.9	5.9	55.6	55.0
Incr Delay (d2), s/veh	1.2	0.2	0.6	0.6	0.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	3.8	3.4	3.5	1.1	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.8	4.0	6.5	6.5	56.3	55.6
LnGrp LOS	E	A	A	A	E	E
Approach Vol, veh/h		1407	856		91	
Approach Delay, s/veh		7.3	6.5		56.2	
Approach LOS		A	A		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.9	91.1		9.7		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	4.9	12.2		4.5		16.2
Green Ext Time (p_c), s	0.2	3.7		0.1		8.8

Intersection Summary		
HCM 6th Ctrl Delay		8.9
HCM 6th LOS		A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	94	13	82	0	0	62
Future Volume (veh/h)	94	13	82	0	0	62
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	15	96	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	175	1385	716	0	12	10
Arrive On Green	0.10	0.74	0.38	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	111	15	96	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.9	0.0	0.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.5	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	175	1385	716	0	12	10
V/C Ratio(X)	0.63	0.01	0.13	0.00	0.00	0.00
Avail Cap(c_a), veh/h	2311	3750	3750	0	1156	1028
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	0.00	0.00
Uniform Delay (d), s/veh	6.7	0.5	3.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	0.5	3.2	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		126	96		0	
Approach Delay, s/veh		9.3	3.2		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.5	9.9				15.4	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.9	2.5				2.0	0.0
Green Ext Time (p_c), s	0.3	0.3				0.0	0.0

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

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1442	11	66	853	1	21	0	171	1	0	6
Future Volume (veh/h)	1	1442	11	66	853	1	21	0	171	1	0	6
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	0.98		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1518	11	69	898	1	22	0	43	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	2	2109	15	98	2320	3	62	6	53	141	0	0
Arrive On Green	0.00	1.00	1.00	0.05	0.64	0.63	0.07	0.00	0.06	0.07	0.00	0.00
Sat Flow, veh/h	1781	3615	26	1781	3642	4	345	94	858	1303	0	0
Grp Volume(v), veh/h	1	746	783	69	438	461	65	0	0	1	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1865	1781	1777	1870	1297	0	0	1303	0	0
Q Serve(g_s), s	0.1	0.0	0.0	4.6	14.3	14.3	4.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	0.0	4.6	14.3	14.3	5.8	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.34		0.66	1.00		0.00
Lane Grp Cap(c), veh/h	2	1036	1088	98	1132	1191	131	0	0	152	0	0
V/C Ratio(X)	0.41	0.72	0.72	0.70	0.39	0.39	0.49	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1088	148	1132	1191	349	0	0	383	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.71	0.71	0.71	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	59.8	0.0	0.0	55.7	10.5	10.5	55.3	0.0	0.0	52.4	0.0	0.0
Incr Delay (d2), s/veh	33.1	3.9	3.7	2.5	0.7	0.7	1.1	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.1	1.1	1.1	2.1	5.3	5.6	2.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.9	3.9	3.7	58.2	11.2	11.2	56.4	0.0	0.0	52.4	0.0	0.0
LnGrp LOS	F	A	A	E	B	B	E	A	A	D	A	A
Approach Vol, veh/h		1530			968			65			1	
Approach Delay, s/veh		3.9			14.5			56.4			52.4	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.2	80.4		11.4	10.6	74.0		11.4				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.1	16.3		7.8	6.6	2.0		2.1				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	9.2		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	800	47	115	276	272	49	447	285	808	565	142
Future Volume (veh/h)	171	800	47	115	276	272	49	447	285	808	565	142
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		0.99	1.00		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	186	870	42	125	300	100	53	486	306	878	614	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	1092	53	186	1104	1014	69	563	246	1136	1295	316
Arrive On Green	0.07	0.32	0.32	0.05	0.30	0.30	0.04	0.16	0.16	0.33	0.46	0.45
Sat Flow, veh/h	3456	3447	166	3563	3741	1564	1781	3554	1556	3456	2821	688
Grp Volume(v), veh/h	186	448	464	125	300	100	53	486	306	878	386	378
Grp Sat Flow(s),veh/h/ln	1728	1777	1837	1781	1870	1564	1781	1777	1556	1728	1777	1732
Q Serve(g_s), s	6.3	27.7	27.7	4.1	7.4	0.7	3.5	16.0	15.8	27.4	18.0	18.2
Cycle Q Clear(g_c), s	6.3	27.7	27.7	4.1	7.4	0.7	3.5	16.0	15.8	27.4	18.0	18.2
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.40
Lane Grp Cap(c), veh/h	255	563	582	186	1104	1014	69	563	246	1136	816	795
V/C Ratio(X)	0.73	0.80	0.80	0.67	0.27	0.10	0.77	0.86	1.24	0.77	0.47	0.48
Avail Cap(c_a), veh/h	576	563	582	416	1104	1014	238	563	246	1136	816	795
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77
Uniform Delay (d), s/veh	54.4	37.5	37.5	55.9	32.4	2.4	57.1	49.2	35.0	36.3	22.4	22.7
Incr Delay (d2), s/veh	4.0	11.2	10.9	4.2	0.6	0.2	16.1	13.1	138.3	2.6	1.5	1.6
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	2.8	13.4	13.8	1.9	3.3	0.3	1.9	8.0	15.3	11.6	7.6	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.4	48.7	48.3	60.0	33.0	2.6	73.3	62.4	173.3	38.9	24.0	24.2
LnGrp LOS	E	D	D	E	C	A	E	E	F	D	C	C
Approach Vol, veh/h		1098			525			845			1642	
Approach Delay, s/veh		50.2			33.6			103.2			32.0	
Approach LOS		D			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	39.4	8.7	59.1	10.3	42.0	44.7	23.0				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	20.0	29.6	16.0	34.7	14.0	35.6	33.0	* 18				
Max Q Clear Time (g_c+I1), s	8.3	9.4	5.5	20.2	6.1	29.7	29.4	18.0				
Green Ext Time (p_c), s	0.5	1.5	0.1	2.8	0.2	2.1	1.5	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	51.7
HCM 6th LOS	D

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
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	255	273	143	248	295	672	141	599	139	523	954	274
Future Volume (veh/h)	255	273	143	248	295	672	141	599	139	523	954	274
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	297	317	160	288	343	0	164	697	0	608	1109	0
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	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	678	295	314	972		223	829		657	1317	
Arrive On Green	0.10	0.19	0.19	0.18	0.27	0.00	0.06	0.23	0.00	0.19	0.37	0.00
Sat Flow, veh/h	3456	3554	1548	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	297	317	160	288	343	0	164	697	0	608	1109	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1548	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	10.1	9.5	8.4	19.1	9.3	0.0	5.6	22.4	0.0	20.8	34.3	0.0
Cycle Q Clear(g_c), s	10.1	9.5	8.4	19.1	9.3	0.0	5.6	22.4	0.0	20.8	34.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	678	295	314	972		223	829		657	1317	
V/C Ratio(X)	0.83	0.47	0.54	0.92	0.35		0.73	0.84		0.93	0.84	
Avail Cap(c_a), veh/h	490	888	387	341	1066		432	829		662	1317	
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	0.75	0.75	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.7	43.1	24.4	48.5	35.0	0.0	55.1	43.9	0.0	47.8	34.6	0.0
Incr Delay (d2), s/veh	6.2	0.2	0.6	21.3	0.3	0.0	1.8	10.0	0.0	18.6	6.7	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	4.7	4.2	3.1	10.2	4.1	0.0	2.5	10.9	0.0	10.5	15.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.0	43.3	25.0	69.9	35.4	0.0	56.9	53.9	0.0	66.4	41.2	0.0
LnGrp LOS	E	D	C	E	D		E	D		E	D	
Approach Vol, veh/h		774			631			861			1717	
Approach Delay, s/veh		45.5			51.1			54.5			50.1	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.2	32.0	26.4	26.9	11.8	48.5	16.4	36.8
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	22.8	24.4	21.1	11.5	7.6	36.3	12.1	11.3
Green Ext Time (p_c), s	0.1	1.2	0.1	1.0	0.2	0.0	0.3	3.1

Intersection Summary	
HCM 6th Ctrl Delay	50.3
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	147	625	939	76	66	148
Future Volume (veh/h)	147	625	939	76	66	148
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	167	710	1067	80	79	40
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	370	2414	1572	118	370	184
Arrive On Green	0.11	0.68	0.47	0.44	0.12	0.12
Sat Flow, veh/h	3456	3647	3438	251	3196	1585
Grp Volume(v), veh/h	167	710	567	580	79	40
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1818	1598	1585
Q Serve(g_s), s	1.8	3.1	9.7	9.7	0.9	0.9
Cycle Q Clear(g_c), s	1.8	3.1	9.7	9.7	0.9	0.9
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	370	2414	835	855	370	184
V/C Ratio(X)	0.45	0.29	0.68	0.68	0.21	0.22
Avail Cap(c_a), veh/h	3272	3301	1651	1689	1709	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	2.5	8.1	8.1	15.7	15.7
Incr Delay (d2), s/veh	0.6	0.1	1.0	1.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.2	2.3	2.3	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.0	2.6	9.0	9.1	15.8	15.9
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		877	1147		119	
Approach Delay, s/veh		5.3	9.1		15.8	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	22.4		8.5		30.5
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	3.8	11.7		2.9		5.1
Green Ext Time (p_c), s	0.6	5.2		0.2		3.5

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	101	73	56	1	0	102
Future Volume (veh/h)	101	73	56	1	0	102
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	1870	1811	1722	1870	1870	1870
Adj Flow Rate, veh/h	117	85	65	1	0	2
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	6	12	2	2	2
Cap, veh/h	171	1077	503	8	9	8
Arrive On Green	0.10	0.59	0.30	0.21	0.00	0.00
Sat Flow, veh/h	1781	1811	1691	26	1781	1585
Grp Volume(v), veh/h	117	85	0	66	0	2
Grp Sat Flow(s),veh/h/ln	1781	1811	0	1717	1781	1585
Q Serve(g_s), s	1.3	0.4	0.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	1.3	0.4	0.0	0.6	0.0	0.0
Prop In Lane	1.00			0.02	1.00	1.00
Lane Grp Cap(c), veh/h	171	1077	0	511	9	8
V/C Ratio(X)	0.69	0.08	0.00	0.13	0.00	0.25
Avail Cap(c_a), veh/h	1795	2820	0	2674	898	799
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	8.7	1.7	0.0	5.1	0.0	9.9
Incr Delay (d2), s/veh	4.8	0.0	0.0	0.1	0.0	5.9
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	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.5	1.7	0.0	5.2	0.0	15.8
LnGrp LOS	B	A	A	A	A	B
Approach Vol, veh/h		202	66		2	
Approach Delay, s/veh		8.5	5.2		15.8	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.9	9.9				15.8	4.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	3.3	2.6				2.4	2.0
Green Ext Time (p_c), s	0.3	0.2				0.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	674	8	122	1010	1	6	0	44	0	0	0
Future Volume (veh/h)	1	674	8	122	1010	1	6	0	44	0	0	0
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		0.98	0.99		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	1	749	7	136	1122	1	7	0	0	0	0	0
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	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	5	1703	16	308	2345	2	219	0	0	0	18	0
Arrive On Green	0.00	0.47	0.43	0.17	0.64	0.61	0.04	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	3606	34	1781	3643	3	1195	0	0	0	1870	0
Grp Volume(v), veh/h	1	369	387	136	547	576	7	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1863	1781	1777	1870	1195	0	0	0	1870	0
Q Serve(g_s), s	0.0	4.8	4.8	2.4	5.5	5.5	0.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	4.8	2.4	5.5	5.5	0.2	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h	5	839	880	308	1144	1203	253	0	0	0	18	0
V/C Ratio(X)	0.19	0.44	0.44	0.44	0.48	0.48	0.03	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	769	2113	2216	1026	1602	1685	758	0	0	0	808	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	6.1	6.1	12.9	3.2	3.2	16.6	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	6.7	0.4	0.3	0.4	0.3	0.3	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.9	0.7	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	6.5	6.5	13.2	3.5	3.5	16.7	0.0	0.0	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		757			1259			7			0	
Approach Delay, s/veh		6.5			4.5			16.7			0.0	
Approach LOS		A			A			B				

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.0	26.3		4.3	10.0	20.4		4.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.0	7.5		2.2	4.4	6.8		0.0				
Green Ext Time (p_c), s	0.0	4.9		0.0	0.2	3.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	5.3
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	232	25	244	786	530	91	435	119	172	374	126
Future Volume (veh/h)	180	232	25	244	786	530	91	435	119	172	374	126
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		0.99	1.00		1.00	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	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	202	261	18	274	883	388	102	489	125	193	420	139
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	256	1671	115	335	1926	958	127	717	320	260	513	168
Arrive On Green	0.07	0.50	0.50	0.09	0.51	0.51	0.07	0.20	0.20	0.08	0.20	0.18
Sat Flow, veh/h	3456	3374	231	3563	3741	1565	1781	3554	1585	3428	2626	860
Grp Volume(v), veh/h	202	137	142	274	883	388	102	489	125	193	283	276
Grp Sat Flow(s),veh/h/ln	1728	1777	1828	1781	1870	1565	1781	1777	1585	1714	1777	1709
Q Serve(g_s), s	6.9	5.0	5.1	9.1	18.0	15.4	6.8	15.3	8.2	6.6	18.3	18.6
Cycle Q Clear(g_c), s	6.9	5.0	5.1	9.1	18.0	15.4	6.8	15.3	8.2	6.6	18.3	18.6
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	256	880	905	335	1926	958	127	717	320	260	347	334
V/C Ratio(X)	0.79	0.16	0.16	0.82	0.46	0.41	0.80	0.68	0.39	0.74	0.81	0.83
Avail Cap(c_a), veh/h	259	880	905	386	1926	958	193	717	320	514	415	399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	54.6	16.6	16.6	53.4	18.5	12.1	54.9	44.3	41.5	54.3	46.2	46.7
Incr Delay (d2), s/veh	14.8	0.4	0.4	11.6	0.8	1.3	13.1	2.7	0.8	3.6	9.0	10.3
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	3.5	2.1	2.2	4.4	7.3	5.3	3.5	6.9	3.2	2.9	8.8	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.5	16.9	17.0	65.0	19.3	13.4	67.9	47.0	42.3	57.9	55.2	57.0
LnGrp LOS	E	B	B	E	B	B	E	D	D	E	E	E
Approach Vol, veh/h		481			1545			716			752	
Approach Delay, s/veh		39.0			25.9			49.1			56.5	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	65.8	13.9	27.4	15.3	63.4	13.1	28.2
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7
Max Q Clear Time (g_c+I1), s	8.9	20.0	8.8	20.6	11.1	7.1	8.6	17.3
Green Ext Time (p_c), s	0.0	6.3	0.1	1.2	0.2	1.0	0.5	1.2

Intersection Summary	
HCM 6th Ctrl Delay	39.1
HCM 6th LOS	D

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.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	330	85	106	286	646	98	684	96	774	733	235
Future Volume (veh/h)	301	330	85	106	286	646	98	684	96	774	733	235
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	324	355	87	114	308	0	105	735	0	832	788	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	576	253	143	566		159	829		902	1634	
Arrive On Green	0.08	0.16	0.16	0.08	0.16	0.00	0.05	0.23	0.00	0.26	0.46	0.00
Sat Flow, veh/h	3456	3554	1564	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	324	355	87	114	308	0	105	735	0	832	788	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1564	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	10.0	11.2	4.1	7.5	9.6	0.0	3.6	24.0	0.0	28.1	18.5	0.0
Cycle Q Clear(g_c), s	10.0	11.2	4.1	7.5	9.6	0.0	3.6	24.0	0.0	28.1	18.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	288	576	253	143	566		159	829		902	1634	
V/C Ratio(X)	1.13	0.62	0.34	0.79	0.54		0.66	0.89		0.92	0.48	
Avail Cap(c_a), veh/h	288	859	378	178	918		403	829		1008	1634	
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	0.96	0.96	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.0	46.8	21.9	54.2	46.4	0.0	56.3	44.5	0.0	43.2	22.5	0.0
Incr Delay (d2), s/veh	91.0	0.4	0.3	13.7	1.7	0.0	1.7	13.4	0.0	12.0	1.0	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	7.9	4.9	2.3	3.9	4.3	0.0	1.6	11.9	0.0	13.3	7.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	146.0	47.2	22.2	67.9	48.1	0.0	58.0	57.9	0.0	55.2	23.5	0.0
LnGrp LOS	F	D	C	E	D		E	E		E	C	
Approach Vol, veh/h		766			422			840			1620	
Approach Delay, s/veh		86.2			53.5			57.9			39.8	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.7	32.0	13.7	23.4	9.5	59.2	14.0	23.1
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	10.0	29.8
Max Q Clear Time (g_c+I1), s	30.1	26.0	9.5	13.2	5.6	20.5	12.0	11.6
Green Ext Time (p_c), s	1.2	0.4	0.0	0.9	0.1	8.4	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	55.3
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	1053	722	34	72	64
Future Volume (veh/h)	70	1053	722	34	72	64
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	1145	785	36	78	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	133	2843	2520	116	168	75
Arrive On Green	0.04	0.80	0.73	0.72	0.05	0.05
Sat Flow, veh/h	3456	3647	3553	159	3563	1585
Grp Volume(v), veh/h	76	1145	403	418	78	15
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1841	1781	1585
Q Serve(g_s), s	2.6	11.4	9.6	9.6	2.6	1.1
Cycle Q Clear(g_c), s	2.6	11.4	9.6	9.6	2.6	1.1
Prop In Lane	1.00			0.09	1.00	1.00
Lane Grp Cap(c), veh/h	133	2843	1294	1341	168	75
V/C Ratio(X)	0.57	0.40	0.31	0.31	0.46	0.20
Avail Cap(c_a), veh/h	749	2843	1294	1341	475	211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	56.7	3.5	5.7	5.8	55.7	55.0
Incr Delay (d2), s/veh	1.7	0.2	0.6	0.6	0.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.1	3.2	3.3	1.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	58.4	3.8	6.3	6.3	56.4	55.5
LnGrp LOS	E	A	A	A	E	E
Approach Vol, veh/h		1221	821		93	
Approach Delay, s/veh		7.2	6.3		56.3	
Approach LOS		A	A		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	91.4		9.7		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	4.6	11.6		4.6		13.4
Green Ext Time (p_c), s	0.2	3.5		0.1		7.0

