Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

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VINTAGE – Auf der Maur/Rickenbach

EXHIBIT B

Prepared for

THE CITY OF PLEASANTON

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Balancing Functionality and Livability
Traffic Engineering • Transportation Planning

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Executive Summary

The proposed Vintage Sustainable Mixed-Use Village project would result in the development of a vacant lot with 345 apartment homes and about 38,000 square feet of neighborhood retail space. Two alternatives are proposed for the retail space, one of which would include a drive through lane, but a smaller building foot-print. To ensure a conservative analysis, the alternative with the larger building foot-print was analyzed. It was determined that this project conforms to the assumed land uses for the site presented in the recently approved *Pleasanton Housing Element*.

The site is located at 3150 Bernal Avenue, southeast of the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue in the City of Pleasanton. The project is anticipated to generate an average of 3,819 net new trips on a daily basis, of which 191 trips would occur during the morning peak hour and 285 trips during the evening peak hour.

Currently the study intersection of Bernal Avenue/Utah Street operates unacceptably at LOS F during the p.m. peak period for all study scenarios. The proposed project would include signalization of this intersection. Under the Existing plus Project scenario, the study intersections are expected to continue operating acceptably upon the addition of project generated traffic and the proposed signalization of Bernal Avenue/Utah Street and signal retiming. Under the Existing plus Approved Projects scenario, the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue would operate unacceptably at LOS E during the a.m. peak period and would continue to do so with the addition of project-generated traffic. However, as part of its Traffic Impact Fee (TIF) program, the City has plans to modify the intersection that would result in acceptable operations. All other study intersections are expected to operate acceptably without and with the addition of project generated traffic.

Access to the site would be obtained via driveways on Stanley Boulevard, Bernal Avenue and Nevada Street. Installation of the western driveway at Stanley Boulevard would require the modification of the center median and the westbound left-turn lane at the Stanley Boulevard/Bernal Avenue-Valley Avenue intersection, resulting in reduced storage area for the westbound left-turn pocket. It is expected that the left-turn queue would extend beyond this reduced storage area by one or two vehicles during the morning peak hour under Cumulative plus Project conditions. Additionally, it is recommended that 75-foot right-turn tapers be installed at each of the project driveways on Stanley Boulevard.

The project driveway at Bernal Avenue/Utah Street is proposed to be signalized while the other driveways would not be signalized. In addition, the City has plans to signalize the intersection of Bernal Avenue/Nevada Street. It is recommended that clear sight lines be maintained at all unsignalized driveways to meet Caltrans recommended standards. This would include maintaining clear sight lines between the project driveway on Nevada Street and the adjacent Congregation Beth Emek Synagogue driveway to minimize the potential for vehicle conflicts.

Parking would be provided at a rate of one space per 200 square feet of shopping center. If the drive-through alternative is developed, 174 parking spaces would be provided for the shopping center. If the alternative without the drive-through is developed, 189 parking spaces would be provided. This parking supply would not satisfy the City's parking requirement of one space per 180 square feet; however, no parking deficit is anticipated based on an ITE parking demand analysis and the internal trip capture between the different land uses. Two commercial loading berths would be provided which meets the City's requirements, regardless of the type of tenant.

A total of 612 parking spaces would be provided for residential uses, which exceeds the minimum required parking supply of 581 parking spaces. These residential parking spaces would be provided away from the shopping center, in an area that would be inconvenient for shopping center users. However,

to reduce the possibility of overflow shopping center parking in residential areas, it is recommended that signs be posted that indicate restricted residential parking areas.

Vehicle circulation on the site would be provided by a series of five primary drive aisles that connect to the various commercial and residential parking areas. As proposed on the site plan, these drive aisles would be configured in a manner that would allow residents to access their homes without traveling through the shopping center. Likewise, the most direct path of access from adjacent streets to the shopping center would avoid the residential areas.

Pedestrian and bicycle access to the site is expected to be adequate. Connectivity would be provided between the project site and the regional pedestrian and bicycle network, including connections to nearby parks and trails. While the proposed project would include installation of bus stops along its frontage, access to transit service would be somewhat limited by the fact that the nearest westbound Route 10 bus stop is located on Stanley Boulevard west of California Avenue-Reflections Drive about one-half mile away from the site, which is beyond the distance that many users would find convenient to access the service.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed mixed-use residential and neighborhood shopping center to be located at 3150 Bernal Avenue in the City of Pleasanton. The traffic study was completed in accordance with the criteria established by the City of Pleasanton, and is consistent with standard traffic engineering techniques.

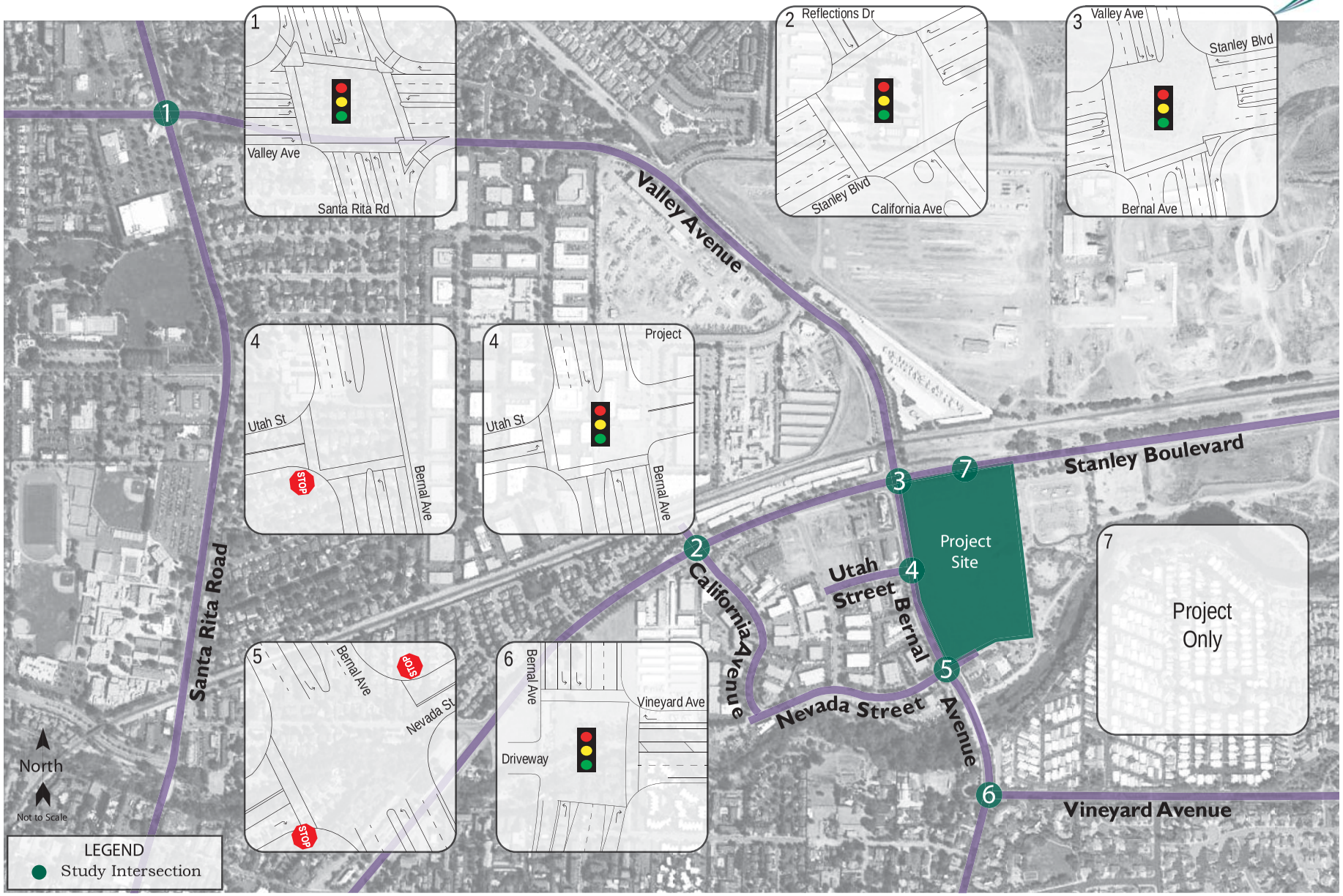
Prelude

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

It was determined that the proposed Vintage Sustainable Mixed-Use Village project would conform to assumptions for the site that were contained in the *Pleasanton Housing Element Update,* and it was analyzed on a general design basis in the *Pleasanton Housing Element Transportation Analysis* (Fehr & Peers, 2011). Therefore, the purpose of this study is summarize those findings and analyze the suitability and adequacy of the project's access as proposed and determine its impacts on a more detailed level on facilities in the immediately vicinity of the project site.

Project Profile

The proposed Vintage Sustainable Mixed-Use Village project would develop a mixed-use commercial and residential project on a currently undeveloped lot at the southeast corner of Stanley Boulevard/Bernal Avenue-Valley Avenue in the City of Pleasanton, as shown in Figure 1. Two different alternatives are being proposed for the commercial aspect of the project, a neighborhood retail center of 38,781 square feet, or a slightly smaller center with 35,169 square feet that would include a drive through for either a drug store or small grocery tenant. Both alternatives would include 345 apartment homes.



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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

Figure 1

City of Pleasanton

Study Area and Lane Configurations

Operational Analysis

Study Area and Periods

The study area consists of the following six intersections as well as a project driveway:

1. Valley Avenue/Santa Rita Road
2. Stanley Boulevard/California Avenue-Reflections Drive
3. Stanley Boulevard/Bernal Avenue-Valley Avenue
4. Bernal Avenue/Utah Street
5. Bernal Avenue/Nevada Street
6. Bernal Avenue/Vineyard Avenue
7. Stanley Boulevard/Proposed Left-Turn into Site

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.

At the direction of City staff, traffic volume data presented in the recently approved *Pleasanton Housing Element Transportation Analysis* (Fehr & Peers, 2011), was incorporated into this analysis.

Study Intersections

Valley Avenue/Santa Rita Road is a four-way, signalized intersection with protected left-turn phasing on all approaches. Uncontrolled channelized right-turn lanes are provided on the northbound, westbound and southbound approaches. Marked crosswalks are provided across all legs of the intersection, along with pedestrian signal equipment and phasing.