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

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	73	14	86	0	0	49
Future Volume (veh/h)	73	14	86	0	0	49
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	86	16	101	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	143	1375	730	0	12	10
Arrive On Green	0.08	0.74	0.39	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	86	16	101	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.7	0.0	0.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.5	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	143	1375	730	0	12	10
V/C Ratio(X)	0.60	0.01	0.14	0.00	0.00	0.00
Avail Cap(c_a), veh/h	2357	3824	3824	0	1179	1049
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	0.00	0.00
Uniform Delay (d), s/veh	6.7	0.5	3.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.7	0.5	3.1	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		102	101		0	
Approach Delay, s/veh		9.1	3.1		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.2	9.9				15.1	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.7	2.5				2.0	0.0
Green Ext Time (p_c), s	0.2	0.3				0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.1
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1092	8	51	772	1	18	0	116	5	0	3
Future Volume (veh/h)	7	1092	8	51	772	1	18	0	116	5	0	3
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		0.98	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	1162	8	54	821	1	19	0	99	5	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	2110	15	89	2275	3	49	8	115	150	0	0
Arrive On Green	0.02	1.00	1.00	0.05	0.62	0.61	0.11	0.00	0.10	0.11	0.00	0.00
Sat Flow, veh/h	1781	3618	25	1781	3642	4	141	74	1120	880	0	0
Grp Volume(v), veh/h	7	571	599	54	401	421	118	0	0	5	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1866	1781	1777	1869	1335	0	0	880	0	0
Q Serve(g_s), s	0.5	0.0	0.0	3.6	13.1	13.1	5.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	0.0	3.6	13.1	13.1	10.3	0.0	0.0	0.7	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.16		0.84	1.00		0.00
Lane Grp Cap(c), veh/h	15	1036	1088	89	1110	1168	183	0	0	158	0	0
V/C Ratio(X)	0.45	0.55	0.55	0.61	0.36	0.36	0.64	0.00	0.00	0.03	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1088	148	1110	1168	355	0	0	327	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.76	0.76	0.76	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.7	0.0	0.0	55.8	10.9	10.9	52.8	0.0	0.0	48.2	0.0	0.0
Incr Delay (d2), s/veh	7.0	2.0	1.9	1.9	0.7	0.7	1.4	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.2	0.6	0.6	1.6	5.0	5.2	3.6	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.7	2.0	1.9	57.7	11.6	11.6	54.2	0.0	0.0	48.2	0.0	0.0
LnGrp LOS	E	A	A	E	B	B	D	A	A	D	A	A
Approach Vol, veh/h		1177			876			118			5	
Approach Delay, s/veh		2.3			14.4			54.2			48.2	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	79.0		16.3	10.0	74.0		16.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.5	15.1		12.3	5.6	2.0		2.7				
Green Ext Time (p_c), s	0.0	3.5		0.2	0.0	5.7		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	711	32	155	329	264	47	435	311	515	504	103
Future Volume (veh/h)	155	711	32	155	329	264	47	435	311	515	504	103
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		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	733	28	160	339	92	48	448	316	531	520	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	227	1105	42	224	1174	1028	62	559	249	1102	1337	264
Arrive On Green	0.07	0.32	0.32	0.06	0.31	0.31	0.04	0.16	0.16	0.32	0.45	0.44
Sat Flow, veh/h	3456	3489	133	3563	3741	1564	1781	3554	1585	3456	2956	583
Grp Volume(v), veh/h	160	373	388	160	339	92	48	448	316	531	312	311
Grp Sat Flow(s),veh/h/ln	1728	1777	1845	1781	1870	1564	1781	1777	1585	1728	1777	1763
Q Serve(g_s), s	5.4	21.8	21.8	5.3	8.2	0.6	3.2	14.6	15.5	14.8	14.0	14.2
Cycle Q Clear(g_c), s	5.4	21.8	21.8	5.3	8.2	0.6	3.2	14.6	15.5	14.8	14.0	14.2
Prop In Lane	1.00		0.07	1.00		1.00	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	227	563	584	224	1174	1028	62	559	249	1102	803	797
V/C Ratio(X)	0.71	0.66	0.66	0.72	0.29	0.09	0.77	0.80	1.27	0.48	0.39	0.39
Avail Cap(c_a), veh/h	576	563	584	416	1174	1028	238	563	251	1102	803	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	54.9	35.5	35.5	55.2	31.1	2.3	57.4	48.7	34.0	32.9	21.8	22.0
Incr Delay (d2), s/veh	4.0	6.1	5.9	4.2	0.6	0.2	17.7	8.1	147.9	0.3	1.3	1.3
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	2.5	10.1	10.5	2.4	3.6	0.3	1.7	7.0	16.1	6.1	5.9	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.9	41.5	41.3	59.4	31.7	2.4	75.1	56.8	182.0	33.2	23.1	23.3
LnGrp LOS	E	D	D	E	C	A	E	E	F	C	C	C
Approach Vol, veh/h		921			591			812			1154	
Approach Delay, s/veh		44.5			34.6			106.6			27.8	
Approach LOS		D			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	41.7	8.2	58.3	11.5	42.0	43.6	22.9				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	20.0	29.6	16.0	34.7	14.0	35.6	33.0	* 18				
Max Q Clear Time (g_c+I1), s	7.4	10.2	5.2	16.2	7.3	23.8	16.8	17.5				
Green Ext Time (p_c), s	0.5	1.6	0.1	2.3	0.3	2.5	2.2	0.1				

Intersection Summary	
HCM 6th Ctrl Delay	51.8
HCM 6th LOS	D

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
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	330	85	106	286	646	98	684	96	774	733	235
Future Volume (veh/h)	301	330	85	106	286	646	98	684	96	774	733	235
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	324	355	87	114	308	0	105	735	0	832	788	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	576	253	172	563		159	829		902	1634	
Arrive On Green	0.10	0.16	0.16	0.10	0.16	0.00	0.05	0.23	0.00	0.26	0.46	0.00
Sat Flow, veh/h	3456	3554	1564	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	324	355	87	114	308	0	105	735	0	832	788	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1564	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	11.2	11.2	4.3	7.4	9.6	0.0	3.6	24.0	0.0	28.1	18.5	0.0
Cycle Q Clear(g_c), s	11.2	11.2	4.3	7.4	9.6	0.0	3.6	24.0	0.0	28.1	18.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	576	253	172	563		159	829		902	1634	
V/C Ratio(X)	0.94	0.62	0.34	0.66	0.55		0.66	0.89		0.92	0.48	
Avail Cap(c_a), veh/h	346	859	378	178	859		403	829		1008	1634	
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	0.96	0.96	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.6	46.8	23.1	52.3	46.5	0.0	56.3	44.5	0.0	43.2	22.5	0.0
Incr Delay (d2), s/veh	32.2	0.4	0.3	6.4	1.7	0.0	1.7	13.4	0.0	12.0	1.0	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	6.4	4.9	2.3	3.6	4.3	0.0	1.6	11.9	0.0	13.3	7.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.9	47.2	23.4	58.7	48.2	0.0	58.0	57.9	0.0	55.2	23.5	0.0
LnGrp LOS	F	D	C	E	D		E	E		E	C	
Approach Vol, veh/h		766			422			840			1620	
Approach Delay, s/veh		60.9			51.1			57.9			39.8	
Approach LOS		E			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.7	32.0	15.6	23.4	9.5	59.2	16.0	23.0
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	12.0	27.8
Max Q Clear Time (g_c+I1), s	30.1	26.0	9.4	13.2	5.6	20.5	13.2	11.6
Green Ext Time (p_c), s	1.2	0.4	0.0	0.9	0.1	8.4	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	49.7
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	240	190	270	420	1040	180	780	130	550	990	250
Future Volume (veh/h)	320	240	190	270	420	1040	180	780	130	550	990	250
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		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	255	196	287	447	0	191	830	0	585	1053	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	400	621	270	313	871		251	829		638	1269	
Arrive On Green	0.12	0.17	0.17	0.18	0.25	0.00	0.07	0.23	0.00	0.18	0.36	0.00
Sat Flow, veh/h	3456	3554	1545	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	340	255	196	287	447	0	191	830	0	585	1053	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1545	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	11.6	7.7	10.3	19.0	13.0	0.0	6.5	28.0	0.0	19.9	32.5	0.0
Cycle Q Clear(g_c), s	11.6	7.7	10.3	19.0	13.0	0.0	6.5	28.0	0.0	19.9	32.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	400	621	270	313	871		251	829		638	1269	
V/C Ratio(X)	0.85	0.41	0.73	0.92	0.51		0.76	1.00		0.92	0.83	
Avail Cap(c_a), veh/h	490	888	386	341	1066		432	829		662	1269	
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	0.30	0.30	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.0	44.0	23.9	48.6	39.1	0.0	54.6	46.0	0.0	48.0	35.2	0.0
Incr Delay (d2), s/veh	9.8	0.2	1.6	10.4	0.3	0.0	1.8	31.5	0.0	16.8	6.4	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	5.5	3.4	3.8	9.2	5.7	0.0	2.9	15.8	0.0	10.0	14.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.8	44.2	25.5	58.9	39.4	0.0	56.4	77.5	0.0	64.8	41.6	0.0
LnGrp LOS	E	D	C	E	D		E	F		E	D	
Approach Vol, veh/h		791			734			1021			1638	
Approach Delay, s/veh		47.1			47.0			73.5			49.9	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.6	32.0	26.3	25.0	12.7	46.8	17.9	33.4
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	21.9	30.0	21.0	12.3	8.5	34.5	13.6	15.0
Green Ext Time (p_c), s	0.2	0.0	0.1	0.9	0.2	0.1	0.3	3.9

Intersection Summary	
HCM 6th Ctrl Delay	54.7
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	120	560	1610	80	60	170
Future Volume (veh/h)	120	560	1610	80	60	170
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	135	629	1809	82	77	39
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	275	2706	2105	95	295	146
Arrive On Green	0.08	0.76	0.61	0.59	0.09	0.09
Sat Flow, veh/h	3456	3647	3552	155	3196	1585
Grp Volume(v), veh/h	135	629	922	969	77	39
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1837	1598	1585
Q Serve(g_s), s	2.0	2.8	23.1	23.9	1.2	1.3
Cycle Q Clear(g_c), s	2.0	2.8	23.1	23.9	1.2	1.3
Prop In Lane	1.00			0.08	1.00	1.00
Lane Grp Cap(c), veh/h	275	2706	1082	1118	295	146
V/C Ratio(X)	0.49	0.23	0.85	0.87	0.26	0.27
Avail Cap(c_a), veh/h	2338	2706	1179	1219	1221	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	1.9	8.7	8.9	23.1	23.1
Incr Delay (d2), s/veh	1.0	0.0	5.8	6.4	0.2	0.4
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	0.2	6.7	7.4	0.4	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.1	1.9	14.5	15.3	23.3	23.5
LnGrp LOS	C	A	B	B	C	C
Approach Vol, veh/h		764	1891		116	
Approach Delay, s/veh		6.0	14.9		23.3	
Approach LOS		A	B		C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.4	37.3		9.0		45.7
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	4.0	25.9		3.3		4.8
Green Ext Time (p_c), s	0.4	6.1		0.2		3.0

Intersection Summary	
HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	100	90	0	0	110
Future Volume (veh/h)	90	100	90	0	0	110
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	1870	1811	1722	1870	1870	1870
Adj Flow Rate, veh/h	103	115	103	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	6	12	2	2	2
Cap, veh/h	165	1338	663	0	12	10
Arrive On Green	0.09	0.74	0.39	0.00	0.00	0.00
Sat Flow, veh/h	1781	1811	1722	0	1781	1585
Grp Volume(v), veh/h	103	115	103	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1811	1722	0	1781	1585
Q Serve(g_s), s	0.9	0.3	0.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.3	0.6	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	165	1338	663	0	12	10
V/C Ratio(X)	0.62	0.09	0.16	0.00	0.00	0.00
Avail Cap(c_a), veh/h	2326	3653	3474	0	1163	1035
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	0.00	0.00
Uniform Delay (d), s/veh	6.7	0.6	3.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	0.6	3.2	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		218	103		0	
Approach Delay, s/veh		5.3	3.2		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.4	9.9				15.3	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.9	2.6				2.3	0.0
Green Ext Time (p_c), s	0.3	0.3				0.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	4.6
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	610	20	210	1670	10	10	0	40	10	0	10
Future Volume (veh/h)	10	610	20	210	1670	10	10	0	40	10	0	10
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		0.97	0.98		1.00	0.98		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	11	685	19	236	1876	11	11	0	0	11	0	7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	26	1682	47	325	2336	14	235	0	0	186	0	29
Arrive On Green	0.01	0.48	0.45	0.18	0.65	0.61	0.07	0.00	0.00	0.07	0.00	0.05
Sat Flow, veh/h	1781	3529	98	1781	3622	21	1222	0	0	911	0	579
Grp Volume(v), veh/h	11	345	359	236	919	968	11	0	0	18	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	1866	1222	0	0	1490	0	0
Q Serve(g_s), s	0.3	5.2	5.2	5.1	15.7	15.8	0.0	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.3	5.2	5.2	5.1	15.7	15.8	0.3	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.01	1.00		0.00	0.61		0.39
Lane Grp Cap(c), veh/h	26	847	882	325	1146	1204	265	0	0	250	0	0
V/C Ratio(X)	0.43	0.41	0.41	0.73	0.80	0.80	0.04	0.00	0.00	0.07	0.00	0.00
Avail Cap(c_a), veh/h	649	1781	1854	865	1350	1418	636	0	0	709	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.1	7.0	7.0	15.9	5.4	5.4	18.3	0.0	0.0	18.5	0.0	0.0
Incr Delay (d2), s/veh	4.2	0.3	0.3	1.2	3.1	3.0	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.1	1.2	1.3	1.7	2.4	2.5	0.1	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	7.3	7.3	17.0	8.5	8.4	18.3	0.0	0.0	18.6	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		715			2123			11			18	
Approach Delay, s/veh		7.6			9.4			18.3			18.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	30.6		6.0	11.5	23.6		6.0				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.3	17.8		2.3	7.1	7.2		2.4				
Green Ext Time (p_c), s	0.0	7.5		0.0	0.4	2.8		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 Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	230	50	240	1000	1070	10	580	130	140	350	130
Future Volume (veh/h)	260	230	50	240	1000	1070	10	580	130	140	350	130
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	292	258	32	270	1488	683	11	652	136	157	393	143
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1647	202	331	2003	983	91	681	315	221	494	177
Arrive On Green	0.08	0.52	0.50	0.09	0.54	0.54	0.05	0.19	0.20	0.06	0.19	0.18
Sat Flow, veh/h	3456	3183	391	3563	3741	1585	1781	3554	1554	3428	2540	911
Grp Volume(v), veh/h	292	143	147	270	1488	683	11	652	136	157	273	263
Grp Sat Flow(s),veh/h/ln	1728	1777	1797	1781	1870	1585	1781	1777	1554	1714	1777	1674
Q Serve(g_s), s	9.0	5.1	5.2	8.9	36.8	34.5	0.7	21.8	9.2	5.4	17.6	18.0
Cycle Q Clear(g_c), s	9.0	5.1	5.2	8.9	36.8	34.5	0.7	21.8	9.2	5.4	17.6	18.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	259	920	930	331	2003	983	91	681	315	221	345	325
V/C Ratio(X)	1.13	0.16	0.16	0.82	0.74	0.70	0.12	0.96	0.43	0.71	0.79	0.81
Avail Cap(c_a), veh/h	259	920	930	386	2003	983	193	681	315	514	415	391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	55.5	15.2	15.4	53.4	21.5	15.2	54.4	48.0	41.8	55.0	46.0	46.5
Incr Delay (d2), s/veh	94.3	0.4	0.4	11.2	2.5	4.1	0.6	24.4	0.9	3.7	7.6	9.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	2.1	2.2	4.3	14.9	12.3	0.3	11.7	3.5	2.4	8.3	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	149.8	15.5	15.7	64.7	24.0	19.3	55.0	72.4	42.8	58.8	53.6	55.8
LnGrp LOS	F	B	B	E	C	B	D	E	D	E	D	E
Approach Vol, veh/h		582			2441			799			693	
Approach Delay, s/veh		83.0			27.2			67.1			55.6	
Approach LOS		F			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	68.2	11.4	27.3	15.1	66.1	11.8	27.0				
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3				
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7				
Max Q Clear Time (g_c+I1), s	11.0	38.8	2.7	20.0	10.9	7.2	7.4	23.8				
Green Ext Time (p_c), s	0.0	8.4	0.0	1.2	0.2	1.1	0.4	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	45.8
HCM 6th LOS	D