Stanley Boulevard/California Avenue-Reflections Drive is a signalized four-legged intersection with marked pedestrian crossings of the northern, eastern and southern legs of the intersection. Pedestrian signal equipment and phasing are provided along with the marked crossings. The Stanley Boulevard approaches are controlled with protected left-turn phasing while the California Boulevard-Reflections Drive approaches have permitted left-turn phasing.

Stanley Boulevard/Bernal Avenue-Valley Avenue is a four-legged, signalized intersection immediately northwest of the project site with protected left-turn phasing on all approaches. Marked crosswalks and pedestrian crossing signal equipment are provided across the southern and western legs, with pedestrian crossing prohibited on the other two legs.

Bernal Avenue/Utah Street is currently a tee-intersection that is stop-controlled on the eastbound Utah Street approach with a marked pedestrian crossing of Utah Street. The proposed project would result in the creation of a fourth, eastern, leg to the intersection and signalization of the intersection.

Bernal Avenue/Nevada Street is a four-way intersection that is stop-controlled on the Nevada Street approaches. A marked pedestrian crossing is provided across the western Nevada Street leg, but not across any of the other legs.

Bernal Avenue/Vineyard Avenue is essentially a tee-intersection, with a fourth, minor, leg consisting of a residential driveway. The signalized intersection has protected left-turn phasing on the Bernal Avenue approaches and split phasing on the Bernal Avenue and driveway approaches. Marked pedestrian crossings along with pedestrian signal phasing are provided across the northern and eastern legs.

Stanley Boulevard/Proposed Left-Turn into Site would be created with the proposed project, approximately 360 feet east of Bernal Avenue. This driveway would be configured to allow both westbound left-turn and eastbound right-turn inbound movements; however, northbound left-turn outbound movements would be prohibited, allowing for only northbound right-turn movements from the driveway. The outbound driveway approach would be stop-controlled.

The locations of the study intersections and driveway as well as the existing lane configurations and traffic control are shown in Figure 1.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site; however, currently there is no sidewalk on the east side of Bernal Avenue along the project site. Since the site is currently undeveloped, there are no pedestrian destinations that would result in travel along this section of Bernal Avenue, so the gap does not represent a barrier to pedestrian connectivity.

Marked crosswalks and pedestrian signal phasing are provided at all signalized intersections. At the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue it was noted that while there is a crosswalk along much of the southern leg, there is no marked crosswalk connecting the northbound right-turn splitter-island with the adjacent sidewalk.

Bicycle Facilities

The *Highway Design Manual*, California Department of Transportation (Caltrans), 2012, classifies bikeways into three categories:

- *Class I Multi-Use Path*: a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- *Class II Bike Lane*: a striped and signed lane for one-way bike travel on a street or highway.
- *Class III Bike Route*: signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, Class II bike lanes exist on Bernal Avenue south of Stanley Boulevard and on Stanley Boulevard west of Bernal Avenue. Additionally, on Stanley Boulevard, east of Bernal Avenue there is a combination of an eastbound Class II bicycle lane and the Arroyo Bike Trail, an off-road, Class I multi-use path. The City's BMX park is located on Stanley Boulevard, just east of the project site, along the Arroyo Bike Trail.

Transit Facilities

Transit service in Pleasanton is provided by three agencies: The Livermore Amador Valley Transit Authority provides fixed route bus service, and the Bay Area Rapid Transit District (BART) and the Altamont Commuter Express (ACE) both operate commuter rail service. Below is a summary of the transit lines that currently service the project site.

Wheels Bus

The Livermore Amador Valley Transit Authority provides fixed route bus service under the name Wheels in the City of Pleasanton as well as the neighboring Cities of Dublin, Livermore and unincorporated portions of Alameda County.

Route 10 stops along the project's Stanley Boulevard frontage in the eastbound direction. In the westbound direction Route 10 stops on Stanley Boulevard just west of California Avenue-Reflections Drive. This route provides connections to the Dublin/Pleasanton BART station to the west and the Livermore Transit Center and ACE station to the east. On weekday evenings and weekends, this route continues east to the Stoneridge Mall; however, on weekdays passengers would need to transfer to another line to reach the mall. Route 10 runs daily, starting as early as 3:40 a.m. in the westbound direction and 6:00 a.m. in the eastbound direction on weekdays, with service ending around 12:30 a.m. Generally, the route is operates on a 30-minute headway with some additional buses during peak periods. On weekends the headway is increased to 40-minutes between buses.

Two bicycles can be carried on most Wheels buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on Wheels buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. The City of Pleasanton Dial-a-ride is designed to serve the needs of individuals with disabilities within Pleasanton which is supplemented by the Livermore Amador Valley Transit Authority the greater Livermore-Amador Valley region.

BART

The Bay Area Rapid Transit District (BART) provides heavy-rail rapid transit service within Alameda, Contra Costa, San Francisco and San Mateo Counties. The Dublin/Pleasanton station, located along I-580 between Hopyard Road-Dougherty Road and Hacienda Drive is the easternmost station along that segment of the BART system and is approximately six miles northwest of the proposed project site. Additionally the West Dublin Pleasanton station, located near the Stoneridge Mall serves the City. One line provides service to the two Dublin/Pleasanton stations with the line terminating in Daly City. Passengers can transfer to other BART lines that terminate at Richmond, Pittsburg/Bay Point, Fremont, Millbrae and the San Francisco International Airport. Wheels Bus Route 10 serves both the project site and the Dublin/Pleasanton BART Station, along with five other bus lines.

ACE

The Altamont Commuter Express (ACE) is an intra-city rail transit service that provides commuter service between Stockton and San Jose with ten stations. Four westbound trains are provided in the morning and four eastbound trains are provided in the evening. There is one station located in Pleasanton, at Pleasanton Avenue north of Bernal Avenue. The next closest station is in Livermore, located at Railroad Avenue near North Livermore Avenue. Wheels Bus Route 10 provides direct service between the project site and the Livermore ACE station; however, there is no direct bus between the project site and the Pleasanton ACE station.

Capacity Analysis

Intersection Level of Service Methodologies

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

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000. 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 use of these methodologies is consistent with the recently completed City of Pleasanton Housing Element traffic analysis.

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

The study intersections that are currently controlled by a traffic signal, or may be in the future, were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

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

Table 1
Intersection Level of Service Criteria

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

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

Traffic Operation Standards

The City of Pleasanton has adopted an LOS standard of D or better for intersection operations per the General Plan (adopted July 2009). Traffic impacts at signalized intersections would be considered significant if the Project would result in any of the following:

- Deterioration of a signalized intersection from LOS D (or better) to LOS E or LOS F
- The project adds ten or more trips to a signalized intersection projected to operate at LOS E prior to the addition of project traffic

Traffic Model

The City of Pleasanton's traffic model is maintained by City Staff and uses Synchro analysis software. The model was provided by City staff to use for this analysis. This citywide model was last updated for the City's Housing Element update and is consistent with the buildout of the City's General Plan. The proposed project was included in the environmental analysis for the City's Housing Element update, and was therefore included in this traffic model for all study scenarios except the existing conditions scenarios.

Traffic volume data were obtained directly from this model, with adjustments made as noted below:

- *Existing conditions* – traffic volume data were obtained directly from the model for the existing conditions without project scenario.
- *Existing plus Project conditions* – project traffic volumes were added to the existing conditions traffic volumes to represent existing plus project conditions.
- *Existing plus Approved Projects conditions* – short-term future traffic volume data provided in the traffic model includes traffic that would be generated by the proposed project. Therefore the project's traffic volumes were subtracted out from the traffic model volumes.

- *Existing plus Approved Projects plus Project conditions* – short-term future traffic volume data provided in the traffic model already includes traffic that would be generated by the proposed project, so no adjustments were made to the data provided.
- *Cumulative conditions* – to develop the Cumulative without project scenario, the project's traffic volumes were subtracted out from those presented in the traffic model.
- *Cumulative plus Project conditions* – these future traffic volumes were applied directly from the City's traffic model.

Recent traffic volume data for the intersection of Bernal Avenue/Utah Street were not available. Therefore, traffic volumes for this intersection were developed based on balancing traffic volumes with adjacent intersections.

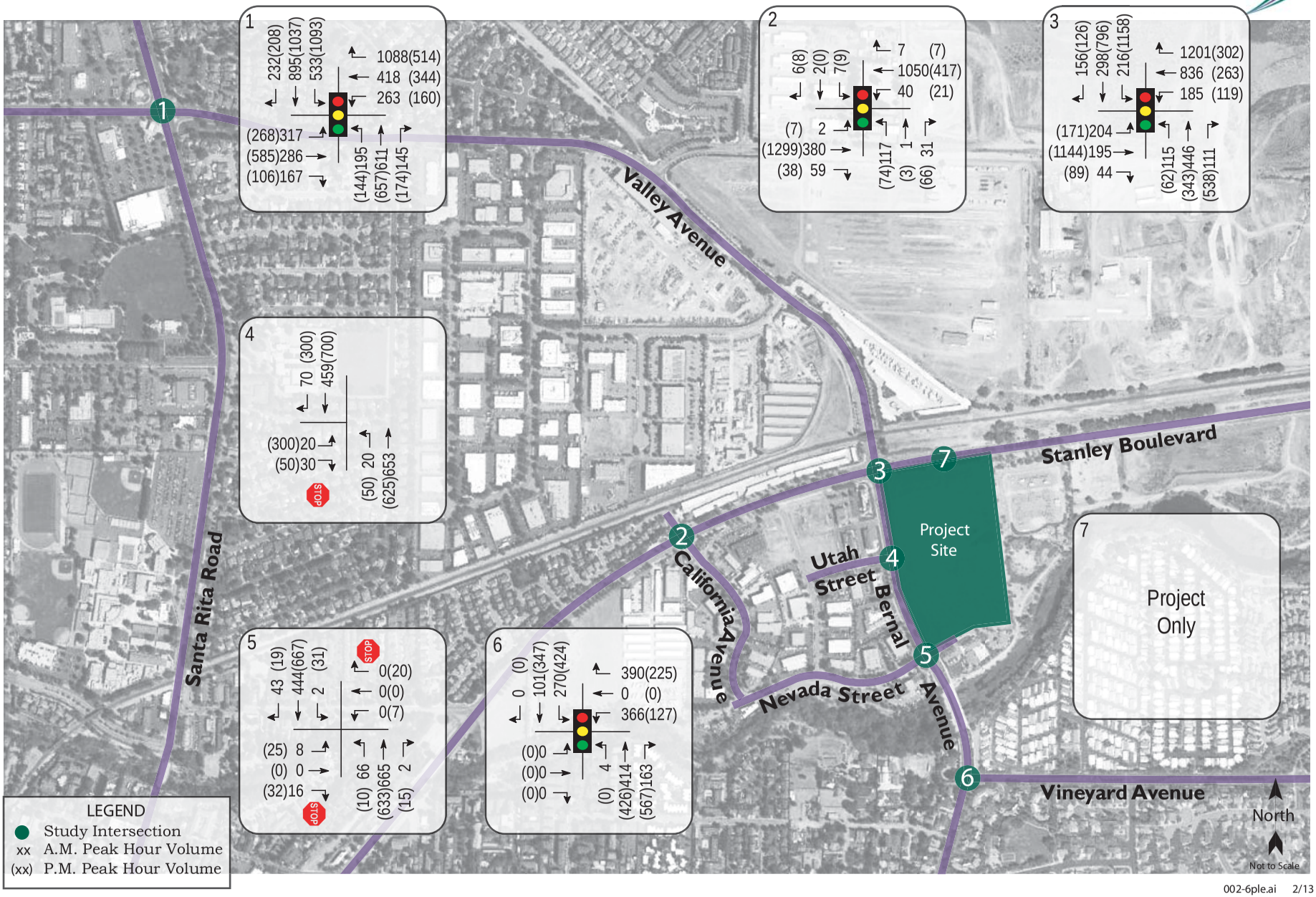
Congestion Management Program Analysis

The Alameda County Transportation Commission (ACTC) administers the County's Congestion Management Program (CMP). As part of the ACTC's duty as the regional transportation planning coordinating agency, it requires analysis of certain development projects to determine their impacts to the regional transportation network. The proposed Vintage Sustainable Mixed-Use Village Project was included in the City's Housing Element update, which included a full analysis of regional routes to meet the ACTC's requirements. Since the proposed project is consistent with the CMP analysis completed for the approved Housing Element, no additional CMP analysis was performed.

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.

Under existing conditions, all study intersections operate acceptably at LOS D or better except for the intersection of Bernal Avenue/Utah Street which currently operates at LOS F during the p.m. peak hour; however, this does not represent unacceptable operations as the City's thresholds only apply to signalized intersections. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 2, and copies of the Level of Service calculations are provided in Appendix A.



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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

City of Pleasanton

Figure 2

Existing Traffic Volumes

Table 2
Existing Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Existing Conditions**			
	AM Peak		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Valley Ave/Santa Rita Ave	34.2	C	43.1	D
2. Stanley Blvd/California Ave-Reflections Dr	15.8	B	8.9	A
3. Stanley Blvd/Bernal Ave-Valley Ave	52.2	D	47.4	D
4. Bernal Ave/Utah St	0.7	A	**75.7**	**F**
Eastbound Utah St	*13.7*	*B*	**	***F***
5. Bernal Ave/Nevada St	1.9	A	2.1	A
Eastbound Bernal Ave	*24.0*	*C*	*33.3*	*D*
Westbound Bernal Ave	*0.1*	*A*	*0.4*	*A*
6. Bernal Ave/Vineyard Ave	15.8	B	11.5	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation

Traffic Impact Fee Program

The City of Pleasanton has established a Traffic Impact Fee (TIF) program to fund future enhancements to the transportation network based on anticipated needs. As part of the City's program, there are plans to modify the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue to convert the westbound right-turn lane to be an uncontrolled movement. Additionally, the eastbound approach would be modified to provide a single left-turn lane, two through lanes and a shared through and right-turn lane. These improvements were included in the analysis of Existing plus Approved Projects and Cumulative scenarios.

Furthermore, it was noted that the City's traffic model includes signalization of Bernal Avenue/Nevada Street under cumulative build-out conditions; this modification was therefore included in the Cumulative scenario.

Project Description

The Vintage Sustainable Mixed-Use Village project consists of developing a mixed-use project on a vacant lot at the southeast corner of Stanley Boulevard/Bernal Avenue-Valley Avenue. The proposed project would include up to 38,700 square feet of neighborhood retail space and 345 apartment homes. Two alternatives are proposed for the retail component, one of which would include a drive-through lane, but would have slightly smaller building footprint. The project site would be accessed via four access points; one on Bernal Avenue, one on Nevada Street and two on Stanley Boulevard. The proposed project site plan is shown in Figure 3.

Source: Steinberg Architects

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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

City of Pleasanton

Figure 3

Site Plan

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*, 9th Edition, 2012. The published standard rates for Apartments (Land Use 220) and Shopping Center (Land Use 820) were applied. The following two retail options are being proposed in addition to 345 apartment homes:

- 38,781 square feet with no drive through lane
- 35,169 square feet with drive through lane

To provide a conservative analysis and to allow for the most flexibility in tenant options, the larger sized shopping center of 38,781 square feet was used for trip generation purposes.

Internal Capture Trips

The *Trip Generation Handbook* also includes data and methodologies that can be applied to determine the proportion of internal trips that may occur within a development area that includes a variety of land uses. Internal trips occur at mixed-use developments, and in the case of the proposed project would consist of residents patronizing adjacent retail and restaurant uses, as well as employees of non-residential uses patronizing other non-residential uses (such as employees of one tenant patronizing another retailer or service provider on the site). The majority of these trips would be made by walking, and the few that would be made by automobile would only be on-site, so would not affect the adjacent street network. Tables 7.1 and 7.2 of the *Trip Generation Handbook* were consulted to determine internal capture rates, which ranged between 12 percent and 53 percent for interaction between Residential and Retail uses. However, data presented in ITE were collected at sites that had considerably larger retail components then being proposed for this project which would result in a greater interaction between retail and residential uses, therefore a conservative rate of 15 percent was applied for this site. This rate was applied to the total trips for whichever land use had a lower trip generation for that study period, then that number was doubled to account for both the outbound and inbound ends of the trip.

Pass-by Trips

Some portion of traffic associated with the shopping center is drawn from existing traffic on nearby streets. These vehicle trips are not considered "new," but are instead comprised of drivers who are already driving on the adjacent street system and choose to make an interim stop, and are referred to as "pass-by." The percentage of these pass-by trips was developed based on information provided in the *Trip Generation Handbook: An ITE Recommended Practice*, ITE, 2004. This reference includes pass-by data collected at numerous locations for many land uses, such as the shopping center use applied in this traffic analysis. PM Peak Hour Pass-by rates were developed based on the fitted curve equation presented in Figure 5.5 of the *Trip Generation Handbook*, which resulted in a pass-by potential of 51 percent. ITE does not provide data for AM Peak Hour or Daily Pass-by rates, therefore it was assumed that the a.m. pass-by trips would be half of the p.m. rate, or 25.5 percent and the overall daily rate was assumed to be 35 percent. The pass-by rate was applied only to the shopping center component of the proposed project after deducting internally captured trips associated with the retail component.

Since the drivers of pass-by trips would need to slightly alter their path of travel to enter and exit the site, turning volumes at project driveways were adjusted. For example, if a driver traveling southbound on Bernal Avenue decides to stop at the shopping center, their movement would be subtracted from the southbound through movement, but then added to the southbound left-turn movement entering the

site. Similarly, when this driver leaves the site, their movement would be added to the westbound left-turn movement leaving the site.

Total Project Trip Generation

The expected trip generation potential for the proposed project is indicated in Table 3, with deductions taken for pass-by and internal capture trips. The proposed project is expected to generate an average of 3,819 new trips on a daily basis, including 191 during the morning peak hour and 285 during the evening peak hour.

Table 3
Trip Generation Summary – No Drive-Through Lane

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Apartment	345 du	6.42	2,214	0.50	173	35	138	0.60	207	135	72
Shopping Center	38.781 ksf	94.61	3,669	1.12	44	27	17	8.19	318	152	166
Internal Capture		*-15%*	*-664*	*-15%*	*-13*	-8	*-5*	*-15%*	*-62*	-41	*-21*
Pass-by		*-35%*	*-1,400*	*-25.5%*	*-13*	-8	*-5*	*-51%*	*-178*	-85	*-93*
Total			**3,819**		**191**	**46**	**145**		**285**	**161**	**124**

Note: du = dwelling unit; ksf = 1,000 square feet; Pass-by deductions were applied to the Shopping Center component only, after internal capture deductions were applied

Although not applied to the analysis, trip generation estimates were developed for the alternative that would include a drive-through lane in the shopping center. Under this alternative, it is estimated that an average of 3,487 net new daily trips would be generated, of which 189 would occur during the a.m. peak hour and 275 would occur during the p.m. peak hour, as summarized in Table 4. Overall, this alternative would generate slightly fewer trips than the alternative without the drive-through lane. Therefore, to ensure a conservative analysis, the alternative without the drive-through lane was analyzed.