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
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	240	190	270	420	1040	180	780	130	550	990	250
Future Volume (veh/h)	320	240	190	270	420	1040	180	780	130	550	990	250
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	255	196	287	447	0	191	830	0	585	1053	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	625	272	425	691		248	1149		804	1504	
Arrive On Green	0.11	0.18	0.18	0.12	0.19	0.00	0.07	0.32	0.00	0.16	0.42	0.00
Sat Flow, veh/h	3456	3554	1546	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	340	255	196	287	447	0	191	830	0	585	1053	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1546	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	11.6	7.6	10.5	9.5	13.9	0.0	6.5	24.7	0.0	13.3	29.1	0.0
Cycle Q Clear(g_c), s	11.6	7.6	10.5	9.5	13.9	0.0	6.5	24.7	0.0	13.3	29.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	396	625	272	425	691		248	1149		804	1504	
V/C Ratio(X)	0.86	0.41	0.72	0.67	0.65		0.77	0.72		0.73	0.70	
Avail Cap(c_a), veh/h	432	865	376	425	806		317	1149		963	1504	
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	0.30	0.30	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.2	43.9	25.0	50.3	44.5	0.0	54.7	35.8	0.0	47.9	28.4	0.0
Incr Delay (d2), s/veh	13.9	0.2	2.0	1.1	0.7	0.0	6.2	4.0	0.0	1.6	2.7	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	5.7	3.4	4.0	4.2	6.1	0.0	3.0	11.2	0.0	5.6	12.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	44.1	27.0	51.4	45.3	0.0	60.9	39.8	0.0	49.6	31.1	0.0
LnGrp LOS	E	D	C	D	D		E	D		D	C	
Approach Vol, veh/h		791			734			1021			1638	
Approach Delay, s/veh		49.3			47.7			43.8			37.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.6	42.8	20.0	25.1	12.6	54.8	17.7	27.3
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 37	13.0	* 28	11.0	49.4	15.0	26.0
Max Q Clear Time (g_c+I1), s	15.3	26.7	11.5	12.5	8.5	31.1	13.6	15.9
Green Ext Time (p_c), s	1.1	5.3	0.1	0.9	0.1	9.5	0.1	2.7

Intersection Summary	
HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	540	110	180	360	750	130	810	120	1020	1040	200
Future Volume (veh/h)	380	540	110	180	360	750	130	810	120	1020	1040	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	396	562	111	188	375	0	135	844	0	1062	1083	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	439	724	320	178	629		192	829		1008	1709	
Arrive On Green	0.13	0.20	0.20	0.10	0.18	0.00	0.06	0.23	0.00	0.29	0.48	0.00
Sat Flow, veh/h	3456	3554	1571	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	396	562	111	188	375	0	135	844	0	1062	1083	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	13.6	17.9	5.7	12.0	11.7	0.0	4.6	28.0	0.0	35.0	27.3	0.0
Cycle Q Clear(g_c), s	13.6	17.9	5.7	12.0	11.7	0.0	4.6	28.0	0.0	35.0	27.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	439	724	320	178	629		192	829		1008	1709	
V/C Ratio(X)	0.90	0.78	0.35	1.06	0.60		0.70	1.02		1.05	0.63	
Avail Cap(c_a), veh/h	439	859	380	178	918		403	829		1008	1709	
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	0.95	0.95	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.7	45.2	25.4	54.0	45.4	0.0	55.7	46.0	0.0	42.5	23.2	0.0
Incr Delay (d2), s/veh	21.1	3.0	0.2	81.1	1.8	0.0	1.7	35.8	0.0	43.6	1.8	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	7.1	8.1	2.8	9.3	5.3	0.0	2.0	16.3	0.0	20.7	11.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.7	48.2	25.7	135.1	47.3	0.0	57.4	81.8	0.0	86.1	25.0	0.0
LnGrp LOS	E	D	C	F	D		E	F		F	C	
Approach Vol, veh/h		1069			563			979			2145	
Approach Delay, s/veh		55.0			76.6			78.4			55.3	
Approach LOS		D			E			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.4	32.0	16.0	28.5	10.7	61.7	19.2	25.2
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	10.0	29.8
Max Q Clear Time (g_c+I1), s	37.0	30.0	14.0	19.9	6.6	29.3	15.6	13.7
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.1	9.8	0.0	2.9

Intersection Summary	
HCM 6th Ctrl Delay	62.5
HCM 6th LOS	E

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	1350	850	30	60	90
Future Volume (veh/h)	100	1350	850	30	60	90
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	1392	876	30	62	27
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	161	2843	2521	86	168	75
Arrive On Green	0.05	0.80	0.72	0.71	0.05	0.05
Sat Flow, veh/h	3456	3647	3595	120	3563	1585
Grp Volume(v), veh/h	103	1392	444	462	62	27
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1845	1781	1585
Q Serve(g_s), s	3.5	15.5	11.2	11.2	2.0	2.0
Cycle Q Clear(g_c), s	3.5	15.5	11.2	11.2	2.0	2.0
Prop In Lane	1.00			0.07	1.00	1.00
Lane Grp Cap(c), veh/h	161	2843	1279	1328	168	75
V/C Ratio(X)	0.64	0.49	0.35	0.35	0.37	0.36
Avail Cap(c_a), veh/h	749	2843	1279	1328	475	211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.24	0.24	0.95	0.95	0.99	0.99
Uniform Delay (d), s/veh	56.2	3.9	6.3	6.3	55.5	55.4
Incr Delay (d2), s/veh	0.8	0.1	0.7	0.7	0.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	4.1	3.8	4.0	0.9	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.0	4.1	7.0	7.0	56.0	56.5
LnGrp LOS	E	A	A	A	E	E
Approach Vol, veh/h		1495	906		89	
Approach Delay, s/veh		7.7	7.0		56.1	
Approach LOS		A	A		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.6	90.4		9.6		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	5.5	13.2		4.0		17.5
Green Ext Time (p_c), s	0.3	4.0		0.1		9.6

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	20	70	0	10	60
Future Volume (veh/h)	100	20	70	0	10	60
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	118	24	82	0	12	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	171	1101	549	0	23	20
Arrive On Green	0.10	0.59	0.29	0.00	0.01	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	118	24	82	0	12	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	1.3	0.1	0.7	0.0	0.1	0.0
Cycle Q Clear(g_c), s	1.3	0.1	0.7	0.0	0.1	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	171	1101	549	0	23	20
V/C Ratio(X)	0.69	0.02	0.15	0.00	0.52	0.00
Avail Cap(c_a), veh/h	1773	2877	2877	0	887	789
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	8.8	1.7	5.2	0.0	9.9	0.0
Incr Delay (d2), s/veh	4.9	0.0	0.1	0.0	6.7	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	0.0	0.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	1.7	5.4	0.0	16.5	0.0
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h		142	82		12	
Approach Delay, s/veh		11.7	5.4		16.5	
Approach LOS		B	A		B	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.9	9.9				15.8	4.3
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	3.3	2.7				2.1	2.1
Green Ext Time (p_c), s	0.3	0.2				0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1390	10	70	870	10	20	0	190	10	0	10
Future Volume (veh/h)	10	1390	10	70	870	10	20	0	190	10	0	10
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	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	1463	10	74	916	11	21	0	63	11	0	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	23	2110	14	103	2259	27	56	7	76	115	8	33
Arrive On Green	0.03	1.00	1.00	0.06	0.63	0.62	0.09	0.00	0.08	0.09	0.00	0.08
Sat Flow, veh/h	1781	3617	25	1781	3595	43	238	90	984	831	107	426
Grp Volume(v), veh/h	11	718	755	74	453	474	84	0	0	16	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1865	1781	1777	1861	1312	0	0	1364	0	0
Q Serve(g_s), s	0.7	0.0	0.0	4.9	15.3	15.3	4.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.9	15.3	15.3	7.5	0.0	0.0	1.0	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.02	0.25		0.75	0.69		0.31
Lane Grp Cap(c), veh/h	23	1036	1088	103	1116	1169	150	0	0	167	0	0
V/C Ratio(X)	0.48	0.69	0.69	0.72	0.41	0.41	0.56	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1088	148	1116	1169	351	0	0	385	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.78	0.78	0.78	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.1	0.0	0.0	55.6	11.1	11.1	54.3	0.0	0.0	51.2	0.0	0.0
Incr Delay (d2), s/veh	5.2	3.4	3.3	2.8	0.9	0.8	1.2	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	1.0	2.2	5.8	6.0	2.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	3.4	3.3	58.3	12.0	12.0	55.6	0.0	0.0	51.3	0.0	0.0
LnGrp LOS	E	A	A	E	B	B	E	A	A	D	A	A
Approach Vol, veh/h		1484			1001			84			16	
Approach Delay, s/veh		3.8			15.4			55.6			51.3	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	79.4		13.3	10.9	74.0		13.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.7	17.3		9.5	6.9	2.0		3.0				
Green Ext Time (p_c), s	0.0	4.1		0.2	0.0	8.5		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	1040	50	130	110	270	40	370	280	850	520	170
Future Volume (veh/h)	200	1040	50	130	110	270	40	370	280	850	520	170
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		0.99	1.00		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	217	1130	45	141	120	6	43	402	81	924	565	144
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	1102	44	203	1087	1025	57	504	220	1176	1289	327
Arrive On Green	0.08	0.32	0.32	0.06	0.29	0.29	0.03	0.14	0.14	0.34	0.46	0.45
Sat Flow, veh/h	3456	3481	139	3563	3741	1564	1781	3554	1555	3456	2795	710
Grp Volume(v), veh/h	217	577	598	141	120	6	43	402	81	924	358	351
Grp Sat Flow(s),veh/h/ln	1728	1777	1842	1781	1870	1564	1781	1777	1555	1728	1777	1728
Q Serve(g_s), s	7.4	38.0	38.0	4.7	2.8	0.0	2.9	13.1	4.7	28.9	16.3	16.6
Cycle Q Clear(g_c), s	7.4	38.0	38.0	4.7	2.8	0.0	2.9	13.1	4.7	28.9	16.3	16.6
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.41
Lane Grp Cap(c), veh/h	288	563	583	203	1087	1025	57	504	220	1176	819	797
V/C Ratio(X)	0.75	1.02	1.03	0.69	0.11	0.01	0.76	0.80	0.37	0.79	0.44	0.44
Avail Cap(c_a), veh/h	576	563	583	416	1087	1025	238	563	246	1176	819	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78
Uniform Delay (d), s/veh	53.8	41.0	41.0	55.5	31.2	2.0	57.6	49.8	32.2	35.6	21.8	22.1
Incr Delay (d2), s/veh	4.0	44.4	43.9	4.2	0.2	0.0	18.7	7.2	1.0	2.8	1.3	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	22.9	23.7	2.1	1.2	0.0	1.6	6.2	2.2	12.2	6.9	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	85.4	84.9	59.7	31.4	2.0	76.3	57.1	33.2	38.5	23.1	23.4
LnGrp LOS	E	F	F	E	C	A	E	E	C	D	C	C
Approach Vol, veh/h		1392			267			526			1633	
Approach Delay, s/veh		80.9			45.7			55.0			31.9	
Approach LOS		F			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	38.9	7.8	59.3	10.9	42.0	46.1	21.0				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	20.0	29.6	16.0	34.7	14.0	35.6	33.0	* 18				
Max Q Clear Time (g_c+I1), s	9.4	4.8	4.9	18.6	6.7	40.0	30.9	15.1				
Green Ext Time (p_c), s	0.6	0.4	0.1	2.6	0.3	0.0	1.0	0.6				

Intersection Summary	
HCM 6th Ctrl Delay	53.9
HCM 6th LOS	D

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.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	540	110	180	360	750	130	810	120	1020	1040	200
Future Volume (veh/h)	380	540	110	180	360	750	130	810	120	1020	1040	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	396	562	111	188	375	0	135	844	0	1062	1083	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	725	320	245	622		190	971		1185	1656	
Arrive On Green	0.10	0.20	0.20	0.07	0.17	0.00	0.05	0.27	0.00	0.24	0.47	0.00
Sat Flow, veh/h	3456	3554	1571	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	396	562	111	188	375	0	135	844	0	1062	1083	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	12.0	17.9	5.3	6.4	11.7	0.0	4.6	27.2	0.0	24.6	28.1	0.0
Cycle Q Clear(g_c), s	12.0	17.9	5.3	6.4	11.7	0.0	4.6	27.2	0.0	24.6	28.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	725	320	245	622		190	971		1185	1656	
V/C Ratio(X)	1.15	0.78	0.35	0.77	0.60		0.71	0.87		0.90	0.65	
Avail Cap(c_a), veh/h	346	865	382	288	806		259	971		1340	1656	
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	0.95	0.95	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	45.2	22.0	54.8	45.7	0.0	55.8	41.6	0.0	44.4	24.6	0.0
Incr Delay (d2), s/veh	94.2	3.0	0.2	7.7	1.9	0.0	2.7	10.4	0.0	7.1	2.0	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	9.7	8.1	2.8	3.0	5.3	0.0	2.1	13.1	0.0	10.8	11.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	148.2	48.1	22.2	62.4	47.6	0.0	58.5	52.0	0.0	51.5	26.7	0.0
LnGrp LOS	F	D	C	E	D		E	D		D	C	
Approach Vol, veh/h		1069			563			979			2145	
Approach Delay, s/veh		82.5			52.5			52.9			39.0	
Approach LOS		F			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.7	36.8	12.5	28.5	10.6	59.9	16.0	25.0
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	32.0	* 31	10.0	28.0	9.0	54.4	12.0	26.0
Max Q Clear Time (g_c+I1), s	26.6	29.2	8.4	19.9	6.6	30.1	14.0	13.7
Green Ext Time (p_c), s	1.7	1.4	0.1	1.2	0.1	11.6	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	53.2
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	437	190	282	462	1017	180	600	167	753	990	250
Future Volume (veh/h)	320	437	190	282	462	1017	180	600	167	753	990	250
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	320	437	184	282	462	0	180	600	0	753	990	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	678	295	383	716		240	829		854	1229	
Arrive On Green	0.11	0.19	0.19	0.11	0.20	0.00	0.07	0.23	0.00	0.17	0.35	0.00
Sat Flow, veh/h	3456	3554	1547	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	320	437	184	282	462	0	180	600	0	753	990	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1547	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	10.9	13.6	8.3	9.5	14.3	0.0	6.1	18.7	0.0	17.6	30.3	0.0
Cycle Q Clear(g_c), s	10.9	13.6	8.3	9.5	14.3	0.0	6.1	18.7	0.0	17.6	30.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	678	295	383	716		240	829		854	1229	
V/C Ratio(X)	0.84	0.64	0.62	0.74	0.65		0.75	0.72		0.88	0.81	
Avail Cap(c_a), veh/h	490	888	387	662	1066		432	829		963	1229	
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	0.38	0.38	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.4	44.8	17.9	51.7	44.0	0.0	54.8	42.4	0.0	48.6	35.6	0.0
Incr Delay (d2), s/veh	8.1	0.4	0.8	0.4	0.8	0.0	1.8	5.4	0.0	8.1	5.7	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	5.1	6.0	3.0	4.1	6.3	0.0	2.7	8.7	0.0	7.9	13.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	45.2	18.7	52.1	44.8	0.0	56.6	47.9	0.0	56.7	41.3	0.0
LnGrp LOS	E	D	B	D	D		E	D		E	D	
Approach Vol, veh/h		941			744			780			1743	
Approach Delay, s/veh		45.2			47.5			49.9			48.0	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.8	32.0	18.5	26.9	12.3	45.5	17.2	28.2
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	19.6	20.7	11.5	15.6	8.1	32.3	12.9	16.3
Green Ext Time (p_c), s	0.9	2.5	0.5	1.3	0.2	1.6	0.3	3.9

Intersection Summary	
HCM 6th Ctrl Delay	47.6
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	667	560	1390	104	63	561
Future Volume (veh/h)	667	560	1390	104	63	561
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	667	560	1390	96	63	281
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	836	2697	1559	107	214	424
Arrive On Green	0.24	0.76	0.46	0.45	0.13	0.13
Sat Flow, veh/h	3456	3647	3459	231	1598	3170
Grp Volume(v), veh/h	667	560	731	755	63	281
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1820	1598	1585
Q Serve(g_s), s	13.5	3.4	28.0	28.3	2.6	6.3
Cycle Q Clear(g_c), s	13.5	3.4	28.0	28.3	2.6	6.3
Prop In Lane	1.00			0.13	1.00	1.00
Lane Grp Cap(c), veh/h	836	2697	823	843	214	424
V/C Ratio(X)	0.80	0.21	0.89	0.90	0.29	0.66
Avail Cap(c_a), veh/h	1717	2697	866	887	448	890
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	2.6	18.2	18.4	29.1	30.7
Incr Delay (d2), s/veh	1.3	0.0	10.8	11.3	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.6	12.1	12.7	1.0	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.9	2.6	29.1	29.7	29.4	31.3
LnGrp LOS	C	A	C	C	C	C
Approach Vol, veh/h		1227	1486		344	
Approach Delay, s/veh		16.3	29.4		31.0	
Approach LOS		B	C		C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	22.0	38.5		14.0		60.5
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	15.5	30.3		8.3		5.4
Green Ext Time (p_c), s	2.5	2.8		0.8		2.7