Table 4
Trip Generation Summary – With Drive-Through Lane

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Apartment	345 du	6.42	2,214	0.50	173	35	138	0.60	207	135	72
Shopping Center	35.169 ksf	94.61	3,443	1.13	40	25	15	8.46	297	143	154
Internal Capture		*-15%*	*-849*	*-15%*	*-12*	-8	*-4*	*-15%*	-62	-41	*-21*
Pass-by		*-35%*	*-1,321*	*-25.5%*	*-12*	-7	*-5*	*-51%*	*-167*	-80	*-87*
Total			**3,487**		**189**	**45**	**144**		**275**	**157**	**118**

Note: du = dwelling unit; ksf = 1,000 square feet; Pass-by deductions were applied to the Shopping Center component only, after internal capture deductions were applied

Trip Distribution

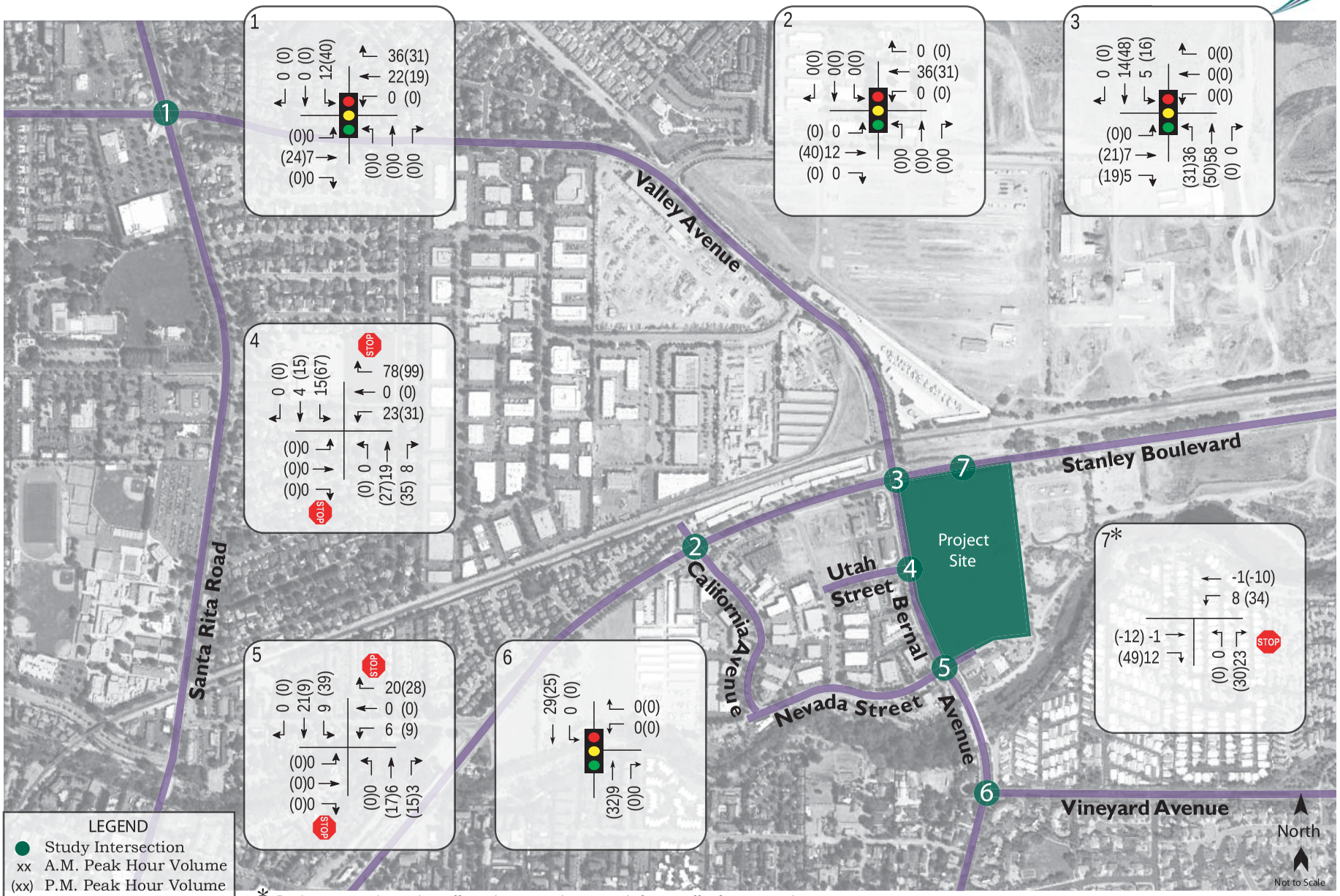
The pattern used to allocate new project trips to the street network was based local travel patterns and the location of likely origins and destinations. The applied distribution assumptions are shown in Table 5. The resulting distributed project traffic volumes are shown in Figure 4.

Table 5
Trip Distribution Assumptions

Route	Percent
Santa Rita Rd north of Valley Ave	25%
Valley Ave west of Santa Rita Rd	15%
Stanley Blvd west of Bernal Ave	25%
Stanley Blvd east of Bernal Ave	15%
Bernal Ave south of Stanley Blvd	20%
TOTAL	**100%**

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, and with the proposed signalization of Bernal Avenue/Utah Street, the study intersections are expected to operate acceptably at LOS D or better. To coincide with the signalization of Bernal Avenue/Utah Street, it was assumed that the traffic signal timing at Stanley Boulevard/Bernal Avenue-Valley Avenue would be adjusted to coordinate with the newly signalized adjacent signal, which would result in less average delay for motorists at the intersection. Furthermore, it was noted that the side street approaches to Bernal Avenue/Nevada Street would operate at LOS E and F during the p.m. peak period; however, since the intersection would operate at LOS B overall, the intersection is considered to operate acceptably. Delay projected for drivers exiting the site is well within the limits of what would typically be considered tolerable. These results are summarized in Table 6.



* Reduction in through traffic volumes is due to a shift in traffic from pass-by trips.

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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

City of Pleasanton

Figure 4

Project Traffic Volumes

Table 6
Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Valley Ave/Santa Rita Ave	34.2	C	43.1	D	34.7	C	46.2	D
2. Stanley Blvd/California Ave-Reflections Dr	15.8	B	8.9	A	12.2	B	8.9	A
3. Stanley Blvd/Bernal Ave-Valley Ave	52.2	D	47.4	D	41.2	D	40.8	D
4. Bernal Ave/Utah St	0.7	A	**75.7**	**F**	14.4	B	31.0	D
Eastbound Utah St	*13.7*	*B*	**	***F***	*Signalized with project*			
5. Bernal Ave/Nevada St	1.9	A	2.1	A	2.9	A	4.1	B
Eastbound Bernal Ave	*24.0*	*C*	*33.3*	*D*	*31.7*	*D*	*40.5*	*E*
Westbound Bernal Ave	*0.1*	*A*	*0.4*	*A*	*33.5*	*D*	*54.5*	*F*
6. Bernal Ave/Vineyard Ave	15.8	B	11.5	B	15.8	B	11.6	B
7. Stanley Blvd/Project Driveway	*Project driveway*							
Northbound Project Driveway					*9.4*	*n/a*	*10.1*	*n/a*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation

It should be noted that with the addition of project-related traffic volumes, average delay at the intersection Stanley Boulevard/California Avenue-Reflections Drive would decrease during the a.m. peak hour and would remain unchanged during the p.m. peak hour. 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 adds traffic only to the through movements on Stanley Boulevard, which have average delays that are lower than the average for the intersection as a whole, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers would experience little, if any, change in conditions as a result of the project.

Finding: The study intersections are expected to continue operating acceptably upon the addition of project-generated traffic and the proposed signalization of Bernal Avenue/ Utah Street and signal retiming.

Existing plus Approved Projects Conditions

Existing plus Approved Projects operating conditions were determined with traffic that would be generated by all pending approved projects as contained in the City's Synchro traffic model (including the City's Housing Element but excluding the Vintage Sustainable Mixed-Use Village project) added to the existing volumes. Under these conditions the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue would operate unacceptably at LOS E during the a.m. peak period, and Bernal Avenue/ Utah Street would operate unacceptably at LOS F during the p.m. peak period. All other study intersections are expected to continue to operate acceptably. When the planned TIF improvements are

implemented, it is expected that the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue would operate acceptably at LOS D during the a.m. peak hour and LOS C during the p.m. peak hour. These results are summarized in Table 7, and Existing plus Approved Projects volumes are shown in Figure 5.

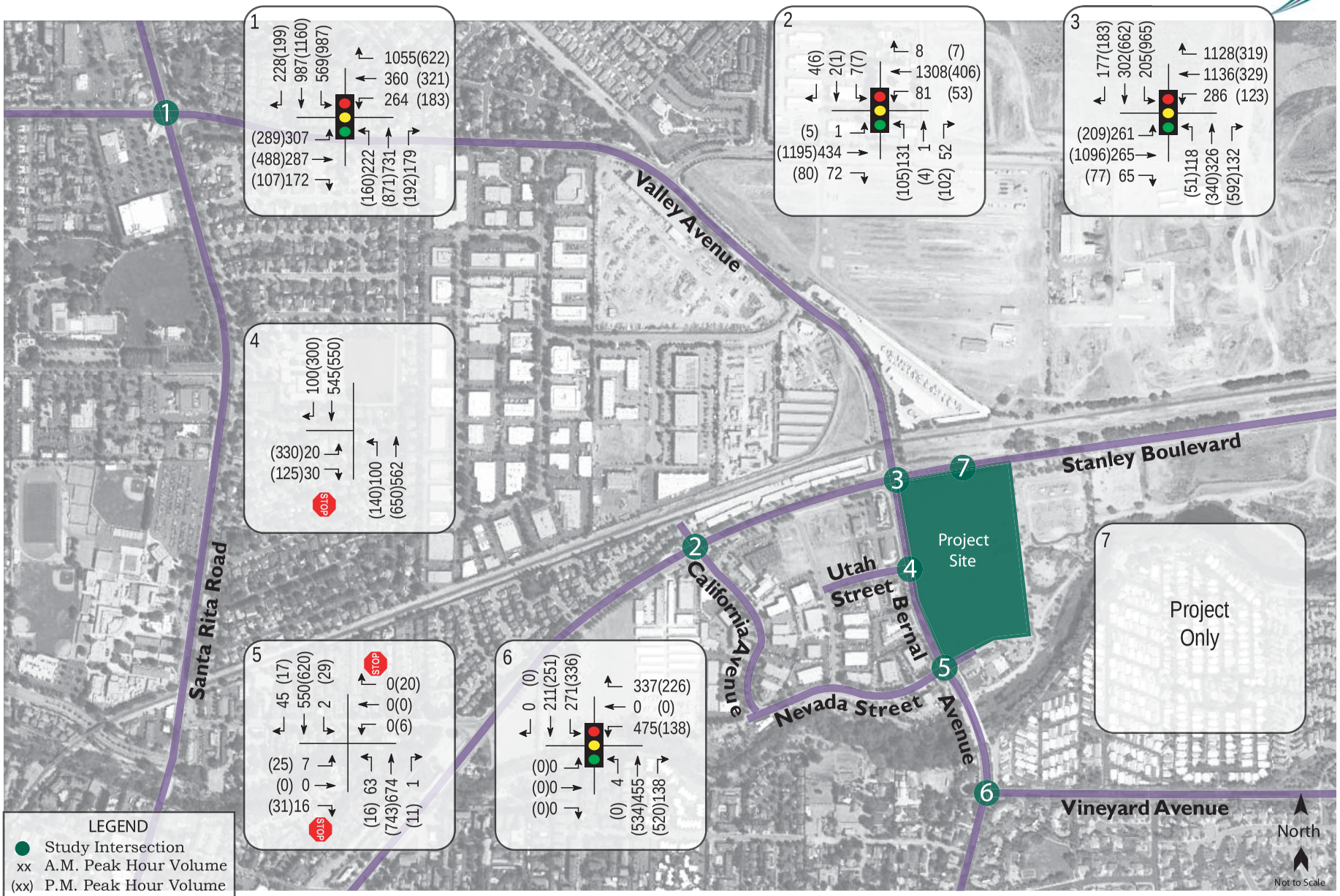
Table 7
Existing plus Approved Projects Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Existing Plus Approved Conditions**			
	AM Peak		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Valley Ave/Santa Rita Ave	36.4	D	41.5	D
2. Stanley Blvd/California Ave-Reflections Dr	12.4	B	11.7	B
3. Stanley Blvd/Bernal Ave-Valley Ave	**59.8**	**E**	33.4	C
With Planned Improvements	49.5	D	31.0	C
4. Bernal Ave/Utah St	1.4	A	**	**F**
Eastbound Utah St	*18.7*	*C*	**	***F***
5. Bernal Ave/Nevada St	1.8	A	1.6	A
Eastbound Bernal Ave	*26.4*	*D*	*24.0*	*C*
Westbound Bernal Ave	*0.0*	*A*	*23.8*	*C*
6. Bernal Ave/Vineyard Ave	18.6	B	11.3	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation; Shaded cells = conditions with planned TIF improvements

Existing plus Approved Projects plus Project Conditions

With project-related traffic added to Existing plus Approved Projects volumes, and the proposed signalization of Bernal Avenue/Utah Street, the study intersections are expected to operate acceptably, except for the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue which would operate unacceptably at LOS E during the a.m. peak hour. However, once the planned TIF improvements are implemented at that intersection, it is expected to operate acceptably at LOS D or better. The proposed driveway on Stanley Boulevard is expected to experience delays averaging less than ten seconds, which is well within the range that would be considered acceptable for drivers entering an arterial from a driveway. These results are summarized in Table 8.



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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

Figure 5

City of Pleasanton

Existing plus Approved Traffic Volumes

Table 8
Existing plus Approved Projects and Existing plus Approved Projects plus Project
Peak Hour Intersection Levels of Service

Study Intersection *Approach*	**Without Project**				**With Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Valley Ave/Santa Rita Ave	36.4	D	41.5	D	37.1	D	43.6	D
2. Stanley Blvd/California Ave-Reflections Dr	12.4	B	11.7	B	12.3	B	11.7	B
3. Stanley Blvd/Bernal Ave-Valley Ave	**59.8**	**E**	33.4	C	**61.7**	**E**	35.4	D
With Planned Improvements	49.5	D	31.0	C	52.5	D	30.2	C
4. Bernal Ave/Utah St	1.4	A	**	**F**	15.8	B	41.1	D
Eastbound Utah St	*18.7*	*C*	**	***F***	*Signalized with project*			
5. Bernal Ave/Nevada St	1.8	A	1.6	A	2.8	A	2.9	B
Eastbound Bernal Ave	*26.4*	*D*	*24.0*	*C*	*34.1*	*E*	*29.2*	*D*
Westbound Bernal Ave	*0.0*	*A*	*23.8*	*C*	*39.0*	*E*	*36.5*	*E*
6. Bernal Ave/Vineyard Ave	18.6	B	11.3	B	18.6	B	11.4	B
7. Stanley Blvd/Project Driveway	*Project driveway*							
Northbound Project Driveway					*9.9*	*n/a*	*9.9*	*n/a*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation; Shaded cells = conditions with planned TIF improvements

As with the Existing plus Project scenario, the addition of project-related traffic volumes results in average delay at the intersection of Stanley Boulevard/California Avenue-Reflections Drive decreasing during both the a.m. and p.m. peak hours due to more efficient use of existing capacity.

Finding: With the completion of planned TIF improvements the study intersections are expected to continue operating acceptably upon the addition of project-generated traffic.

Cumulative Conditions

Cumulative peak hour volume projections were taken from the build-out analysis contained in the *Pleasanton Housing Element Transportation Analysis*. This scenario represents cumulative traffic conditions that would be expected upon build out of the land uses identified in the *General Plan,* including the updated Housing Element. Since the proposed project conforms with the proposed land use for the site in the Housing Element, the cumulative traffic volumes include those that would be generated by the proposed project. Therefore, to analyze Cumulative without Project conditions, traffic generated by the proposed project was subtracted from the Cumulative conditions in the City's traffic model. Furthermore, it was noted that, per the City's Synchro model, under Cumulative conditions the intersection of Bernal Avenue/Nevada Street would be signalized.

Under the anticipated Future volumes without the project, the study intersections are expected to operate acceptably at LOS D or better except Bernal Avenue/Utah Street which would operate at an overall LOS F during the p.m. peak hour, and the eastbound approach would operate at LOS F during both the a.m. and p.m. peak hours. With the planned improvements for Stanley Boulevard/Bernal

Avenue-Valley Avenue, it is expected that the intersection will continue to operate acceptably at LOS D or C during the a.m. and p.m. peak periods, respectively. Future volumes are shown in Figure 6 and operating conditions are summarized in Table 9.

Table 9
Cumulative Peak Hour Levels of Service

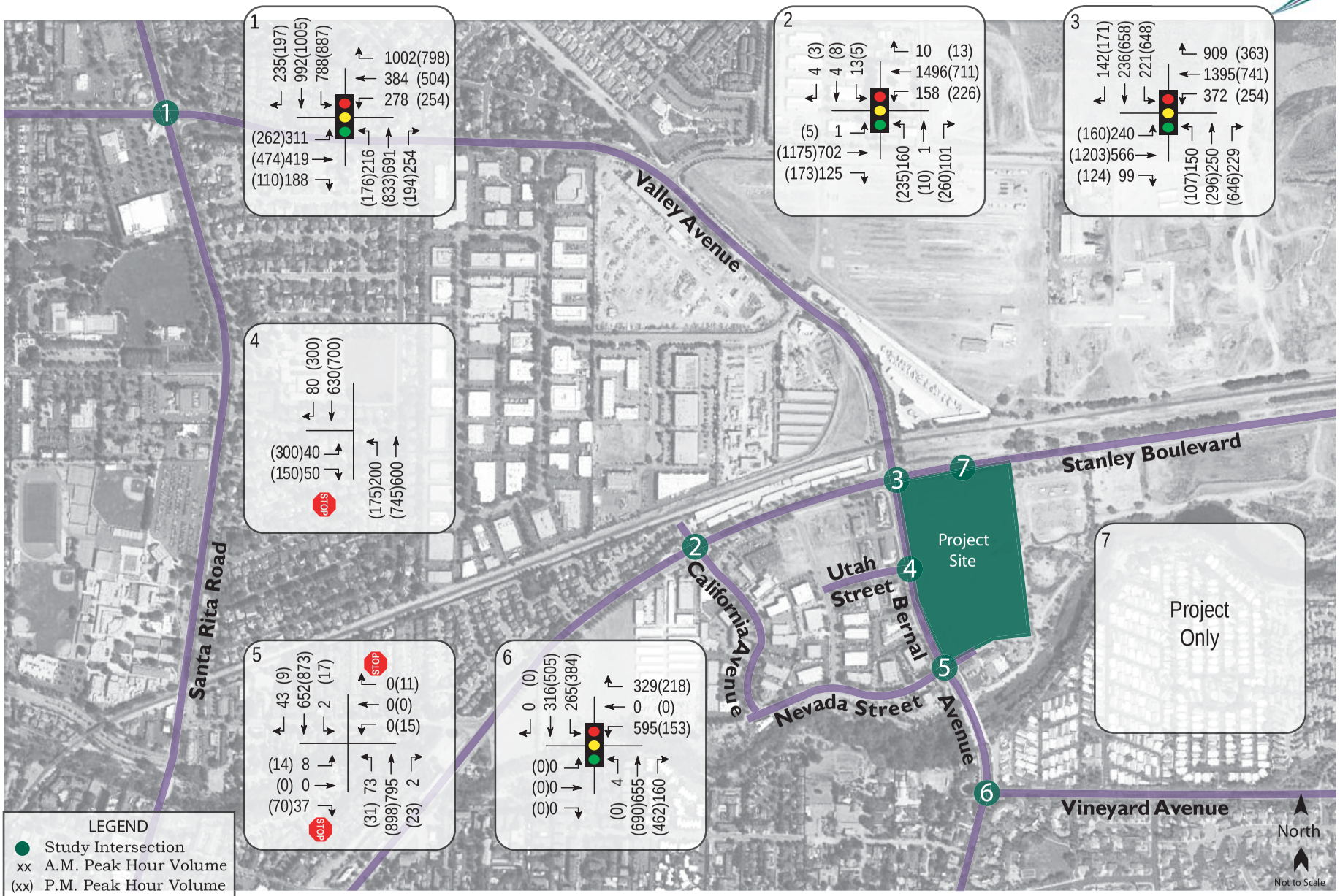
Study Intersection ***Approach***	**Cumulative Conditions**			
	AM Peak		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. Valley Ave/Santa Rita Ave	40.6	D	39.9	D
2. Stanley Blvd/California Ave-Reflections Dr	20.8	C	23.3	C
3. Stanley Blvd/Bernal Ave-Valley Ave	49.6	D	38.6	D
With Planned Improvements	39.6	D	31.0	C
4. Bernal Ave/Utah St	4.8	A	**	**F**
Eastbound Utah St	***61.1***	***F***	**	***F***
5. Bernal Ave/Nevada St	4.2	A	3.9	A
6. Bernal Ave/Vineyard Ave	24.8	C	12.3	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation; Shaded cells = conditions with TIF planned improvements

It was noted that some intersections are expected to operate better under Cumulative conditions than they would under the near-term Existing plus Approved Projects conditions. This is attributed to the fact that the City is anticipating regional improvements that would increase capacity elsewhere, resulting in a shift in traffic patterns.