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

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	681	514	0	0	110
Future Volume (veh/h)	90	681	514	0	0	110
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	681	514	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	146	2677	1508	0	11	10
Arrive On Green	0.08	0.75	0.42	0.00	0.00	0.00
Sat Flow, veh/h	1781	3647	3741	0	1781	1585
Grp Volume(v), veh/h	90	681	514	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	0	1781	1585
Q Serve(g_s), s	0.8	0.9	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.9	1.6	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	146	2677	1508	0	11	10
V/C Ratio(X)	0.61	0.25	0.34	0.00	0.00	0.00
Avail Cap(c_a), veh/h	4835	17975	7453	0	3296	2933
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	0.00	0.00
Uniform Delay (d), s/veh	7.2	0.6	3.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.1	0.0	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.3	0.7	3.3	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		771	514		0	
Approach Delay, s/veh		1.9	3.3		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.3	10.9				16.2	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	44.0	33.1				81.1	30.0
Max Q Clear Time (g_c+I1), s	2.8	3.6				2.9	0.0
Green Ext Time (p_c), s	0.3	2.4				3.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	2.5
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	593	20	230	1424	20	10	0	50	10	0	20
Future Volume (veh/h)	20	593	20	230	1424	20	10	0	50	10	0	20
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		0.97	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	20	593	17	230	1424	20	10	0	0	10	0	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	45	1554	45	328	2151	30	261	0	0	165	0	53
Arrive On Green	0.03	0.44	0.41	0.18	0.60	0.57	0.08	0.00	0.00	0.08	0.00	0.06
Sat Flow, veh/h	1781	3525	101	1781	3586	50	1231	0	0	586	0	938
Grp Volume(v), veh/h	20	299	311	230	705	739	10	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	1860	1231	0	0	1524	0	0
Q Serve(g_s), s	0.4	4.3	4.3	4.6	9.9	10.0	0.0	0.0	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.4	4.3	4.3	4.6	9.9	10.0	0.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	1.00		0.00	0.38		0.62
Lane Grp Cap(c), veh/h	45	783	815	328	1066	1116	293	0	0	259	0	0
V/C Ratio(X)	0.45	0.38	0.38	0.70	0.66	0.66	0.03	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	709	1948	2027	946	1476	1545	694	0	0	771	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.1	7.1	7.1	14.4	5.0	5.0	16.4	0.0	0.0	16.8	0.0	0.0
Incr Delay (d2), s/veh	2.6	0.3	0.3	1.0	0.7	0.7	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.0	1.0	1.5	1.2	1.3	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	7.4	7.4	15.4	5.7	5.7	16.4	0.0	0.0	16.9	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		630			1674			10			26	
Approach Delay, s/veh		7.8			7.0			16.4			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	26.6		6.1	10.9	20.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.4	12.0		2.2	6.6	6.3		2.6				
Green Ext Time (p_c), s	0.0	6.6		0.0	0.4	2.4		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.4
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	590	50	240	880	948	200	499	480	134	347	152
Future Volume (veh/h)	297	590	50	240	880	948	200	499	480	134	347	152
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	297	590	29	240	880	0	200	499	165	134	347	98
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1685	83	300	1780		193	830	363	196	468	130
Arrive On Green	0.08	0.49	0.47	0.09	0.50	0.00	0.11	0.23	0.23	0.06	0.17	0.16
Sat Flow, veh/h	3456	3446	169	3456	3554	1585	1781	3554	1555	3428	2725	757
Grp Volume(v), veh/h	297	304	315	240	880	0	200	499	165	134	224	221
Grp Sat Flow(s),veh/h/ln	1728	1777	1838	1728	1777	1585	1781	1777	1555	1714	1777	1705
Q Serve(g_s), s	9.0	12.7	12.7	8.2	19.7	0.0	13.0	15.0	10.9	4.6	14.3	14.8
Cycle Q Clear(g_c), s	9.0	12.7	12.7	8.2	19.7	0.0	13.0	15.0	10.9	4.6	14.3	14.8
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.44
Lane Grp Cap(c), veh/h	259	869	899	300	1780		193	830	363	196	305	293
V/C Ratio(X)	1.15	0.35	0.35	0.80	0.49		1.04	0.60	0.45	0.68	0.73	0.75
Avail Cap(c_a), veh/h	259	869	899	374	1780		193	830	363	514	415	398
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	18.9	19.0	53.8	19.9	0.0	53.5	41.0	39.4	55.5	47.1	47.6
Incr Delay (d2), s/veh	101.1	1.1	1.1	9.5	1.0	0.0	74.7	1.2	0.9	4.2	4.4	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	5.3	5.5	3.8	7.7	0.0	9.7	6.6	4.2	2.1	6.6	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	156.6	20.0	20.1	63.2	20.9	0.0	128.2	42.2	40.3	59.7	51.5	53.0
LnGrp LOS	F	C	C	E	C		F	D	D	E	D	D
Approach Vol, veh/h		916			1120			864			579	
Approach Delay, s/veh		64.3			29.9			61.7			54.0	
Approach LOS		E			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	64.1	18.3	24.6	14.4	62.7	10.9	32.0				
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3				
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7				
Max Q Clear Time (g_c+I1), s	11.0	21.7	15.0	16.8	10.2	14.7	6.6	17.0				
Green Ext Time (p_c), s	0.0	4.1	0.0	1.2	0.2	2.4	0.3	1.3				

Intersection Summary	
HCM 6th Ctrl Delay	50.9
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	590	50	240	880	948	200	499	480	134	347	152
Future Volume (veh/h)	297	590	50	240	880	948	200	499	480	134	347	152
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	297	590	29	240	880	0	200	499	165	134	347	98
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	346	1610	79	296	1609		231	907	550	201	472	131
Arrive On Green	0.10	0.47	0.45	0.09	0.45	0.00	0.13	0.26	0.26	0.06	0.17	0.16
Sat Flow, veh/h	3456	3446	169	3456	3554	1585	1781	3554	1556	3428	2725	757
Grp Volume(v), veh/h	297	304	315	240	880	0	200	499	165	134	224	221
Grp Sat Flow(s),veh/h/ln	1728	1777	1838	1728	1777	1585	1781	1777	1556	1714	1777	1705
Q Serve(g_s), s	10.2	13.2	13.3	8.2	21.6	0.0	13.2	14.6	9.2	4.6	14.3	14.8
Cycle Q Clear(g_c), s	10.2	13.2	13.3	8.2	21.6	0.0	13.2	14.6	9.2	4.6	14.3	14.8
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.44
Lane Grp Cap(c), veh/h	346	830	859	296	1609		231	907	550	201	308	295
V/C Ratio(X)	0.86	0.37	0.37	0.81	0.55		0.86	0.55	0.30	0.67	0.73	0.75
Avail Cap(c_a), veh/h	346	830	859	317	1609		341	907	550	1028	484	465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	20.5	20.6	53.9	23.9	0.0	51.2	38.7	28.2	55.3	46.9	47.4
Incr Delay (d2), s/veh	19.1	1.2	1.2	14.0	1.3	0.0	14.1	0.7	0.3	3.7	3.3	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	5.6	5.8	4.0	8.6	0.0	6.7	6.3	3.4	2.1	6.5	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.2	21.8	21.8	67.9	25.2	0.0	65.3	39.4	28.5	59.1	50.2	51.2
LnGrp LOS	E	C	C	E	C		E	D	C	E	D	D
Approach Vol, veh/h		916			1120			864			579	
Approach Delay, s/veh		38.2			34.4			43.3			52.7	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	58.3	20.9	24.8	14.3	60.1	11.0	34.6
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3
Max Green Setting (Gmax), s	12.0	33.9	23.0	* 31	11.0	34.9	36.0	18.4
Max Q Clear Time (g_c+I1), s	12.2	23.6	15.2	16.8	10.2	15.3	6.6	16.6
Green Ext Time (p_c), s	0.0	2.9	0.4	1.5	0.1	2.3	0.5	0.6

Intersection Summary	
HCM 6th Ctrl Delay	40.6
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	531	110	224	634	937	130	680	151	995	930	200
Future Volume (veh/h)	380	531	110	224	634	937	130	680	151	995	930	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	380	531	106	224	634	0	130	680	0	995	930	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	705	311	421	783		187	829		1137	1483	
Arrive On Green	0.10	0.20	0.20	0.12	0.22	0.00	0.05	0.23	0.00	0.23	0.42	0.00
Sat Flow, veh/h	3456	3554	1571	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	380	531	106	224	634	0	130	680	0	995	930	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	12.0	16.9	5.1	7.3	20.3	0.0	4.4	21.8	0.0	22.9	24.8	0.0
Cycle Q Clear(g_c), s	12.0	16.9	5.1	7.3	20.3	0.0	4.4	21.8	0.0	22.9	24.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	705	311	421	783		187	829		1137	1483	
V/C Ratio(X)	1.10	0.75	0.34	0.53	0.81		0.70	0.82		0.88	0.63	
Avail Cap(c_a), veh/h	346	859	380	421	859		403	829		1465	1483	
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	0.84	0.84	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	45.3	22.1	49.5	44.4	0.0	55.8	43.6	0.0	44.8	27.6	0.0
Incr Delay (d2), s/veh	77.9	2.3	0.2	0.6	5.6	0.0	1.7	8.9	0.0	4.2	2.0	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	8.9	7.6	2.6	3.2	9.4	0.0	2.0	10.5	0.0	9.8	10.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	131.9	47.6	22.3	50.0	50.0	0.0	57.5	52.5	0.0	49.0	29.6	0.0
LnGrp LOS	F	D	C	D	D		E	D		D	C	
Approach Vol, veh/h		1017			858			810			1925	
Approach Delay, s/veh		76.5			50.0			53.3			39.6	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.6	32.0	18.6	27.8	10.5	54.1	16.0	30.4
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	12.0	27.8
Max Q Clear Time (g_c+I1), s	24.9	23.8	9.3	18.9	6.4	26.8	14.0	22.3
Green Ext Time (p_c), s	2.2	1.5	0.1	1.1	0.1	9.0	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	52.1
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	447	1230	740	42	118	865
Future Volume (veh/h)	447	1230	740	42	118	865
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	447	1230	740	34	118	433
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	526	2843	2123	98	238	423
Arrive On Green	0.15	0.80	0.61	0.60	0.13	0.13
Sat Flow, veh/h	3456	3647	3548	159	1781	3170
Grp Volume(v), veh/h	447	1230	380	394	118	433
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1837	1781	1585
Q Serve(g_s), s	15.1	12.7	12.6	12.6	7.4	16.0
Cycle Q Clear(g_c), s	15.1	12.7	12.6	12.6	7.4	16.0
Prop In Lane	1.00			0.09	1.00	1.00
Lane Grp Cap(c), veh/h	526	2843	1092	1129	238	423
V/C Ratio(X)	0.85	0.43	0.35	0.35	0.50	1.02
Avail Cap(c_a), veh/h	749	2843	1092	1129	238	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.97	0.97	0.90	0.90
Uniform Delay (d), s/veh	49.5	3.7	11.3	11.4	48.3	52.0
Incr Delay (d2), s/veh	3.7	0.3	0.9	0.8	0.5	47.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	3.5	4.9	5.0	3.3	9.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.3	4.0	12.2	12.2	48.8	99.9
LnGrp LOS	D	A	B	B	D	F
Approach Vol, veh/h		1677	774		551	
Approach Delay, s/veh		17.1	12.2		88.9	
Approach LOS		B	B		F	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	22.3	77.7		20.0		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	17.1	14.6		18.0		14.7
Green Ext Time (p_c), s	1.1	3.3		0.0		7.8

Intersection Summary	
HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	389	923	0	10	60
Future Volume (veh/h)	100	389	923	0	10	60
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	389	923	0	10	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	139	2468	1667	0	19	17
Arrive On Green	0.08	0.69	0.47	0.00	0.01	0.00
Sat Flow, veh/h	1781	3647	3741	0	1781	1585
Grp Volume(v), veh/h	100	389	923	0	10	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	0	1781	1585
Q Serve(g_s), s	1.5	1.0	5.1	0.0	0.2	0.0
Cycle Q Clear(g_c), s	1.5	1.0	5.1	0.0	0.2	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	139	2468	1667	0	19	17
V/C Ratio(X)	0.72	0.16	0.55	0.00	0.52	0.00
Avail Cap(c_a), veh/h	2889	10740	4453	0	1970	1753
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	12.2	1.4	5.2	0.0	13.4	0.0
Incr Delay (d2), s/veh	6.8	0.0	0.3	0.0	8.1	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	0.7	0.0	0.6	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.0	1.5	5.5	0.0	21.4	0.0
LnGrp LOS	B	A	A	A	C	A
Approach Vol, veh/h		489	923		10	
Approach Delay, s/veh		5.0	5.5		21.4	
Approach LOS		A	A		C	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.1	16.7				22.8	4.3
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	44.0	33.1				81.1	30.0
Max Q Clear Time (g_c+I1), s	3.5	7.1				3.0	2.2
Green Ext Time (p_c), s	0.4	4.8				1.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	5.4
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1258	20	90	732	10	20	0	230	20	0	10
Future Volume (veh/h)	10	1258	20	90	732	10	20	0	230	20	0	10
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	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	1258	19	90	732	10	20	0	100	20	0	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	21	2089	32	119	2289	31	50	8	117	137	5	17
Arrive On Green	0.02	1.00	1.00	0.07	0.64	0.63	0.11	0.00	0.11	0.11	0.00	0.11
Sat Flow, veh/h	1781	3582	54	1781	3588	49	146	75	1106	782	44	165
Grp Volume(v), veh/h	10	624	653	90	362	380	120	0	0	24	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1859	1781	1777	1860	1327	0	0	991	0	0
Q Serve(g_s), s	0.7	0.0	0.0	6.0	11.1	11.1	6.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.0	11.1	11.1	10.5	0.0	0.0	2.6	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.03	0.17		0.83	0.83		0.17
Lane Grp Cap(c), veh/h	21	1036	1084	119	1134	1187	186	0	0	168	0	0
V/C Ratio(X)	0.48	0.60	0.60	0.76	0.32	0.32	0.65	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1084	148	1134	1187	353	0	0	337	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.2	0.0	0.0	55.1	9.9	9.9	52.6	0.0	0.0	48.6	0.0	0.0
Incr Delay (d2), s/veh	5.1	2.2	2.1	11.9	0.7	0.7	1.4	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	0.3	0.6	0.6	3.0	4.2	4.4	3.6	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.3	2.2	2.1	67.0	10.6	10.6	54.0	0.0	0.0	48.8	0.0	0.0
LnGrp LOS	E	A	A	E	B	B	D	A	A	D	A	A
Approach Vol, veh/h		1287			832			120			24	
Approach Delay, s/veh		2.6			16.7			54.0			48.8	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	80.6		16.7	12.0	74.0		16.7				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.7	13.1		12.5	8.0	2.0		4.6				
Green Ext Time (p_c), s	0.0	3.1		0.2	0.0	6.6		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	930	50	630	460	264	40	367	420	846	518	254
Future Volume (veh/h)	201	930	50	630	460	264	40	367	420	846	518	254
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		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	201	930	42	630	460	0	40	367	154	846	518	180
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	986	45	634	1396		55	476	208	876	947	327
Arrive On Green	0.08	0.28	0.28	0.18	0.39	0.00	0.03	0.13	0.13	0.25	0.37	0.36
Sat Flow, veh/h	3456	3459	156	3456	3554	1585	1781	3554	1555	3456	2576	890
Grp Volume(v), veh/h	201	478	494	630	460	0	40	367	154	846	356	342
Grp Sat Flow(s),veh/h/ln	1728	1777	1839	1728	1777	1585	1781	1777	1555	1728	1777	1690
Q Serve(g_s), s	6.9	31.5	31.5	21.8	10.8	0.0	2.7	12.0	9.3	29.0	19.0	19.3
Cycle Q Clear(g_c), s	6.9	31.5	31.5	21.8	10.8	0.0	2.7	12.0	9.3	29.0	19.0	19.3
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.53
Lane Grp Cap(c), veh/h	261	506	524	634	1396		55	476	208	876	653	621
V/C Ratio(X)	0.77	0.94	0.94	0.99	0.33		0.73	0.77	0.74	0.97	0.55	0.55
Avail Cap(c_a), veh/h	346	506	524	634	1396		104	557	244	876	653	621
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	42.0	42.0	48.9	25.4	0.0	57.7	50.2	32.8	44.3	30.0	30.4
Incr Delay (d2), s/veh	7.4	28.1	27.5	34.3	0.6	0.0	17.0	5.6	9.6	22.4	3.3	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	17.3	17.9	11.9	4.4	0.0	1.4	5.6	4.0	14.8	8.5	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	70.1	69.5	83.2	26.0	0.0	74.7	55.8	42.4	66.7	33.3	33.9
LnGrp LOS	E	E	E	F	C		E	E	D	E	C	C
Approach Vol, veh/h		1173			1090			561			1544	
Approach Delay, s/veh		68.4			59.1			53.5			51.7	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	51.1	7.7	48.1	26.0	38.2	35.7	20.1				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	12.0	41.8	7.0	39.5	22.0	31.8	29.0	* 18				
Max Q Clear Time (g_c+I1), s	8.9	12.8	4.7	21.3	23.8	33.5	31.0	14.0				
Green Ext Time (p_c), s	0.2	1.9	0.0	2.7	0.0	0.0	0.0	0.8				

Intersection Summary	
HCM 6th Ctrl Delay	58.3
HCM 6th LOS	E

Notes

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

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	930	50	630	460	264	40	367	420	846	518	254
Future Volume (veh/h)	201	930	50	630	460	264	40	367	420	846	518	254
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		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	201	930	42	630	460	0	40	367	341	846	518	178
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	989	45	662	1428		55	468	526	1039	1067	365
Arrive On Green	0.08	0.29	0.29	0.19	0.40	0.00	0.03	0.13	0.13	0.30	0.41	0.40
Sat Flow, veh/h	3456	3459	156	3456	3554	1585	1781	3554	1555	3456	2585	884
Grp Volume(v), veh/h	201	478	494	630	460	0	40	367	341	846	355	341
Grp Sat Flow(s),veh/h/ln	1728	1777	1839	1728	1777	1585	1781	1777	1555	1728	1777	1692
Q Serve(g_s), s	6.9	31.5	31.5	21.6	10.7	0.0	2.7	12.0	10.4	27.2	17.6	17.9
Cycle Q Clear(g_c), s	6.9	31.5	31.5	21.6	10.7	0.0	2.7	12.0	10.4	27.2	17.6	17.9
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	261	508	526	662	1428		55	468	526	1039	733	698
V/C Ratio(X)	0.77	0.94	0.94	0.95	0.32		0.73	0.78	0.65	0.81	0.48	0.49
Avail Cap(c_a), veh/h	346	508	526	662	1428		89	495	537	1039	733	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	41.9	41.9	47.9	24.6	0.0	57.7	50.4	15.8	38.9	25.9	26.2
Incr Delay (d2), s/veh	7.4	27.6	27.0	23.6	0.6	0.0	17.0	7.7	2.7	5.1	2.3	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	17.3	17.8	11.0	4.3	0.0	1.4	5.7	3.8	11.9	7.7	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	69.5	68.8	71.5	25.2	0.0	74.7	58.1	18.5	43.9	28.2	28.6
LnGrp LOS	E	E	E	E	C		E	E	B	D	C	C
Approach Vol, veh/h		1173			1090			748			1542	
Approach Delay, s/veh		67.9			52.0			40.9			36.9	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	52.2	7.7	53.5	27.0	38.3	41.4	19.8
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3
Max Green Setting (Gmax), s	12.0	42.9	6.0	39.4	23.0	31.9	30.0	* 15
Max Q Clear Time (g_c+I1), s	8.9	12.7	4.7	19.9	23.6	33.5	29.2	14.0
Green Ext Time (p_c), s	0.2	1.9	0.0	2.7	0.0	0.0	0.4	0.5

Intersection Summary	
HCM 6th Ctrl Delay	49.2
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	257	232	169	299	397	898	159	670	142	563	1026	240
Future Volume (veh/h)	257	232	169	299	397	898	159	670	142	563	1026	240
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		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	247	174	318	422	0	169	713	0	599	1091	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	606	264	341	979		228	829		650	1304	
Arrive On Green	0.10	0.17	0.17	0.19	0.28	0.00	0.07	0.23	0.00	0.19	0.37	0.00
Sat Flow, veh/h	3456	3554	1545	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	273	247	174	318	422	0	169	713	0	599	1091	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1545	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	9.3	7.4	9.4	21.1	11.7	0.0	5.8	23.1	0.0	20.4	33.7	0.0
Cycle Q Clear(g_c), s	9.3	7.4	9.4	21.1	11.7	0.0	5.8	23.1	0.0	20.4	33.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	606	264	341	979		228	829		650	1304	
V/C Ratio(X)	0.82	0.41	0.66	0.93	0.43		0.74	0.86		0.92	0.84	
Avail Cap(c_a), veh/h	490	888	386	341	1066		432	829		662	1304	
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	0.60	0.60	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.1	44.4	25.6	47.7	35.7	0.0	55.0	44.1	0.0	47.9	34.7	0.0
Incr Delay (d2), s/veh	4.2	0.2	1.1	21.9	0.4	0.0	1.8	11.3	0.0	17.9	6.5	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	4.2	3.3	3.5	11.3	5.1	0.0	2.5	11.3	0.0	10.3	15.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	44.5	26.6	69.7	36.1	0.0	56.8	55.4	0.0	65.7	41.2	0.0
LnGrp LOS	E	D	C	E	D		E	E		E	D	
Approach Vol, veh/h		694			740			882			1690	
Approach Delay, s/veh		45.1			50.5			55.7			49.9	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	32.0	28.2	24.5	11.9	48.0	15.6	37.0
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	22.4	25.1	23.1	11.4	7.8	35.7	11.3	13.7
Green Ext Time (p_c), s	0.1	0.9	0.0	0.9	0.2	0.0	0.3	3.7

Intersection Summary	
HCM 6th Ctrl Delay	50.5
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	143	645	1224	111	109	252
Future Volume (veh/h)	143	645	1224	111	109	252
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	161	725	1375	117	172	88
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	315	2543	1793	152	384	190
Arrive On Green	0.09	0.72	0.54	0.52	0.12	0.12
Sat Flow, veh/h	3456	3647	3400	280	3196	1585
Grp Volume(v), veh/h	161	725	736	756	172	88
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1810	1598	1585
Q Serve(g_s), s	2.2	3.5	15.7	16.0	2.4	2.5
Cycle Q Clear(g_c), s	2.2	3.5	15.7	16.0	2.4	2.5
Prop In Lane	1.00			0.15	1.00	1.00
Lane Grp Cap(c), veh/h	315	2543	963	981	384	190
V/C Ratio(X)	0.51	0.29	0.76	0.77	0.45	0.46
Avail Cap(c_a), veh/h	2627	2651	1325	1350	1372	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	2.5	8.7	8.9	19.9	19.9
Incr Delay (d2), s/veh	1.0	0.1	1.8	1.9	0.3	0.7
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	0.4	4.0	4.3	0.8	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	2.5	10.5	10.7	20.2	20.6
LnGrp LOS	C	A	B	B	C	C
Approach Vol, veh/h		886	1492		260	
Approach Delay, s/veh		6.1	10.6		20.3	
Approach LOS		A	B		C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.4	30.4		9.8		38.8
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	4.2	18.0		4.5		5.5
Green Ext Time (p_c), s	0.5	6.8		0.6		3.6

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	110	194	2	0	129
Future Volume (veh/h)	68	110	194	2	0	129
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	1870	1811	1722	1870	1870	1870
Adj Flow Rate, veh/h	78	126	223	2	0	2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	6	12	2	2	2
Cap, veh/h	126	1057	521	5	9	8
Arrive On Green	0.07	0.58	0.31	0.21	0.00	0.00
Sat Flow, veh/h	1781	1811	1704	15	1781	1585
Grp Volume(v), veh/h	78	126	0	225	0	2
Grp Sat Flow(s),veh/h/ln	1781	1811	0	1719	1781	1585
Q Serve(g_s), s	0.8	0.6	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.6	0.0	2.0	0.0	0.0
Prop In Lane	1.00			0.01	1.00	1.00
Lane Grp Cap(c), veh/h	126	1057	0	525	9	8
V/C Ratio(X)	0.62	0.12	0.00	0.43	0.00	0.24
Avail Cap(c_a), veh/h	1845	2898	0	2751	922	821
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	8.7	1.8	0.0	5.4	0.0	9.6
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.6	0.0	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	1.8	0.0	5.9	0.0	15.2
LnGrp LOS	B	A	A	A	A	B
Approach Vol, veh/h		204	225		2	
Approach Delay, s/veh		6.3	5.9		15.2	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.4	9.9				15.3	4.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.8	4.0				2.6	2.0
Green Ext Time (p_c), s	0.2	0.8				0.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	694	12	179	1292	1	10	0	64	0	0	4
Future Volume (veh/h)	3	694	12	179	1292	1	10	0	64	0	0	4
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		0.97	0.97		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	3	780	10	201	1452	1	11	0	0	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	7	1696	22	306	2331	2	222	0	0	0	27	0
Arrive On Green	0.00	0.47	0.44	0.17	0.64	0.60	0.04	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1781	3591	46	1781	3644	3	1171	0	0	0	1870	0
Grp Volume(v), veh/h	3	386	404	201	708	745	11	0	0	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1861	1781	1777	1870	1171	0	0	0	1870	0
Q Serve(g_s), s	0.1	5.1	5.1	3.7	8.4	8.4	0.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	5.1	5.1	3.7	8.4	8.4	0.3	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h	7	839	879	306	1137	1196	255	0	0	0	27	0
V/C Ratio(X)	0.41	0.46	0.46	0.66	0.62	0.62	0.04	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	761	2089	2188	1014	1583	1666	738	0	0	0	799	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.4	6.2	6.3	13.6	3.8	3.8	16.7	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	13.1	0.4	0.4	0.9	0.6	0.5	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	1.0	1.0	1.1	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	6.6	6.6	14.5	4.4	4.3	16.7	0.0	0.0	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		793			1654			11			0	
Approach Delay, s/veh		6.7			5.6			16.7			0.0	
Approach LOS		A			A			B				

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.1	26.5		4.5	10.0	20.6		4.5				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.1	10.4		2.3	5.7	7.1		0.0				
Green Ext Time (p_c), s	0.0	6.8		0.0	0.3	3.3		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	6.0
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	194	62	198	723	708	142	569	132	180	440	165
Future Volume (veh/h)	202	194	62	198	723	708	142	569	132	180	440	165
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	227	218	46	222	926	444	160	639	138	202	494	182
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1310	271	285	1692	873	186	926	406	269	565	207
Arrive On Green	0.08	0.45	0.45	0.08	0.45	0.45	0.10	0.26	0.26	0.08	0.22	0.21
Sat Flow, veh/h	3456	2927	606	3563	3741	1585	1781	3554	1557	3428	2526	924
Grp Volume(v), veh/h	227	131	133	222	926	444	160	639	138	202	346	330
Grp Sat Flow(s),veh/h/ln	1728	1777	1756	1781	1870	1585	1781	1777	1557	1714	1777	1674
Q Serve(g_s), s	7.8	5.3	5.5	7.3	21.6	21.0	10.6	19.5	8.6	6.9	22.6	22.9
Cycle Q Clear(g_c), s	7.8	5.3	5.5	7.3	21.6	21.0	10.6	19.5	8.6	6.9	22.6	22.9
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	259	795	786	285	1692	873	186	926	406	269	397	374
V/C Ratio(X)	0.88	0.16	0.17	0.78	0.55	0.51	0.86	0.69	0.34	0.75	0.87	0.88
Avail Cap(c_a), veh/h	259	795	786	386	1692	873	193	926	406	514	415	391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	54.9	19.8	19.8	54.2	23.9	16.8	52.8	40.0	36.0	54.1	44.9	45.4
Incr Delay (d2), s/veh	26.7	0.4	0.5	6.9	1.3	2.1	29.3	2.2	0.5	3.6	15.3	17.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	2.2	2.3	3.4	9.1	7.7	6.2	8.6	3.3	3.1	11.4	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.6	20.2	20.3	61.1	25.2	18.9	82.1	42.2	36.5	57.7	60.2	62.6
LnGrp LOS	F	C	C	E	C	B	F	D	D	E	E	E
Approach Vol, veh/h		491			1592			937			878	
Approach Delay, s/veh		48.6			28.4			48.2			60.5	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	58.3	17.9	30.8	13.6	57.7	13.4	35.3				
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3				
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7				
Max Q Clear Time (g_c+I1), s	9.8	23.6	12.6	24.9	9.3	7.5	8.9	21.5				
Green Ext Time (p_c), s	0.0	6.9	0.0	0.6	0.3	1.0	0.5	0.1				

Intersection Summary	
HCM 6th Ctrl Delay	43.0
HCM 6th LOS	D

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.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	301	473	91	165	313	701	102	690	161	999	904	218
Future Volume (veh/h)	301	473	91	165	313	701	102	690	161	999	904	218
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	314	493	91	172	326	0	106	719	0	1041	942	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	680	300	178	594		160	829		1008	1742	
Arrive On Green	0.12	0.19	0.19	0.10	0.17	0.00	0.05	0.23	0.00	0.29	0.49	0.00
Sat Flow, veh/h	3456	3554	1570	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	314	493	91	172	326	0	106	719	0	1041	942	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1570	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	10.5	15.6	4.7	11.5	10.1	0.0	3.6	23.3	0.0	35.0	22.1	0.0
Cycle Q Clear(g_c), s	10.5	15.6	4.7	11.5	10.1	0.0	3.6	23.3	0.0	35.0	22.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	430	680	300	178	594		160	829		1008	1742	
V/C Ratio(X)	0.73	0.72	0.30	0.97	0.55		0.66	0.87		1.03	0.54	
Avail Cap(c_a), veh/h	430	859	379	178	918		403	829		1008	1742	
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	0.94	0.94	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.6	45.6	25.8	53.8	45.8	0.0	56.3	44.2	0.0	42.5	21.2	0.0
Incr Delay (d2), s/veh	5.5	1.5	0.2	54.9	1.6	0.0	1.7	11.8	0.0	37.1	1.2	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	4.8	7.0	2.3	7.8	4.6	0.0	1.6	11.5	0.0	19.8	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.1	47.0	26.0	108.7	47.4	0.0	58.0	56.0	0.0	79.6	22.4	0.0
LnGrp LOS	E	D	C	F	D		E	E		F	C	
Approach Vol, veh/h		898			498			825			1983	
Approach Delay, s/veh		48.1			68.6			56.3			52.5	
Approach LOS		D			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.4	32.0	16.0	27.0	9.6	62.8	18.9	24.0
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	10.0	29.8
Max Q Clear Time (g_c+I1), s	37.0	25.3	13.5	17.6	5.6	24.1	12.5	12.1
Green Ext Time (p_c), s	0.0	0.7	0.0	1.1	0.1	9.7	0.0	2.6

Intersection Summary	
HCM 6th Ctrl Delay	54.2
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	175	1281	796	75	96	133
Future Volume (veh/h)	175	1281	796	75	96	133
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	180	1321	821	76	112	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	248	2843	2279	211	218	97
Arrive On Green	0.07	0.80	0.69	0.68	0.06	0.06
Sat Flow, veh/h	3456	3647	3373	304	3563	1585
Grp Volume(v), veh/h	180	1321	445	452	112	57
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1806	1781	1585
Q Serve(g_s), s	6.1	14.2	12.2	12.3	3.7	4.2
Cycle Q Clear(g_c), s	6.1	14.2	12.2	12.3	3.7	4.2
Prop In Lane	1.00			0.17	1.00	1.00
Lane Grp Cap(c), veh/h	248	2843	1235	1255	218	97
V/C Ratio(X)	0.73	0.46	0.36	0.36	0.51	0.59
Avail Cap(c_a), veh/h	749	2843	1235	1255	475	211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.28	0.28	0.95	0.95	0.99	0.99
Uniform Delay (d), s/veh	54.5	3.8	7.5	7.5	54.6	54.9
Incr Delay (d2), s/veh	0.9	0.2	0.8	0.8	0.7	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.8	4.3	4.4	1.6	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	55.4	4.0	8.2	8.3	55.3	57.0
LnGrp LOS	E	A	A	A	E	E
Approach Vol, veh/h		1501	897		169	
Approach Delay, s/veh		10.1	8.3		55.9	
Approach LOS		B	A		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.6	87.4		11.3		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	8.1	14.3		6.2		16.2
Green Ext Time (p_c), s	0.5	4.0		0.2		8.8

Intersection Summary	
HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	94	145	158	0	0	62
Future Volume (veh/h)	94	145	158	0	0	62
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	171	186	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	175	1385	716	0	12	10
Arrive On Green	0.10	0.74	0.38	0.00	0.00	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	111	171	186	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.9	0.4	1.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.4	1.1	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	175	1385	716	0	12	10
V/C Ratio(X)	0.63	0.12	0.26	0.00	0.00	0.00
Avail Cap(c_a), veh/h	2311	3750	3750	0	1156	1028
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	0.00	0.00
Uniform Delay (d), s/veh	6.7	0.6	3.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.0	0.0	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	0.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	0.6	3.5	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		282	186		0	
Approach Delay, s/veh		4.5	3.5		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.5	9.9				15.4	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.9	3.1				2.4	0.0
Green Ext Time (p_c), s	0.3	0.7				0.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	4.1
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1465	11	66	893	1	21	0	171	1	0	6
Future Volume (veh/h)	1	1465	11	66	893	1	21	0	171	1	0	6
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	0.98		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1542	11	69	940	1	22	0	43	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	2	2109	15	98	2320	2	62	6	53	141	0	0
Arrive On Green	0.00	1.00	1.00	0.05	0.64	0.63	0.07	0.00	0.06	0.07	0.00	0.00
Sat Flow, veh/h	1781	3616	26	1781	3643	4	345	94	858	1303	0	0
Grp Volume(v), veh/h	1	757	796	69	459	482	65	0	0	1	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1865	1781	1777	1870	1297	0	0	1303	0	0
Q Serve(g_s), s	0.1	0.0	0.0	4.6	15.2	15.2	4.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	0.0	4.6	15.2	15.2	5.8	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.34		0.66	1.00		0.00
Lane Grp Cap(c), veh/h	2	1036	1088	98	1132	1191	131	0	0	152	0	0
V/C Ratio(X)	0.41	0.73	0.73	0.70	0.41	0.41	0.49	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1088	148	1132	1191	349	0	0	383	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.69	0.69	0.69	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	59.8	0.0	0.0	55.7	10.7	10.7	55.3	0.0	0.0	52.4	0.0	0.0
Incr Delay (d2), s/veh	33.1	4.1	3.9	2.4	0.7	0.7	1.1	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.1	1.2	1.2	2.1	5.6	5.9	2.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.9	4.1	3.9	58.1	11.4	11.4	56.4	0.0	0.0	52.4	0.0	0.0
LnGrp LOS	F	A	A	E	B	B	E	A	A	D	A	A
Approach Vol, veh/h		1554			1010			65			1	
Approach Delay, s/veh		4.1			14.6			56.4			52.4	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.2	80.4		11.4	10.6	74.0		11.4				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.1	17.2		7.8	6.6	2.0		2.1				
Green Ext Time (p_c), s	0.0	4.2		0.1	0.0	9.5		0.0				