Cumulative plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Cumulative volumes, and with the planned TIF improvements, all of the study intersections are expected to operate acceptably, and delays for drivers exiting the site to Stanley Boulevard would remain well within tolerable limits for this type of movement. The Cumulative plus Project operating conditions are summarized in Table 10.



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Traffic Impact Analysis for the Vintage Sustainable Mixed-Use Village Project

Figure 6

City of Pleasanton

Cumulative Traffic Volumes

Table 10
Cumulative and Cumulative plus Project Peak Hour Levels of Service

Study Intersection ***Approach***	**Cumulative**				**Cumulative plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Valley Ave/Santa Rita Ave	40.6	D	39.9	D	41.2	D	40.7	D
2. Stanley Blvd/California Ave-Reflections Dr	20.8	C	23.3	C	20.5	C	23.6	C
3. Stanley Blvd/Bernal Ave-Valley Ave	49.6	D	38.6	D	53.6	D	40.3	D
With Planned Improvements	39.6	D	31.0	C	47.2	D	32.3	C
4. Bernal Ave/Utah St	4.8	A	**	**F**	24.0	C	42.5	D
Eastbound Utah St	***61.1***	***F***	**	***F***	*Signalized with project*			
5. Bernal Ave/Nevada St	4.2	A	3.9	A	4.5	A	4.4	A
6. Bernal Ave/Vineyard Ave	24.8	C	12.3	B	24.9	C	12.5	B
7. Stanley Blvd/Project Driveway	*Project driveway*							
Northbound Project Driveway					*8.8*	*n/a*	*10.1*	*n/a*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* ** = delay greater than 120 seconds; **Bold** text = deficient operation; Shaded cells = conditions with TIF planned improvements

Finding: With the planned TIF improvements all study intersections would continue operating at acceptable Levels of Service with the project.

Queuing

Queuing analysis was performed at the study intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue as well as the project driveway along Stanley Boulevard to determine if there would be adequate left-turn lane storage at these locations with the addition of project generated traffic.

Under each scenario, the projected maximum queues in left-turn pockets were determined using the SIMTRAFFIC application of Synchro, and averaging the maximum projected queue for each of five runs. Queuing analysis was performed assuming that the planned improvements to Stanley Boulevard/Bernal Avenue-Valley Avenue would be in place. As part of the proposed project, the westbound left-turn lanes at Stanley Boulevard/Bernal Avenue-Valley Avenue would be modified to allow for installation of the left-turn lane at the project driveway. This modification would reduce the storage length from the existing 290 feet to approximately 250 feet.

Summarized in Table 11 are the predicted queue lengths for these two left-turn lanes. Copies of the SIMTRAFFIC projections are contained in Appendix B.

Table 11
Maximum Left-Turn Queues – With Planned Improvements

Intersection *Approach*	Available Storage	Maximum Queues in AM Peak Hour				Maximum Queues in PM Peak Hour			
		E+A	E+A+P	C	C+P	E+A	E+A+P	C	C+P
Stanley Blvd/Bernal Ave-Valley Ave									
Eastbound	280	168	151	127	156	**304**	**304**	159	159
Westbound	290/250*	122	223	**314**	**281**	123	116	149	202
Northbound	210	96	159	188	184	92	177	137	181
Southbound	300	88	212	83	109	**324**	**324**	272	290
Stanley Blvd/Project Driveway									
Westbound	250	--	4	--	50	--	72	--	54

Notes: *Under "plus project" conditions the westbound left-turn lane would be reduced to 250 feet of storage
Maximum Queue based on the average of the maximum value from five SIMTRAFFIC runs; all distances are measured in feet; where more than one left-turn lane is provided, the maximum queue is reported; E+A = existing plus approved projects conditions, E+A+P = existing plus approved projects plus project conditions, C = cumulative conditions, C+P = cumulative plus project conditions; **Bold** text = queue length exceeds available storage

Under the Existing plus Approved Projects and Existing plus Approved Projects Plus Project scenarios, the queues for the eastbound and southbound left-turn movements at Stanley Boulevard/Bernal Avenue-Valley Avenue are expected to extend beyond the available storage area during the p.m. peak hour. The project is not expected to contribute to an increase in either of these left-turn queues. Due to shifts in regional traffic patterns, the queues these at locations are expected to be acceptable under Cumulative and Cumulative plus Project conditions.

The proposed project would modify the westbound left-turn lane at Stanley Boulevard/Bernal Avenue-Valley Avenue to have 250 feet of storage, a reduction from the existing 290 feet of storage. Under projected Cumulative volumes, the left-turn lane queue on this approach is expected to extend beyond the existing storage area by 24 feet during the a.m. peak period. With the addition of project generated traffic and the reduced storage length, the queue is expected to decrease slightly, but it would extend beyond the remaining storage area during by 31 feet. When considering the combined typical size and spacing of vehicles in a turn lane is generally in the range of 20 to 25 feet, this calculated increase in queue length of seven feet is not expected to result in an additional vehicle extending beyond the storage area, meaning that the deficiency with the project would be similar to the deficiency under Cumulative conditions without the project.

Finding: The project does not change the length of left-turn queues on the eastbound and southbound approaches to Stanley Boulevard/Bernal Avenue-Valley Avenue that exceed storage length during the a.m. peak hour under short-term conditions, indicating no impact. Under Cumulative Conditions the queue on the westbound approach is expected to exceed available storage by more without the project than with it, even with the reduced storage length proposed to accommodate the left-turn pocket to the site.

Site Access

Access to the site would be provided by a series of four driveways along Bernal Avenue, Stanley Boulevard and Nevada Street. Access restrictions would vary as discussed below.

Project Driveway

Bernal Avenue

A full access driveway would be provided on Bernal Avenue that would align with the existing tee-intersection at Utah Street, forming a fourth leg. This currently unsignalized intersection would be signalized as part of the project. To achieve acceptable operations it was determined that the signal would need to have protected left-turn phasing on all approaches. On the Bernal Avenue approaches the existing left-turn lanes in both directions would continue to be in place (currently the southbound left-turn lane is provided for the sole purpose of allowing U-turn movements at the intersection). The Utah Street and driveway approaches would each need to be marked to provide a single left-turn lane and a shared through and right-turn lane. It was determined that there is adequate street width on the eastbound Utah Street approach for this configuration; however, some on-street parking adjacent to the intersection may need to be restricted to allow for this modification.

Nevada Street

A driveway would be provided at the end of the Nevada Street cul-de-sac, and drivers would access Bernal Avenue via Bernal Avenue/Nevada Street. This intersection would remain stop-controlled on the Nevada Street approaches; however, it is assumed that by the cumulative horizon year the intersection would be signalized, as identified in the City's Synchro traffic model.

The driveway would be located along the bulb portion of a cul-de-sac, immediately adjacent to another driveway that serves the Congregation Beth Emek Synagogue, so consideration was given to the interaction of these two driveways. To minimize the potential for conflicts, the new driveway would need to be configured in a manner that drivers would have a clear view of the other driveway. Furthermore the calendar of events posted on the synagogue's website was reviewed and it was found that the majority of their events typically begin outside of the a.m. or p.m. peak periods when traffic at the proposed project site would be highest. These complementary schedules also would help minimize traffic conflicts at the driveway.

Consideration was given to the potential benefit of designating this project driveway for one-way access instead of the proposed two-way access. Since it was determined that potential conflicts with the adjacent Synagogue driveway would be minimized by ensuring that clear sight lines are preserved, there is no apparent need to restrict access to be either inbound or outbound only. Furthermore, allowing for two-directional access maximizes flexibility for site access and provides the most direct route of ingress/egress for residents living in the southern portion of the site. Therefore, it is recommended that the driveway be configured to allow two-directional access as proposed.

Stanley Boulevard

Two driveways would be provided along Stanley Boulevard; however, due to the relatively high traffic volume and speed of traffic on Stanley Boulevard, these driveways are proposed to be configured to allow only certain turning movements.

A limited access driveway is proposed approximately 360 feet east of Bernal Avenue-Valley Avenue. It would have a 250-foot long westbound left-turn lane to allow inbound left-turn movements; however, outbound (northbound) left-turn movements would be prohibited. Both inbound and outbound right-turn movements would be allowed at the driveway. Installation of this westbound left-turn lane would require modification to the existing center median and westbound left-turn lane at Stanley Boulevard/Bernal Avenue-Valley Avenue, reducing its storage from 290 feet to 250 feet.

Additionally, a limited access driveway would be provided at the eastern edge of the project site, approximately 550 feet east of Bernal Avenue-Valley Avenue. The driveway would be restricted to allow only inbound and outbound right-turn movements. Since left-turn movements would be prohibited, installation of this driveway would not require any modifications to the existing center median.

Drivers entering the site would need to cross over an acceleration lane to make a right-turn into the driveways on Stanley Boulevard. Therefore, to reduce the potential for conflict with through traveling vehicles, it is recommended that eastbound right-turn tapers be installed at each of the project driveways on Stanley Boulevard. It is recommended that at its widest the taper be ten feet wide, including the bicycle lane, with a taper of 15:1, resulting in a taper length of 75 feet. The planned TIF improvements for the area would ultimately convert the far right acceleration lane into a continuous third eastbound lane. When this occurs, it is recommended that the tapers remain unchanged.

Sight Distance

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

The proposed unsignalized driveways on Stanley Boulevard would need to be designed in a manner that ensures that adequate sight lines are provided. The recommended sight distances for minor street approaches that are either a private road or a driveway are based on stopping sight distance. For the posted 45 mile per hour speed limit, the recommended stopping sight distance is 360 feet, or approximately the distance to the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue to the west. Therefore, it is recommended that all landscaping and design features near the driveway are designed in a manner such that they do not impede upon a clear view of the adjacent intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue. Since outbound left-turns would not be permitted at this driveway, it is not necessary to maintain clear sight lines to the east.