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	800	47	115	276	285	49	454	285	816	569	153
Future Volume (veh/h)	191	800	47	115	276	285	49	454	285	816	569	153
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	208	870	42	125	300	114	53	493	306	887	618	162
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1092	53	186	1079	1004	69	563	246	1136	1274	333
Arrive On Green	0.08	0.32	0.32	0.05	0.29	0.29	0.04	0.16	0.16	0.33	0.46	0.45
Sat Flow, veh/h	3456	3447	166	3563	3741	1564	1781	3554	1556	3456	2775	726
Grp Volume(v), veh/h	208	448	464	125	300	114	53	493	306	887	395	385
Grp Sat Flow(s),veh/h/ln	1728	1777	1837	1781	1870	1564	1781	1777	1556	1728	1777	1724
Q Serve(g_s), s	7.1	27.7	27.7	4.1	7.4	0.9	3.5	16.3	15.8	27.8	18.6	18.7
Cycle Q Clear(g_c), s	7.1	27.7	27.7	4.1	7.4	0.9	3.5	16.3	15.8	27.8	18.6	18.7
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.42
Lane Grp Cap(c), veh/h	278	563	582	186	1079	1004	69	563	246	1136	816	792
V/C Ratio(X)	0.75	0.80	0.80	0.67	0.28	0.11	0.77	0.88	1.24	0.78	0.48	0.49
Avail Cap(c_a), veh/h	576	563	582	416	1079	1004	238	563	246	1136	816	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.76	0.76
Uniform Delay (d), s/veh	54.0	37.5	37.5	55.9	33.0	2.5	57.1	49.4	35.0	36.4	22.6	22.8
Incr Delay (d2), s/veh	4.0	11.2	10.9	4.2	0.6	0.2	16.1	14.5	138.3	2.7	1.6	1.6
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	3.2	13.4	13.8	1.9	3.3	0.4	1.9	8.2	15.3	11.8	7.8	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	48.7	48.3	60.0	33.7	2.7	73.3	63.8	173.3	39.1	24.1	24.4
LnGrp LOS	E	D	D	E	C	A	E	E	F	D	C	C
Approach Vol, veh/h		1120			539			852			1667	
Approach Delay, s/veh		50.3			33.2			103.7			32.2	
Approach LOS		D			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	38.6	8.7	59.1	10.3	42.0	44.7	23.0
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3
Max Green Setting (Gmax), s	20.0	29.6	16.0	34.7	14.0	35.6	33.0	* 18
Max Q Clear Time (g_c+I1), s	9.1	9.4	5.5	20.7	6.1	29.7	29.8	18.3
Green Ext Time (p_c), s	0.6	1.6	0.1	2.8	0.2	2.1	1.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.8
HCM 6th LOS	D

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
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	246	190	288	438	1085	180	780	136	566	990	250
Future Volume (veh/h)	320	246	190	288	438	1085	180	780	136	566	990	250
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	262	196	306	466	0	191	830	0	602	1053	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	400	625	272	331	911		251	829		652	1283	
Arrive On Green	0.12	0.18	0.18	0.19	0.26	0.00	0.07	0.23	0.00	0.19	0.36	0.00
Sat Flow, veh/h	3456	3554	1546	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	340	262	196	306	466	0	191	830	0	602	1053	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1546	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	11.6	7.9	10.5	20.3	13.5	0.0	6.5	28.0	0.0	20.5	32.3	0.0
Cycle Q Clear(g_c), s	11.6	7.9	10.5	20.3	13.5	0.0	6.5	28.0	0.0	20.5	32.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	400	625	272	331	911		251	829		652	1283	
V/C Ratio(X)	0.85	0.42	0.72	0.92	0.51		0.76	1.00		0.92	0.82	
Avail Cap(c_a), veh/h	490	888	386	341	1066		432	829		662	1283	
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	0.25	0.25	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.0	44.0	25.0	48.0	38.2	0.0	54.6	46.0	0.0	47.8	34.8	0.0
Incr Delay (d2), s/veh	9.8	0.2	1.6	10.3	0.2	0.0	1.8	31.5	0.0	18.1	6.0	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	5.5	3.5	3.9	9.8	5.8	0.0	2.9	15.8	0.0	10.4	14.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.8	44.2	26.6	58.3	38.4	0.0	56.4	77.5	0.0	65.9	40.8	0.0
LnGrp LOS	E	D	C	E	D		E	F		E	D	
Approach Vol, veh/h		798			772			1021			1655	
Approach Delay, s/veh		47.4			46.3			73.5			49.9	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	32.0	27.5	25.1	12.7	47.3	17.9	34.7
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	22.5	30.0	22.3	12.5	8.5	34.3	13.6	15.5
Green Ext Time (p_c), s	0.1	0.0	0.1	1.0	0.2	0.2	0.3	4.0

Intersection Summary	
HCM 6th Ctrl Delay	54.5
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	148	560	1610	92	96	251
Future Volume (veh/h)	148	560	1610	92	96	251
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	166	629	1809	95	83	167
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	292	2675	2054	107	173	343
Arrive On Green	0.08	0.75	0.60	0.58	0.11	0.11
Sat Flow, veh/h	3456	3647	3524	178	1598	3170
Grp Volume(v), veh/h	166	629	928	976	83	167
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1832	1598	1585
Q Serve(g_s), s	2.7	3.1	25.2	26.3	2.8	2.9
Cycle Q Clear(g_c), s	2.7	3.1	25.2	26.3	2.8	2.9
Prop In Lane	1.00			0.10	1.00	1.00
Lane Grp Cap(c), veh/h	292	2675	1064	1097	173	343
V/C Ratio(X)	0.57	0.24	0.87	0.89	0.48	0.49
Avail Cap(c_a), veh/h	2225	2675	1122	1157	581	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	2.1	9.7	10.0	24.1	24.1
Incr Delay (d2), s/veh	1.3	0.0	7.5	8.5	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.3	8.2	9.1	1.0	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.6	2.2	17.2	18.5	24.9	24.5
LnGrp LOS	C	A	B	B	C	C
Approach Vol, veh/h		795	1904		250	
Approach Delay, s/veh		7.3	17.8		24.6	
Approach LOS		A	B		C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	38.4		10.2		47.3
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	4.7	28.3		4.9		5.1
Green Ext Time (p_c), s	0.6	4.8		0.6		3.0

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	140	207	0	0	110
Future Volume (veh/h)	90	140	207	0	0	110
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	1870	1811	1722	1870	1870	1870
Adj Flow Rate, veh/h	103	161	238	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	6	12	2	2	2
Cap, veh/h	165	1338	663	0	12	10
Arrive On Green	0.09	0.74	0.39	0.00	0.00	0.00
Sat Flow, veh/h	1781	1811	1722	0	1781	1585
Grp Volume(v), veh/h	103	161	238	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1811	1722	0	1781	1585
Q Serve(g_s), s	0.9	0.4	1.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.4	1.5	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	165	1338	663	0	12	10
V/C Ratio(X)	0.62	0.12	0.36	0.00	0.00	0.00
Avail Cap(c_a), veh/h	2326	3653	3474	0	1163	1035
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	0.00	0.00
Uniform Delay (d), s/veh	6.7	0.6	3.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.3	0.0	0.0	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	0.3	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	0.6	3.7	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		264	238		0	
Approach Delay, s/veh		4.5	3.7		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.4	9.9				15.3	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	2.9	3.5				2.4	0.0
Green Ext Time (p_c), s	0.3	0.9				0.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	4.1
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	646	20	210	1682	10	10	0	40	10	0	10
Future Volume (veh/h)	10	646	20	210	1682	10	10	0	40	10	0	10
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		0.97	0.98		1.00	0.98		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	11	726	19	236	1890	11	11	0	0	11	0	7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	26	1692	44	325	2342	14	234	0	0	185	0	29
Arrive On Green	0.01	0.48	0.45	0.18	0.65	0.62	0.07	0.00	0.00	0.07	0.00	0.05
Sat Flow, veh/h	1781	3535	92	1781	3622	21	1222	0	0	911	0	579
Grp Volume(v), veh/h	11	365	380	236	926	975	11	0	0	18	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1851	1781	1777	1866	1222	0	0	1490	0	0
Q Serve(g_s), s	0.3	5.6	5.6	5.2	15.9	16.0	0.0	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.3	5.6	5.6	5.2	15.9	16.0	0.3	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.01	1.00		0.00	0.61		0.39
Lane Grp Cap(c), veh/h	26	851	886	325	1149	1207	264	0	0	249	0	0
V/C Ratio(X)	0.43	0.43	0.43	0.73	0.81	0.81	0.04	0.00	0.00	0.07	0.00	0.00
Avail Cap(c_a), veh/h	645	1772	1845	860	1343	1410	632	0	0	706	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.2	7.1	7.1	16.0	5.4	5.4	18.4	0.0	0.0	18.6	0.0	0.0
Incr Delay (d2), s/veh	4.2	0.3	0.3	1.2	3.2	3.1	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.1	1.3	1.3	1.8	2.4	2.5	0.1	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	7.4	7.4	17.1	8.6	8.5	18.4	0.0	0.0	18.7	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		756			2137			11			18	
Approach Delay, s/veh		7.7			9.5			18.4			18.7	
Approach LOS		A			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	30.8		6.0	11.6	23.8		6.0				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.3	18.0		2.3	7.2	7.6		2.4				
Green Ext Time (p_c), s	0.0	7.5		0.0	0.4	3.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	266	230	50	240	1000	1074	10	582	130	152	356	148
Future Volume (veh/h)	266	230	50	240	1000	1074	10	582	130	152	356	148
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	299	258	32	270	1493	685	11	654	136	171	400	163
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1633	200	331	1986	983	87	681	315	237	493	198
Arrive On Green	0.08	0.51	0.49	0.09	0.53	0.53	0.05	0.19	0.20	0.07	0.20	0.19
Sat Flow, veh/h	3456	3183	391	3563	3741	1585	1781	3554	1554	3428	2451	984
Grp Volume(v), veh/h	299	143	147	270	1493	685	11	654	136	171	288	275
Grp Sat Flow(s),veh/h/ln	1728	1777	1797	1781	1870	1585	1781	1777	1554	1714	1777	1659
Q Serve(g_s), s	9.0	5.1	5.3	8.9	37.4	34.7	0.7	21.9	9.2	5.9	18.6	19.1
Cycle Q Clear(g_c), s	9.0	5.1	5.3	8.9	37.4	34.7	0.7	21.9	9.2	5.9	18.6	19.1
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	259	912	922	331	1986	983	87	681	315	237	357	334
V/C Ratio(X)	1.15	0.16	0.16	0.82	0.75	0.70	0.13	0.96	0.43	0.72	0.81	0.82
Avail Cap(c_a), veh/h	259	912	922	386	1986	983	193	681	315	514	415	387
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	55.5	15.5	15.6	53.4	22.0	15.3	54.6	48.0	41.8	54.7	45.7	46.3
Incr Delay (d2), s/veh	103.9	0.4	0.4	11.2	2.7	4.1	0.6	25.0	0.9	3.7	8.8	10.6
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	7.6	2.1	2.2	4.3	15.2	12.4	0.3	11.8	3.5	2.6	8.9	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	159.4	15.8	16.0	64.7	24.6	19.3	55.3	73.0	42.8	58.4	54.5	56.9
LnGrp LOS	F	B	B	E	C	B	E	E	D	E	D	E
Approach Vol, veh/h		589			2448			801			734	
Approach Delay, s/veh		88.7			27.6			67.6			56.3	
Approach LOS		F			C			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	67.7	11.1	28.1	15.1	65.6	12.3	27.0				
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3				
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7				
Max Q Clear Time (g_c+I1), s	11.0	39.4	2.7	21.1	10.9	7.3	7.9	23.9				
Green Ext Time (p_c), s	0.0	8.2	0.0	1.2	0.2	1.1	0.4	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

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
1: Santa Rita Rd & Valley Ave

07/17/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	246	190	288	438	1085	180	780	136	566	990	250
Future Volume (veh/h)	320	246	190	288	438	1085	180	780	136	566	990	250
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	262	196	306	466	0	191	830	0	602	1053	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	625	272	434	700		248	1149		804	1504	
Arrive On Green	0.11	0.18	0.18	0.13	0.20	0.00	0.07	0.32	0.00	0.16	0.42	0.00
Sat Flow, veh/h	3456	3554	1546	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	340	262	196	306	466	0	191	830	0	602	1053	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1546	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	11.6	7.9	10.6	10.2	14.5	0.0	6.5	24.7	0.0	13.7	29.1	0.0
Cycle Q Clear(g_c), s	11.6	7.9	10.6	10.2	14.5	0.0	6.5	24.7	0.0	13.7	29.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	396	625	272	434	700		248	1149		804	1504	
V/C Ratio(X)	0.86	0.42	0.72	0.71	0.67		0.77	0.72		0.75	0.70	
Avail Cap(c_a), veh/h	432	865	376	434	806		317	1149		963	1504	
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	0.25	0.25	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.2	44.0	25.2	50.3	44.5	0.0	54.7	35.8	0.0	48.1	28.4	0.0
Incr Delay (d2), s/veh	13.9	0.2	2.0	1.1	0.7	0.0	6.2	4.0	0.0	2.0	2.7	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	5.7	3.5	4.0	4.4	6.4	0.0	3.0	11.2	0.0	5.8	12.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	44.1	27.2	51.5	45.2	0.0	60.9	39.8	0.0	50.1	31.1	0.0
LnGrp LOS	E	D	C	D	D		E	D		D	C	
Approach Vol, veh/h		798			772			1021			1655	
Approach Delay, s/veh		49.3			47.7			43.8			38.0	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.6	42.8	20.3	25.1	12.6	54.8	17.7	27.7
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 37	13.0	* 28	11.0	49.4	15.0	26.0
Max Q Clear Time (g_c+I1), s	15.7	26.7	12.2	12.6	8.5	31.1	13.6	16.5
Green Ext Time (p_c), s	1.1	5.3	0.1	0.9	0.1	9.5	0.1	2.7

Intersection Summary	
HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	560	110	191	371	781	130	810	140	1072	1040	200
Future Volume (veh/h)	380	560	110	191	371	781	130	810	140	1072	1040	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	396	583	111	199	386	0	135	844	0	1117	1083	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	444	738	326	178	636		192	829		1008	1709	
Arrive On Green	0.13	0.21	0.21	0.10	0.18	0.00	0.06	0.23	0.00	0.29	0.48	0.00
Sat Flow, veh/h	3456	3554	1571	1781	3554	1585	3456	3647	0	3456	3554	1585
Grp Volume(v), veh/h	396	583	111	199	386	0	135	844	0	1117	1083	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1781	1777	1585	1728	1777	0	1728	1777	1585
Q Serve(g_s), s	13.5	18.7	5.7	12.0	12.0	0.0	4.6	28.0	0.0	35.0	27.3	0.0
Cycle Q Clear(g_c), s	13.5	18.7	5.7	12.0	12.0	0.0	4.6	28.0	0.0	35.0	27.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	444	738	326	178	636		192	829		1008	1709	
V/C Ratio(X)	0.89	0.79	0.34	1.12	0.61		0.70	1.02		1.11	0.63	
Avail Cap(c_a), veh/h	444	859	380	178	918		403	829		1008	1709	
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	0.93	0.93	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.5	45.1	25.4	54.0	45.4	0.0	55.7	46.0	0.0	42.5	23.2	0.0
Incr Delay (d2), s/veh	19.2	3.6	0.2	100.0	1.9	0.0	1.7	35.8	0.0	62.9	1.8	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	7.0	8.5	2.8	10.3	5.4	0.0	2.0	16.3	0.0	23.4	11.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.7	48.7	25.7	154.0	47.2	0.0	57.4	81.8	0.0	105.4	25.0	0.0
LnGrp LOS	E	D	C	F	D		E	F		F	C	
Approach Vol, veh/h		1090			585			979			2200	
Approach Delay, s/veh		54.4			83.5			78.4			65.8	
Approach LOS		D			F			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.4	32.0	16.0	28.9	10.7	61.7	19.4	25.5
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	10.0	29.8
Max Q Clear Time (g_c+I1), s	37.0	30.0	14.0	20.7	6.6	29.3	15.5	14.0
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.1	9.8	0.0	3.0

Intersection Summary	
HCM 6th Ctrl Delay	67.9
HCM 6th LOS	E

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	192	1350	850	70	83	143
Future Volume (veh/h)	192	1350	850	70	83	143
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	198	1392	876	71	110	56
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	268	2843	2289	186	215	96
Arrive On Green	0.08	0.80	0.69	0.68	0.06	0.06
Sat Flow, veh/h	3456	3647	3414	269	3563	1585
Grp Volume(v), veh/h	198	1392	469	478	110	56
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1813	1781	1585
Q Serve(g_s), s	6.7	15.5	13.4	13.4	3.6	4.1
Cycle Q Clear(g_c), s	6.7	15.5	13.4	13.4	3.6	4.1
Prop In Lane	1.00			0.15	1.00	1.00
Lane Grp Cap(c), veh/h	268	2843	1225	1250	215	96
V/C Ratio(X)	0.74	0.49	0.38	0.38	0.51	0.58
Avail Cap(c_a), veh/h	749	2843	1225	1250	475	211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.15	0.15	0.95	0.95	0.99	0.99
Uniform Delay (d), s/veh	54.2	3.9	7.9	7.9	54.7	54.9
Incr Delay (d2), s/veh	0.5	0.1	0.9	0.8	0.7	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.1	4.8	4.9	1.6	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	54.6	4.0	8.7	8.8	55.4	57.0
LnGrp LOS	D	A	A	A	E	E
Approach Vol, veh/h		1590	947		166	
Approach Delay, s/veh		10.3	8.8		55.9	
Approach LOS		B	A		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.3	86.7		11.2		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	8.7	15.4		6.1		17.5
Green Ext Time (p_c), s	0.6	4.3		0.2		9.6

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

06/30/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	152	146	0	10	60
Future Volume (veh/h)	100	152	146	0	10	60
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	118	179	172	0	12	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	171	1101	549	0	23	20
Arrive On Green	0.10	0.59	0.29	0.00	0.01	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	118	179	172	0	12	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	1.3	0.9	1.4	0.0	0.1	0.0
Cycle Q Clear(g_c), s	1.3	0.9	1.4	0.0	0.1	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	171	1101	549	0	23	20
V/C Ratio(X)	0.69	0.16	0.31	0.00	0.52	0.00
Avail Cap(c_a), veh/h	1773	2877	2877	0	887	789
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	8.8	1.9	5.5	0.0	9.9	0.0
Incr Delay (d2), s/veh	4.9	0.1	0.3	0.0	6.7	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	0.0	0.2	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	1.9	5.8	0.0	16.5	0.0
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h		297	172		12	
Approach Delay, s/veh		6.6	5.8		16.5	
Approach LOS		A	A		B	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.9	9.9				15.8	4.3
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	20.0	30.0				30.0	10.0
Max Q Clear Time (g_c+I1), s	3.3	3.4				2.9	2.1
Green Ext Time (p_c), s	0.3	0.6				0.6	0.0

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

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

06/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1413	10	70	910	10	20	0	190	10	0	10
Future Volume (veh/h)	10	1413	10	70	910	10	20	0	190	10	0	10
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	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	1487	10	74	958	11	21	0	63	11	0	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	23	2110	14	103	2260	26	56	7	76	115	8	33
Arrive On Green	0.03	1.00	1.00	0.06	0.63	0.62	0.09	0.00	0.08	0.09	0.00	0.08
Sat Flow, veh/h	1781	3618	24	1781	3597	41	238	90	984	831	107	426
Grp Volume(v), veh/h	11	730	767	74	473	496	84	0	0	16	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1865	1781	1777	1862	1312	0	0	1364	0	0
Q Serve(g_s), s	0.7	0.0	0.0	4.9	16.2	16.2	4.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.9	16.2	16.2	7.5	0.0	0.0	1.0	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.02	0.25		0.75	0.69		0.31
Lane Grp Cap(c), veh/h	23	1036	1088	103	1116	1170	150	0	0	167	0	0
V/C Ratio(X)	0.48	0.70	0.70	0.72	0.42	0.42	0.56	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1088	148	1116	1170	351	0	0	385	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.76	0.76	0.76	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.1	0.0	0.0	55.6	11.3	11.3	54.3	0.0	0.0	51.2	0.0	0.0
Incr Delay (d2), s/veh	5.1	3.5	3.4	2.7	0.9	0.9	1.2	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	1.0	2.2	6.1	6.4	2.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	3.5	3.4	58.3	12.2	12.2	55.6	0.0	0.0	51.3	0.0	0.0
LnGrp LOS	E	A	A	E	B	B	E	A	A	D	A	A
Approach Vol, veh/h		1508			1043			84			16	
Approach Delay, s/veh		3.9			15.5			55.6			51.3	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	79.4		13.3	10.9	74.0		13.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.7	18.2		9.5	6.9	2.0		3.0				
Green Ext Time (p_c), s	0.0	4.3		0.2	0.0	8.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	1040	50	130	110	283	40	377	280	858	524	181
Future Volume (veh/h)	220	1040	50	130	110	283	40	377	280	858	524	181
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		0.99	1.00		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	1130	45	141	120	21	43	410	81	933	570	156
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	311	1102	44	203	1062	1012	57	510	223	1170	1267	346
Arrive On Green	0.09	0.32	0.32	0.06	0.28	0.28	0.03	0.14	0.14	0.34	0.46	0.45
Sat Flow, veh/h	3456	3481	139	3563	3741	1564	1781	3554	1555	3456	2747	749
Grp Volume(v), veh/h	239	577	598	141	120	21	43	410	81	933	368	358
Grp Sat Flow(s),veh/h/ln	1728	1777	1842	1781	1870	1564	1781	1777	1555	1728	1777	1720
Q Serve(g_s), s	8.1	38.0	38.0	4.7	2.8	0.2	2.9	13.4	4.7	29.4	16.9	17.1
Cycle Q Clear(g_c), s	8.1	38.0	38.0	4.7	2.8	0.2	2.9	13.4	4.7	29.4	16.9	17.1
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.44
Lane Grp Cap(c), veh/h	311	563	583	203	1062	1012	57	510	223	1170	819	793
V/C Ratio(X)	0.77	1.02	1.03	0.69	0.11	0.02	0.76	0.80	0.36	0.80	0.45	0.45
Avail Cap(c_a), veh/h	576	563	583	416	1062	1012	238	563	246	1170	819	793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77
Uniform Delay (d), s/veh	53.4	41.0	41.0	55.5	31.8	2.1	57.6	49.7	32.0	36.0	22.0	22.2
Incr Delay (d2), s/veh	4.0	44.4	43.9	4.2	0.2	0.0	18.7	7.6	1.0	3.1	1.4	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	22.9	23.7	2.1	1.3	0.1	1.6	6.4	2.2	12.5	7.1	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	85.4	84.9	59.7	32.0	2.2	76.3	57.4	33.0	39.1	23.3	23.7
LnGrp LOS	E	F	F	E	C	A	E	E	C	D	C	C
Approach Vol, veh/h		1414			282			534			1659	
Approach Delay, s/veh		80.5			43.6			55.2			32.2	
Approach LOS		F			D			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	38.1	7.8	59.3	10.9	42.0	45.9	21.2				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	20.0	29.6	16.0	34.7	14.0	35.6	33.0	* 18				
Max Q Clear Time (g_c+I1), s	10.1	4.8	4.9	19.1	6.7	40.0	31.4	15.4				
Green Ext Time (p_c), s	0.7	0.5	0.1	2.7	0.3	0.0	0.8	0.5				

Intersection Summary	
HCM 6th Ctrl Delay	53.8
HCM 6th LOS	D

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.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/17/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	560	110	191	371	781	130	810	140	1072	1040	200
Future Volume (veh/h)	380	560	110	191	371	781	130	810	140	1072	1040	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	396	583	111	199	386	0	135	844	0	1117	1083	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	738	326	254	629		190	971		1231	1688	
Arrive On Green	0.10	0.21	0.21	0.07	0.18	0.00	0.05	0.27	0.00	0.24	0.48	0.00
Sat Flow, veh/h	3456	3554	1571	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	396	583	111	199	386	0	135	844	0	1117	1083	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	12.5	18.7	5.4	6.8	12.0	0.0	4.6	27.2	0.0	25.9	27.6	0.0
Cycle Q Clear(g_c), s	12.5	18.7	5.4	6.8	12.0	0.0	4.6	27.2	0.0	25.9	27.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	360	738	326	254	629		190	971		1231	1688	
V/C Ratio(X)	1.10	0.79	0.34	0.78	0.61		0.71	0.87		0.91	0.64	
Avail Cap(c_a), veh/h	360	865	382	288	806		259	971		1340	1688	
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	0.93	0.93	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.7	45.1	22.9	54.6	45.6	0.0	55.8	41.6	0.0	44.0	23.8	0.0
Incr Delay (d2), s/veh	76.9	3.5	0.2	9.3	1.9	0.0	2.7	10.4	0.0	8.3	1.9	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	9.2	8.5	2.7	3.3	5.4	0.0	2.1	13.1	0.0	11.5	11.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	130.6	48.6	23.1	63.9	47.5	0.0	58.5	52.0	0.0	52.3	25.7	0.0
LnGrp LOS	F	D	C	E	D		E	D		D	C	
Approach Vol, veh/h		1090			585			979			2200	
Approach Delay, s/veh		75.8			53.1			52.9			39.2	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.8	36.8	12.8	28.9	10.6	61.0	16.5	25.2
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	32.0	* 31	10.0	28.0	9.0	54.4	12.0	26.0
Max Q Clear Time (g_c+I1), s	27.9	29.2	8.8	20.7	6.6	29.6	14.5	14.0
Green Ext Time (p_c), s	1.5	1.4	0.1	1.1	0.1	11.7	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	51.9
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	443	190	300	480	1062	180	600	173	769	990	250
Future Volume (veh/h)	320	443	190	300	480	1062	180	600	173	769	990	250
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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	320	443	184	300	480	0	180	600	0	769	990	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	681	297	390	727		240	829		868	1238	
Arrive On Green	0.11	0.19	0.19	0.11	0.20	0.00	0.07	0.23	0.00	0.17	0.35	0.00
Sat Flow, veh/h	3456	3554	1547	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	320	443	184	300	480	0	180	600	0	769	990	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1547	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	10.9	13.8	8.4	10.1	14.9	0.0	6.1	18.7	0.0	17.9	30.2	0.0
Cycle Q Clear(g_c), s	10.9	13.8	8.4	10.1	14.9	0.0	6.1	18.7	0.0	17.9	30.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	681	297	390	727		240	829		868	1238	
V/C Ratio(X)	0.84	0.65	0.62	0.77	0.66		0.75	0.72		0.89	0.80	
Avail Cap(c_a), veh/h	490	888	387	662	1066		432	829		963	1238	
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	0.33	0.33	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.4	44.8	18.3	51.7	43.9	0.0	54.8	42.4	0.0	48.5	35.3	0.0
Incr Delay (d2), s/veh	8.1	0.4	0.8	0.4	0.7	0.0	1.8	5.4	0.0	8.7	5.5	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	5.1	6.1	3.0	4.4	6.6	0.0	2.7	8.7	0.0	8.1	13.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	45.2	19.1	52.1	44.6	0.0	56.6	47.9	0.0	57.1	40.8	0.0
LnGrp LOS	E	D	B	D	D		E	D		E	D	
Approach Vol, veh/h		947			780			780			1759	
Approach Delay, s/veh		45.3			47.5			49.9			47.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.1	32.0	18.8	27.0	12.3	45.8	17.2	28.5
Change Period (Y+Rc), s	5.4	* 5.4	5.2	* 5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	23.0	* 27	23.0	* 29	15.0	34.6	17.0	34.8
Max Q Clear Time (g_c+I1), s	19.9	20.7	12.1	15.8	8.1	32.2	12.9	16.9
Green Ext Time (p_c), s	0.8	2.5	0.5	1.3	0.2	1.7	0.3	4.0

Intersection Summary	
HCM 6th Ctrl Delay	47.6
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	695	560	1390	116	99	642
Future Volume (veh/h)	695	560	1390	116	99	642
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1811	1678	1870
Adj Flow Rate, veh/h	695	560	1390	108	99	362
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	6	15	2
Cap, veh/h	852	2643	1491	115	251	498
Arrive On Green	0.25	0.74	0.45	0.43	0.16	0.16
Sat Flow, veh/h	3456	3647	3426	258	1598	3170
Grp Volume(v), veh/h	695	560	738	760	99	362
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1814	1598	1585
Q Serve(g_s), s	15.3	3.9	31.6	32.1	4.5	8.8
Cycle Q Clear(g_c), s	15.3	3.9	31.6	32.1	4.5	8.8
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	852	2643	795	812	251	498
V/C Ratio(X)	0.82	0.21	0.93	0.94	0.39	0.73
Avail Cap(c_a), veh/h	1587	2643	800	817	414	822
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	3.1	21.0	21.3	30.5	32.3
Incr Delay (d2), s/veh	1.5	0.0	16.9	17.9	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.9	15.1	15.9	1.7	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.1	3.2	37.9	39.2	30.9	33.1
LnGrp LOS	C	A	D	D	C	C
Approach Vol, veh/h		1255	1498		461	
Approach Delay, s/veh		18.1	38.6		32.6	
Approach LOS		B	D		C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	23.9	40.1		16.6		63.9
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	37.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	17.3	34.1		10.8		5.9
Green Ext Time (p_c), s	2.6	0.6		1.0		2.6

Intersection Summary		
HCM 6th Ctrl Delay		29.7
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	721	631	0	0	110
Future Volume (veh/h)	90	721	631	0	0	110
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	90	721	631	0	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	144	2736	1630	0	10	9
Arrive On Green	0.08	0.77	0.46	0.00	0.00	0.00
Sat Flow, veh/h	1781	3647	3741	0	1781	1585
Grp Volume(v), veh/h	90	721	631	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	0	1781	1585
Q Serve(g_s), s	0.8	1.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.8	1.0	2.0	0.0	0.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	144	2736	1630	0	10	9
V/C Ratio(X)	0.62	0.26	0.39	0.00	0.00	0.00
Avail Cap(c_a), veh/h	4509	16765	6951	0	3075	2736
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	0.00	0.00
Uniform Delay (d), s/veh	7.7	0.6	3.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.3	0.1	0.2	0.0	0.0	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	0.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.1	0.6	3.2	0.0	0.0	0.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h		811	631		0	
Approach Delay, s/veh		1.9	3.2		0.0	
Approach LOS		A	A			

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	5.4	12.0				17.4	0.0
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	44.0	33.1				81.1	30.0
Max Q Clear Time (g_c+I1), s	2.8	4.0				3.0	0.0
Green Ext Time (p_c), s	0.3	3.0				3.7	0.0

Intersection Summary		
HCM 6th Ctrl Delay		2.5
HCM 6th LOS		A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	629	20	230	1436	20	10	0	50	10	0	20
Future Volume (veh/h)	20	629	20	230	1436	20	10	0	50	10	0	20
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		0.97	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1767	1870	1870	1870	1411	1870	1856	1870	1870	1870
Adj Flow Rate, veh/h	20	629	17	230	1436	20	10	0	0	10	0	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	9	2	2	2	33	2	3	2	2	2
Cap, veh/h	45	1557	42	328	2152	30	261	0	0	165	0	53
Arrive On Green	0.03	0.44	0.41	0.18	0.60	0.57	0.08	0.00	0.00	0.08	0.00	0.06
Sat Flow, veh/h	1781	3531	95	1781	3587	50	1231	0	0	586	0	938
Grp Volume(v), veh/h	20	316	330	230	711	745	10	0	0	26	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1850	1781	1777	1860	1231	0	0	1524	0	0
Q Serve(g_s), s	0.4	4.6	4.6	4.6	10.1	10.1	0.0	0.0	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.4	4.6	4.6	4.6	10.1	10.1	0.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	1.00		0.00	0.38		0.62
Lane Grp Cap(c), veh/h	45	783	816	328	1066	1116	293	0	0	259	0	0
V/C Ratio(X)	0.45	0.40	0.40	0.70	0.67	0.67	0.03	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	709	1948	2028	946	1476	1545	694	0	0	771	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.1	7.2	7.2	14.4	5.0	5.0	16.4	0.0	0.0	16.8	0.0	0.0
Incr Delay (d2), s/veh	2.6	0.3	0.3	1.0	0.7	0.7	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.0	1.1	1.5	1.2	1.3	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	7.5	7.5	15.4	5.8	5.7	16.4	0.0	0.0	16.9	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		666			1686			10			26	
Approach Delay, s/veh		7.9			7.1			16.4			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	26.6		6.1	10.9	20.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	15.0	30.0		15.0	20.0	40.0		15.0				
Max Q Clear Time (g_c+I1), s	2.4	12.1		2.2	6.6	6.6		2.6				
Green Ext Time (p_c), s	0.0	6.6		0.0	0.4	2.6		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.4
HCM 6th LOS	A

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	303	590	50	240	880	952	200	501	480	146	353	170
Future Volume (veh/h)	303	590	50	240	880	952	200	501	480	146	353	170
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	303	590	29	240	880	0	200	501	165	146	353	116
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	259	1663	82	300	1757		193	840	368	209	467	151
Arrive On Green	0.08	0.48	0.46	0.09	0.49	0.00	0.11	0.24	0.24	0.06	0.18	0.17
Sat Flow, veh/h	3456	3446	169	3456	3554	1585	1781	3554	1556	3428	2618	845
Grp Volume(v), veh/h	303	304	315	240	880	0	200	501	165	146	237	232
Grp Sat Flow(s),veh/h/ln	1728	1777	1838	1728	1777	1585	1781	1777	1556	1714	1777	1687
Q Serve(g_s), s	9.0	12.8	12.9	8.2	20.0	0.0	13.0	15.0	10.9	5.0	15.2	15.7
Cycle Q Clear(g_c), s	9.0	12.8	12.9	8.2	20.0	0.0	13.0	15.0	10.9	5.0	15.2	15.7
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	259	857	887	300	1757		193	840	368	209	317	301
V/C Ratio(X)	1.17	0.35	0.36	0.80	0.50		1.04	0.60	0.45	0.70	0.75	0.77
Avail Cap(c_a), veh/h	259	857	887	374	1757		193	840	368	514	415	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	19.4	19.5	53.8	20.4	0.0	53.5	40.7	39.1	55.2	46.8	47.3
Incr Delay (d2), s/veh	109.5	1.1	1.1	9.5	1.0	0.0	74.7	1.2	0.9	4.1	5.4	6.7
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	5.4	5.6	3.8	7.8	0.0	9.7	6.6	4.2	2.2	7.1	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.0	20.5	20.6	63.2	21.4	0.0	128.2	41.9	40.0	59.4	52.1	54.0
LnGrp LOS	F	C	C	E	C		F	D	D	E	D	D
Approach Vol, veh/h		922			1120			866			615	
Approach Delay, s/veh		68.0			30.4			61.5			54.6	
Approach LOS		E			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	63.3	18.3	25.4	14.4	61.9	11.3	32.4				
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3				
Max Green Setting (Gmax), s	9.0	51.6	13.0	* 27	13.0	47.6	18.0	21.7				
Max Q Clear Time (g_c+I1), s	11.0	22.0	15.0	17.7	10.2	14.9	7.0	17.0				
Green Ext Time (p_c), s	0.0	4.1	0.0	1.3	0.2	2.4	0.4	1.3				