Additionally, the proposed unsignalized driveway on Nevada Street will need to be designed in a manner that ensures that adequate sight lines are provided. Currently there is no posted speed limit on Nevada Street; however, given the fact that the driveway would be located less than 300 feet from the adjacent intersection of Bernal Avenue/Nevada Street it is recommended that clear sight lines be maintained to this intersection. Furthermore, a clear view of the adjacent driveway for the Congregation Beth Emek Synagogue would need to be maintained.

Internal Circulation

Internal circulation would be provided by five primary drive aisles, labeled on the site plan as Drive A, Drive B, Drive C, Drive D and Drive E. Three of these, Drives A, B and C, would go through the core area of the site, with the remaining two running along the perimeter. Drive A and Drive B would connect to the shopping center's parking area and would be the primary access path for drivers traveling

from Bernal Avenue or Stanley Boulevard to the shopping center. All drive aisles would connect to the various residential buildings and their associated parking areas. The driveways on Nevada Street and the eastern driveway on Stanley Boulevard would allow for direct access to residential areas without traveling through the shopping center. While it would be possible for drivers destined for the shopping center to drive through residential areas, this would be an indirect and circuitous route, making it unlikely for many drivers to choose this option.

Parking

Shopping Center

In its Municipal Code (§ 18.88.30), the City of Pleasanton has established minimum parking requirements for various land uses. For the commercial portion of the project the zoning is Commercial Neighborhood, which requires one parking space is required for every 180 square feet of gross floor area. For the alternative without the drive-through lane, this would result in a need for 215 parking spaces, or 195 parking spaces for the alternative with the drive-through lane.

The proposed project would include 174 parking spaces if the option with the drive-through is developed. If the option without the drive-through lane is developed a total of 189 parking spaces would be provided. Under either option, parking would be provided at a rate of approximately one parking space per 200 square feet of floor space, which could not adequately meet the City's requirement of one space per 180 square feet. However, no parking deficit is actually anticipated based on parking demand analysis per *ITE Parking Generation, 3rd Edition*, 2004, which is summarized in Table 12, along with a comparison to the City's parking requirements. Furthermore, the internal trip capture between the apartment and commercial uses would lead to some residents walking to the shopping center and therefore further reducing the parking demand.

Table 12
Parking Supply Summary

Land Use Scenario	Size (ksf)	Proposed Parking Supply	City Parking Code		ITE Average Peak Generation – Non-December		ITE Peak Generation – December	
			Rate	Spaces	Rate	Peak Demand	Rate	Peak Demand
Without Drive-Through	38.8	189	1/180 sf	215	3.02/ksf	117	4.74/ksf	184
With Drive-Through	35.2	174	1/180 sf	195	3.02/ksf	106	4.74/ksf	167

Note: ksf = 1,000 square feet; sf = square feet

Residential

Residential parking would be provided separately from the shopping center. The Pleasanton Municipal Code (§ 18.88.30) requires the following minimum parking standards for apartment developments:

3. *Apartment house parking requirements shall be computed as follows:*

    a. *For apartments with two bedrooms or less, a minimum of two spaces shall be required for each of the first four units; one and one-half spaces for each additional unit.*

b. *For apartments with three or more bedrooms (or two bedrooms and a den convertible to a third bedroom), a minimum of two spaces per unit shall be required. Parking requirements for units having less than three bedrooms shall be computed separately from the requirements for units having three bedrooms or more and then added together.*

c. *Visitor parking, in a ratio of one parking space for each seven (1:7) units, shall be provided. All visitor parking spaces shall be clearly marked for this use. Visitor parking may be open or covered and does not count as part of the covered parking requirement described in subsection A4 of this section.*

The proposed project would include 176 one-bedroom units, 146 two-bedroom units and 23 three bedroom units, resulting in a required minimum parking supply of 581 spaces. A total of 612 residential parking spaces are proposed to be provided, exceeding the code requirements by 31 parking spaces. These parking spaces would be provided away from the shopping center, making them less convenient for shopping center users. However, to reduce the possibility of overflow shopping center parking in residential areas, it is recommended that signs be posted to indicate restricted residential parking areas.

Drive-Through Lane

One of the proposed site plan alternatives would allow for installation of a drive-through lane at the northeast corner of the retail area. Although closest to the western driveway on Stanley Boulevard, it appears that the drive-through lane is oriented to be best accessed by the Bernal Avenue/Utah Street driveway. Depending on the origin or final destination of users, and considering access restrictions on the Stanley Boulevard driveways, some drivers would need to continue through the parking lot to enter or exit the drive-through lane. The proposed drive-through lane would include storage space for approximately two to three vehicles. If a longer queue forms, it would partially block the main drive-aisle. To assist drivers, it is recommended that signs be installed in the parking lot directing users to the preferred drive-through access route.

Loading

The City has established minimum standards for commercial loading zones within developments (PMC (§ 18.92.030). These requirements vary slightly depending on the type of tenants on the site; however, it was determined that for a shopping center sized 69,999 square feet or less, regardless of the possible tenants, two loading berths would be required. These berths would need to have minimum dimensions of 12 feet by 45 feet each.

On the site plan, two loading berths are proposed on the northeast corner of the shopping center. The most direct route of access for a delivery driver would be to enter on the westernmost driveway on Stanley Boulevard, proceed through Drive B then back into the loading dock. To exit the site, the driver would pull forward and proceed along Drive B then Drive A towards the driveway at Bernal Avenue/Utah Street.

Alternative Modes

Pedestrian Facilities

Given the proximity of commercial and recreational uses near the site, including Tawny Park which is about one-half of a mile south of the center of the project site, it is reasonable to assume that some project patrons and employees would want to walk, bicycle, and/or utilize transit for trips to and from the project site.

Sidewalks are planned to be installed along the project frontage connecting to the surrounding network of sidewalks. Continuous sidewalks would be provided to nearby recreational facilities including Tawny Park, the Arroyo Bike Trail and the City's BMX Park. In addition to driveways, pedestrian entrances are also planned along Bernal Avenue and Stanley Boulevard, which are expected to provide adequate pedestrian connectivity with the surrounding pedestrian network.

Currently, marked crosswalks are not provided across Bernal Avenue at either Utah Street or Nevada Street. Implementation of the project would include signalization of Bernal Avenue/Utah Street and the City has long-term plans to signalize the intersection of Bernal Avenue/Nevada Street. When these two intersections are signalized as currently proposed, it is recommended that crosswalks and pedestrian traffic signal equipment be installed as part of the signal installation project.

Finding: Pedestrian facilities serving the project site are expected to be adequate.

Recommendation: Pedestrian crossing facilities should be included as part of the project's planned signalization of the Bernal Avenue/Utah Street intersection.

Recommendation: Pedestrian crossing facilities also should be included as part of the City's future planned signalization of the Bernal Avenue/Nevada Street signalization project pursuant to the City's TIF program.

Bicycle Facilities

Existing bicycle facilities, including bike lanes on streets fronting the project site together with nearby Arroyo Bike Trail, are expected provide adequate access for bicyclists. The City's BMX Park is located just east of the project site on Stanley Boulevard and would be easily accessible from the project site.

Finding: Bicycle facilities serving the project site are expected to be adequate.

Transit

Existing transit routes are adequate to accommodate any project-generated transit trips. The proposed project would include installation of bus stop facilities along its Stanley Boulevard and Bernal Avenue frontages, but none would be provided across the street for travel in the opposite direction. Existing and proposed stops located along the project's frontage are within acceptable walking distance of the site. However, the current westbound bus stop for Route 10 located on Stanley Boulevard west of California Avenue-Reflections Drive is located approximately one-half mile from the center of the project site, which is generally considered to be beyond the distance that most users would consider to be convenient. No modifications to this bus stop location are proposed as part of this project, therefore, it is recommended that the applicant work with LAVTA to determine if there is a need for a bus stop closer to the project site.

Finding: Proposed bus stops adjacent to the project site are expected to be adequate; however, the existing Route 10 westbound bus stop on Stanley Boulevard is located approximately one-half mile away from the site which may not be adequate for some users.

Recommendation: The applicant should work with LAVTA to determine if a westbound Route 10 bus stop should be installed closer to the project site.

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 July 1, 2006, through June 30, 2011.

As presented in Table 13, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2009 Collision Data on California State Highways*, California Department of Transportation. It was found that all study intersections experienced a calculated collision rate lower than the statewide average rate for similar facilities. Collision rate calculations are provided in Appendix C.

Table 13
Collision Rates at the Study Intersections

Study Intersection	Number of Collisions	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Valley Ave/Santa Rita Rd	31	0.33	0.36
2. Stanley Blvd/California Ave-Reflections Dr	5	0.16	0.36
3. Valley Ave/Stanley Blvd	15	0.20	0.36
4. Bernal Ave/Utah St	3	0.13	0.15
5. Bernal Ave/Nevada St	1	0.04	0.15
6. Bernal Ave/Vineyard Ave	8	0.26	0.36

Note: c/mve = collisions per million vehicles entering

Conclusions and Recommendations

Conclusions

The following summarizes the findings of this analysis.

Existing Conditions

- Currently the intersection of Bernal Avenue/Utah Street operates at LOS F during the p.m. peak hour, but all other study intersections operate acceptably. The LOS F operations at Bernal Avenue/Utah Street do not constitute unacceptable operations as the City's operational standards only apply to signalized intersections.

- The City's Traffic Impact Fee (TIF) program includes planned improvements to Stanley Boulevard/ Bernal Avenue-Valley Avenue that would increase vehicle capacity at the intersection.

Project Conditions

- The proposed project is anticipated to generate an average of 3,819 net new vehicle trips on a daily basis, of which 191 would occur during the a.m. peak hour and 285 would occur during the p.m. peak hour.

- The project as proposed includes signalization of Bernal Avenue/Utah Street, with the fourth, eastern leg being a project driveway.