Intersection Summary	
HCM 6th Ctrl Delay	52.1
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	303	590	50	240	880	952	200	501	480	146	353	170
Future Volume (veh/h)	303	590	50	240	880	952	200	501	480	146	353	170
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		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	303	590	29	240	880	0	200	501	165	146	353	116
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	3	2	2
Cap, veh/h	346	1587	78	296	1585		231	916	554	215	471	152
Arrive On Green	0.10	0.46	0.44	0.09	0.45	0.00	0.13	0.26	0.26	0.06	0.18	0.17
Sat Flow, veh/h	3456	3446	169	3456	3554	1585	1781	3554	1556	3428	2618	845
Grp Volume(v), veh/h	303	304	315	240	880	0	200	501	165	146	237	232
Grp Sat Flow(s),veh/h/ln	1728	1777	1838	1728	1777	1585	1781	1777	1556	1714	1777	1687
Q Serve(g_s), s	10.4	13.4	13.4	8.2	21.9	0.0	13.2	14.6	9.2	5.0	15.2	15.7
Cycle Q Clear(g_c), s	10.4	13.4	13.4	8.2	21.9	0.0	13.2	14.6	9.2	5.0	15.2	15.7
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	346	818	847	296	1585		231	916	554	215	320	303
V/C Ratio(X)	0.88	0.37	0.37	0.81	0.56		0.86	0.55	0.30	0.68	0.74	0.76
Avail Cap(c_a), veh/h	346	818	847	317	1585		341	916	554	1028	484	460
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.3	21.1	21.2	53.9	24.5	0.0	51.2	38.5	28.0	55.0	46.6	47.1
Incr Delay (d2), s/veh	21.5	1.3	1.3	14.0	1.4	0.0	14.1	0.7	0.3	3.7	3.4	4.1
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	5.5	5.7	5.9	4.0	8.8	0.0	6.7	6.3	3.4	2.2	6.9	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.8	22.4	22.4	67.9	25.9	0.0	65.3	39.2	28.3	58.8	50.0	51.2
LnGrp LOS	E	C	C	E	C		E	D	C	E	D	D
Approach Vol, veh/h		922			1120			866			615	
Approach Delay, s/veh		39.6			34.9			43.1			52.5	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	57.5	20.9	25.6	14.3	59.3	11.5	34.9
Change Period (Y+Rc), s	4.0	6.4	5.3	* 5.3	4.0	6.4	4.0	5.3
Max Green Setting (Gmax), s	12.0	33.9	23.0	* 31	11.0	34.9	36.0	18.4
Max Q Clear Time (g_c+I1), s	12.4	23.9	15.2	17.7	10.2	15.4	7.0	16.6
Green Ext Time (p_c), s	0.0	2.9	0.4	1.5	0.1	2.3	0.6	0.6

Intersection Summary	
HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
1: Santa Rita Rd & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	551	110	235	645	968	130	680	171	1047	930	200
Future Volume (veh/h)	380	551	110	235	645	968	130	680	171	1047	930	200
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		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	380	551	106	235	645	0	130	680	0	1047	930	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	717	317	414	788		187	829		1187	1518	
Arrive On Green	0.10	0.20	0.20	0.12	0.22	0.00	0.05	0.23	0.00	0.24	0.43	0.00
Sat Flow, veh/h	3456	3554	1571	3456	3554	1585	3456	3647	0	5023	3554	1585
Grp Volume(v), veh/h	380	551	106	235	645	0	130	680	0	1047	930	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1571	1728	1777	1585	1728	1777	0	1674	1777	1585
Q Serve(g_s), s	12.0	17.6	5.2	7.7	20.7	0.0	4.4	21.8	0.0	24.1	24.4	0.0
Cycle Q Clear(g_c), s	12.0	17.6	5.2	7.7	20.7	0.0	4.4	21.8	0.0	24.1	24.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	717	317	414	788		187	829		1187	1518	
V/C Ratio(X)	1.10	0.77	0.33	0.57	0.82		0.70	0.82		0.88	0.61	
Avail Cap(c_a), veh/h	346	859	380	414	859		403	829		1465	1518	
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	0.82	0.82	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	45.2	22.7	49.9	44.4	0.0	55.8	43.6	0.0	44.2	26.7	0.0
Incr Delay (d2), s/veh	77.9	2.8	0.2	0.9	5.8	0.0	1.7	8.9	0.0	4.9	1.9	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	8.9	7.9	2.6	3.4	9.6	0.0	2.0	10.5	0.0	10.4	10.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	131.9	48.0	22.9	50.8	50.2	0.0	57.5	52.5	0.0	49.1	28.5	0.0
LnGrp LOS	F	D	C	D	D		E	D		D	C	
Approach Vol, veh/h		1037			880			810			1977	
Approach Delay, s/veh		76.2			50.4			53.3			39.4	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.8	32.0	18.4	28.2	10.5	55.3	16.0	30.6
Change Period (Y+Rc), s	5.4	* 5.4	4.0	5.2	4.0	5.4	4.0	5.2
Max Green Setting (Gmax), s	35.0	* 27	12.0	27.8	14.0	47.6	12.0	27.8
Max Q Clear Time (g_c+I1), s	26.1	23.8	9.7	19.6	6.4	26.4	14.0	22.7
Green Ext Time (p_c), s	2.2	1.5	0.1	1.1	0.1	9.1	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	52.0
HCM 6th LOS	D

Notes

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

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

HCM 6th Signalized Intersection Summary
2: Valley Ave & Busch Rd

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	539	1230	740	82	141	918
Future Volume (veh/h)	539	1230	740	82	141	918
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	539	1230	740	74	141	486
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	614	2843	1916	191	238	423
Arrive On Green	0.18	0.80	0.59	0.58	0.13	0.13
Sat Flow, veh/h	3456	3647	3346	325	1781	3170
Grp Volume(v), veh/h	539	1230	404	410	141	486
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1801	1781	1585
Q Serve(g_s), s	18.2	12.7	14.5	14.6	8.9	16.0
Cycle Q Clear(g_c), s	18.2	12.7	14.5	14.6	8.9	16.0
Prop In Lane	1.00			0.18	1.00	1.00
Lane Grp Cap(c), veh/h	614	2843	1046	1061	238	423
V/C Ratio(X)	0.88	0.43	0.39	0.39	0.59	1.15
Avail Cap(c_a), veh/h	749	2843	1046	1061	238	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.97	0.97	0.89	0.89
Uniform Delay (d), s/veh	48.1	3.7	13.1	13.2	48.9	52.0
Incr Delay (d2), s/veh	5.9	0.3	1.0	1.0	2.5	89.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	3.4	5.7	5.8	4.1	11.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	54.0	4.0	14.2	14.2	51.4	141.4
LnGrp LOS	D	A	B	B	D	F
Approach Vol, veh/h		1769	814		627	
Approach Delay, s/veh		19.2	14.2		121.1	
Approach LOS		B	B		F	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.3	74.7		20.0		100.0
Change Period (Y+Rc), s	4.0	5.3		4.9		5.3
Max Green Setting (Gmax), s	26.0	64.7		15.1		94.7
Max Q Clear Time (g_c+I1), s	20.2	16.6		18.0		14.7
Green Ext Time (p_c), s	1.1	3.5		0.0		7.8

Intersection Summary		
HCM 6th Ctrl Delay		37.8
HCM 6th LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: Busch Rd & Ironwood Dr

07/05/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	521	999	0	10	60
Future Volume (veh/h)	100	521	999	0	10	60
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	521	999	0	10	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	137	2511	1735	0	19	17
Arrive On Green	0.08	0.71	0.49	0.00	0.01	0.00
Sat Flow, veh/h	1781	3647	3741	0	1781	1585
Grp Volume(v), veh/h	100	521	999	0	10	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	0	1781	1585
Q Serve(g_s), s	1.6	1.4	5.7	0.0	0.2	0.0
Cycle Q Clear(g_c), s	1.6	1.4	5.7	0.0	0.2	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	137	2511	1735	0	19	17
V/C Ratio(X)	0.73	0.21	0.58	0.00	0.53	0.00
Avail Cap(c_a), veh/h	2770	10297	4270	0	1888	1680
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	12.8	1.4	5.2	0.0	13.9	0.0
Incr Delay (d2), s/veh	7.2	0.0	0.3	0.0	8.1	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	0.7	0.0	0.7	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.0	1.5	5.5	0.0	22.0	0.0
LnGrp LOS	B	A	A	A	C	A
Approach Vol, veh/h		621	999		10	
Approach Delay, s/veh		4.5	5.5		22.0	
Approach LOS		A	A		C	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	6.2	17.8				24.0	4.3
Change Period (Y+Rc), s	4.0	4.9				4.9	4.0
Max Green Setting (Gmax), s	44.0	33.1				81.1	30.0
Max Q Clear Time (g_c+I1), s	3.6	7.7				3.4	2.2
Green Ext Time (p_c), s	0.4	5.3				2.5	0.0

Intersection Summary		
HCM 6th Ctrl Delay		5.2
HCM 6th LOS		A

HCM 6th Signalized Intersection Summary
4: Boulder St & Valley Ave

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1281	20	90	772	10	20	0	230	20	0	10
Future Volume (veh/h)	10	1281	20	90	772	10	20	0	230	20	0	10
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	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	1281	19	90	772	10	20	0	100	20	0	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	21	2090	31	119	2291	30	50	8	117	137	5	17
Arrive On Green	0.02	1.00	1.00	0.07	0.64	0.63	0.11	0.00	0.11	0.11	0.00	0.11
Sat Flow, veh/h	1781	3583	53	1781	3591	47	146	75	1106	782	44	165
Grp Volume(v), veh/h	10	635	665	90	382	400	120	0	0	24	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1859	1781	1777	1861	1327	0	0	991	0	0
Q Serve(g_s), s	0.7	0.0	0.0	6.0	11.9	11.9	6.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.0	11.9	11.9	10.5	0.0	0.0	2.6	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.17		0.83	0.83		0.17
Lane Grp Cap(c), veh/h	21	1036	1085	119	1134	1187	186	0	0	168	0	0
V/C Ratio(X)	0.48	0.61	0.61	0.76	0.34	0.34	0.65	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	104	1036	1085	148	1134	1187	353	0	0	337	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	58.2	0.0	0.0	55.1	10.0	10.0	52.6	0.0	0.0	48.6	0.0	0.0
Incr Delay (d2), s/veh	4.9	2.2	2.1	11.9	0.8	0.8	1.4	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	0.3	0.6	0.6	3.0	4.5	4.7	3.6	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.1	2.2	2.1	67.0	10.8	10.8	54.0	0.0	0.0	48.8	0.0	0.0
LnGrp LOS	E	A	A	E	B	B	D	A	A	D	A	A
Approach Vol, veh/h		1310			872			120			24	
Approach Delay, s/veh		2.6			16.6			54.0			48.8	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	80.6		16.7	12.0	74.0		16.7				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	7.0	71.7		28.0	10.0	68.7		28.0				
Max Q Clear Time (g_c+I1), s	2.7	13.9		12.5	8.0	2.0		4.6				
Green Ext Time (p_c), s	0.0	3.3		0.2	0.0	6.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd

07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	930	50	630	460	277	40	374	420	854	522	265
Future Volume (veh/h)	221	930	50	630	460	277	40	374	420	854	522	265
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		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	930	42	630	460	0	40	374	154	854	522	191
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	986	45	634	1376		55	482	211	870	932	339
Arrive On Green	0.08	0.28	0.28	0.18	0.39	0.00	0.03	0.14	0.14	0.25	0.37	0.36
Sat Flow, veh/h	3456	3459	156	3456	3554	1585	1781	3554	1555	3456	2536	923
Grp Volume(v), veh/h	221	478	494	630	460	0	40	374	154	854	365	348
Grp Sat Flow(s),veh/h/ln	1728	1777	1839	1728	1777	1585	1781	1777	1555	1728	1777	1683
Q Serve(g_s), s	7.5	31.5	31.5	21.8	10.9	0.0	2.7	12.2	9.2	29.5	19.6	19.9
Cycle Q Clear(g_c), s	7.5	31.5	31.5	21.8	10.9	0.0	2.7	12.2	9.2	29.5	19.6	19.9
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.55
Lane Grp Cap(c), veh/h	280	506	524	634	1376		55	482	211	870	653	619
V/C Ratio(X)	0.79	0.94	0.94	0.99	0.33		0.73	0.78	0.73	0.98	0.56	0.56
Avail Cap(c_a), veh/h	346	506	524	634	1376		104	557	244	870	653	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.1	42.0	42.0	48.9	25.9	0.0	57.7	50.1	32.2	44.6	30.2	30.6
Incr Delay (d2), s/veh	9.5	28.1	27.5	34.3	0.7	0.0	17.0	5.9	9.1	25.9	3.4	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	17.3	17.9	11.9	4.5	0.0	1.4	5.7	3.9	15.4	8.8	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.6	70.1	69.5	83.2	26.5	0.0	74.7	56.0	41.2	70.5	33.6	34.2
LnGrp LOS	E	E	E	F	C		E	E	D	E	C	C
Approach Vol, veh/h		1193			1090			568			1567	
Approach Delay, s/veh		68.6			59.3			53.3			53.9	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	50.5	7.7	48.1	26.0	38.2	35.5	20.3				
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3				
Max Green Setting (Gmax), s	12.0	41.8	7.0	39.5	22.0	31.8	29.0	* 18				
Max Q Clear Time (g_c+I1), s	9.5	12.9	4.7	21.9	23.8	33.5	31.5	14.2				
Green Ext Time (p_c), s	0.2	1.9	0.0	2.7	0.0	0.0	0.0	0.8				

Intersection Summary	
HCM 6th Ctrl Delay	59.1
HCM 6th LOS	E

Notes

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

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

HCM 6th Signalized Intersection Summary
5: Bernal Ave/Valley Ave & Stanley Blvd 07/05/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	930	50	630	460	277	40	374	420	854	522	265
Future Volume (veh/h)	221	930	50	630	460	277	40	374	420	854	522	265
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		0.98	1.00		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	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	930	42	630	460	0	40	374	341	854	522	189
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	989	45	662	1409		55	473	528	1095	1095	394
Arrive On Green	0.08	0.29	0.29	0.19	0.40	0.00	0.03	0.13	0.13	0.32	0.43	0.42
Sat Flow, veh/h	3456	3459	156	3456	3554	1585	1781	3554	1555	3456	2545	917
Grp Volume(v), veh/h	221	478	494	630	460	0	40	374	341	854	364	347
Grp Sat Flow(s),veh/h/ln	1728	1777	1839	1728	1777	1585	1781	1777	1555	1728	1777	1685
Q Serve(g_s), s	7.5	31.5	31.5	21.6	10.8	0.0	2.7	12.2	10.4	26.9	17.6	17.9
Cycle Q Clear(g_c), s	7.5	31.5	31.5	21.6	10.8	0.0	2.7	12.2	10.4	26.9	17.6	17.9
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	280	508	526	662	1409		55	473	528	1095	764	725
V/C Ratio(X)	0.79	0.94	0.94	0.95	0.33		0.73	0.79	0.65	0.78	0.48	0.48
Avail Cap(c_a), veh/h	346	508	526	662	1409		89	495	537	1095	764	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.1	41.9	41.9	47.9	25.1	0.0	57.7	50.4	16.7	37.2	24.5	24.8
Incr Delay (d2), s/veh	9.5	27.6	27.0	23.6	0.6	0.0	17.0	8.2	2.6	3.7	2.1	2.3
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	3.6	17.3	17.8	11.0	4.4	0.0	1.4	5.9	4.0	11.6	7.6	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.6	69.5	68.8	71.5	25.7	0.0	74.7	58.5	19.3	40.9	26.6	27.1
LnGrp LOS	E	E	E	E	C		E	E	B	D	C	C
Approach Vol, veh/h		1193			1090			755			1565	
Approach Delay, s/veh		68.1			52.2			41.7			34.5	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	51.6	7.7	55.6	27.0	38.3	43.3	20.0
Change Period (Y+Rc), s	4.0	6.4	4.0	5.3	4.0	6.4	5.3	* 5.3
Max Green Setting (Gmax), s	12.0	42.9	6.0	39.4	23.0	31.9	30.0	* 15
Max Q Clear Time (g_c+I1), s	9.5	12.8	4.7	19.9	23.6	33.5	28.9	14.2
Green Ext Time (p_c), s	0.2	1.9	0.0	2.8	0.0	0.0	0.5	0.4

Intersection Summary	
HCM 6th Ctrl Delay	48.6
HCM 6th LOS	D

Notes

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

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

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