- The proposed project would reduce the westbound left-turn pocket storage length at Stanley Boulevard/Bernal Avenue-Valley Avenue from 290 feet to 250 feet in order to install a left-turn pocket for a project driveway.

Existing plus Project Scenario

- With the addition of project generated traffic to existing traffic along with signal retiming and the installation of the proposed traffic signal at Bernal Avenue/Utah Street, all study intersections are expected to operate acceptably.

Existing plus Approved Projects Scenario

- With the addition of project generated trips, and the proposed signalization of Bernal Avenue/Utah Street as well as completion of planned TIF improvements at Stanley Boulevard/Bernal Avenue-Valley Avenue, all study intersections are expected to operate acceptably under the Existing plus Approved Projects plus Project scenario.

- It is expected that the eastbound and southbound left-turn queues at Stanley Boulevard/Bernal Avenue-Valley Avenue would extend beyond their storage area. The addition of project-generated traffic would not impact the length of either of the queues.

Cumulative Scenario

- The intersection of Bernal Avenue/Nevada Street has been identified by the City for future signalization; therefore, the intersection was assumed to be signalized under the Cumulative scenario.

- Under Cumulative without project conditions the intersection of Bernal Avenue/Utah Street is expected to operate unacceptably; however, due to changes in regional transportation patterns, the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue is expected to return to acceptable operations, even without the planned improvements included in the TIF program.

- With the addition of project-generated traffic, and the implementation of planned improvements including the proposed signalization of Bernal Avenue/Utah Street, all study intersections are expected to operate acceptably under Cumulative plus Project conditions.

- Under the Cumulative without Project conditions, the westbound left-turn queue at Stanley Boulevard/Bernal Avenue-Valley Avenue is expected to extend beyond the storage area by 24 feet. With the addition of project-generated traffic, and the proposed reduction the left-turn storage area, it is expected that the peak left-turn queue would extend beyond the storage area by 31 feet, an increase of seven feet. However, given that the standard size and spacing of vehicles far exceeds seven feet, this calculated increase in queue distance is not expected to result in an addition vehicle extending beyond the storage area. The impact is therefore not significant.

- Due to a shift in regional traffic patterns, these queues southbound and eastbound left-turn queues at Stanley Boulevard/Bernal Avenue-Valley Avenue are expected to be contained within their storage length under Cumulative conditions.

Project Access

- The project site would be accessed by driveways on Stanley Boulevard, Bernal Avenue and Nevada Street.

- It is expected that Nevada Street would be able to adequately serve both a project driveway and the adjacent Congregation Beth Emek Synagogue driveway, allowing for bi-directional travel on the project's driveway.

- Five primary drive aisles would provide vehicle circulation through the site, connecting the various parking areas. They are configured in a manner that allows residents to access their homes without needing to travel through the shopping center. Furthermore, the most direct access routes to the shopping center are via Stanley Boulevard and Bernal Avenue so would not result in travel through residential areas, discouraging shopping center users from driving through residential areas.

On-Site Parking and Loading

- Parking for the retail uses would be provided at a rate of one space per 200 square feet, which does not meet the City's parking requirement of one space per 180 square feet.

- Although the City code would not be satisfied, no parking deficit is actually anticipated based on an ITE parking demand analysis and also the internal trip capture between different land uses.

- A total of 612 residential parking spaces would be provided, exceeding the City's minimum requirement of 581 parking spaces.

- Two commercial loading berths would be provided, which meets the City's requirements.

Alternative Modes of Transportation

- Pedestrian and bicycle facilities accessing the site are generally expected to be acceptable and would provide connectivity to the local network of bicycle and pedestrian facilities.

- Proposed transit facilities located immediately along the project's frontage are expected to adequately serve the project; however, the existing Route 10 westbound bus stop on Stanley Boulevard is west of California Avenue-Reflection Drive about one-half mile away from the project site, a distance that many users may not find convenient.

Collision History

- For the five-year period of July 1, 2006, through June 30, 2011, the calculated collision rates for all study intersections were lower than the statewide average rate for similar facilities.

Recommendations

The following items are recommended to enhance access to the project site and minimize the project's impact on the adjacent transportation network.

- To achieve acceptable operations at the Bernal Avenue/Utah Street driveway it was determined that the proposed traffic signal should have protected left-turn phasing on all approaches. On the Bernal Avenue approaches the existing left-turn lanes in both directions should be retained. On the Utah Street and driveway approaches the geometry should be modified to provide a single left-turn lane and a shared through and right-turn lane on each.

- Pedestrian crossing facilities should be included as part of the proposed project's signalization of Bernal Avenue/Utah Street.

- Pedestrian crossing facilities should be included at the Bernal Avenue/Nevada Street intersections as part of the City's planned signalization, pursuant to the City's Traffic Impact Fee Program.

- It is recommended that all landscaping, signage and buildings be designed in a manner that maintains adequate sight lines at project driveways.

- To minimize the potential for conflicts, it is recommended that clear sight lines be maintained between the project's driveway on Nevada Street and the adjacent driveway for the Congregation Beth Emek Synagogue.

- It is recommended that a 75-foot long right turn deceleration taper be installed at each of the project's driveways on Stanley Boulevard.

- To reduce the possibility of overflow shopping center parking in residential areas, it is recommended that signs be posted to indicate restricted residential parking areas.

- If the alternative with the drive-through lane is developed, it is recommended that signs be installed in the parking lot to direct drivers along the recommended access path.

- The applicant should coordinate with the LAVTA to determine if a westbound Route 10 bus stop should be located closer to the project site.

Study Participants and References

Study Participants

Principal in Charge:	Mark E. Spencer, PE
Engineer:	Tony Henderson, PE
Technician/Graphics:	Deborah J. Mizell
Editing/Formatting:	Angela McCoy
Quality Control Review:	Dalene J. Whitlock, PE, PTOE

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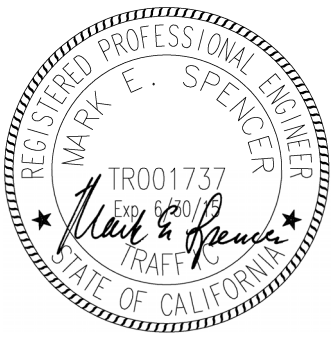

Appendix A

Intersection Level of Service Calculations

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

2/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	317	286	167	263	418	1088	195	611	145	533	895	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	369	333	194	306	486	1265	227	710	169	620	1041	270
RTOR Reduction (vph)	0	0	148	0	0	0	0	0	29	0	0	91
Lane Group Flow (vph)	369	333	46	306	486	1265	227	710	140	620	1041	179
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	16.6	17.1	17.1	24.0	24.5	120.0	10.5	38.9	38.9	22.0	50.4	50.4
Effective Green, g (s)	17.6	19.1	19.1	25.0	26.5	120.0	11.5	40.9	40.9	23.0	52.4	52.4
Actuated g/C Ratio	0.15	0.16	0.16	0.21	0.22	1.00	0.10	0.34	0.34	0.19	0.44	0.44
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	520	582	256	381	808	1615	340	1246	550	680	1597	700
v/s Ratio Prot	0.10	0.09		0.17	0.13		0.06	0.19		c0.17	0.28	
v/s Ratio Perm			0.03			c0.78			0.09			0.11
v/c Ratio	0.71	0.57	0.18	0.80	0.60	0.78	0.67	0.57	0.25	0.91	0.65	0.26
Uniform Delay, d1	48.8	46.7	43.7	45.2	42.0	0.0	52.4	32.4	28.5	47.5	26.6	21.4
Progression 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
Incremental Delay, d2	3.6	0.8	0.1	11.0	1.9	3.9	3.8	1.9	1.1	16.3	2.1	0.9
Delay (s)	52.4	47.5	43.8	56.1	43.9	3.9	56.2	34.2	29.7	63.8	28.7	22.3
Level of Service	D	D	D	E	D	A	E	C	C	E	C	C
Approach Delay (s)		48.7			21.1			38.1			39.1	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	34.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	3.0	
Intersection Capacity Utilization	68.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

2/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	204	195	44	185	836	1201	115	446	111	216	298	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.98	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3241	1489	1829	3657	1599	3547	3469	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3241	1489	1829	3657	1599	3547	3469	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	224	214	48	203	919	1320	126	490	122	237	327	171
RTOR Reduction (vph)	0	0	28	0	87	198	0	0	0	0	74	0
Lane Group Flow (vph)	224	214	20	203	1452	502	126	490	122	237	424	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		Prot	Prot		Free	Prot		
Protected Phases	1	6		5	2	2	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	10.3	37.0	37.0	10.2	36.9	36.9	10.8	19.8	100.0	12.0	21.0	
Effective Green, g (s)	11.3	41.0	41.0	11.2	40.9	40.9	11.8	22.8	100.0	13.0	24.0	
Actuated g/C Ratio	0.11	0.41	0.41	0.11	0.41	0.41	0.12	0.23	1.00	0.13	0.24	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	401	1499	652	397	1326	609	216	834	1599	461	833	
v/s Ratio Prot	c0.06	0.06		0.06	c0.45	0.34	c0.07	c0.13		0.07	0.12	
v/s Ratio Perm			0.01						c0.08			
v/c Ratio	0.56	0.14	0.03	0.51	1.10	0.82	0.58	0.59	0.08	0.51	0.51	
Uniform Delay, d1	42.0	18.5	17.6	41.8	29.6	26.3	41.8	34.4	0.0	40.6	32.9	
Progression Factor	1.01	0.90	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	0.2	0.1	1.1	55.0	12.0	4.0	1.1	0.1	1.0	0.5	
Delay (s)	44.1	16.8	20.2	42.9	84.5	38.4	45.7	35.5	0.1	41.5	33.4	
Level of Service	D	B	C	D	F	D	D	D	A	D	C	
Approach Delay (s)		29.7			67.8			31.4			36.0	
Approach LOS		C			E			C			D	

Intersection Summary				
HCM Average Control Delay	52.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	81.5%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

2/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	366	0	390	4	414	163	270	101	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1622	1829	3657	1616	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1622	1829	3657	1616	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	431	0	459	5	487	192	303	119	0
RTOR Reduction (vph)	0	0	0	0	0	165	0	0	61	0	0	0
Lane Group Flow (vph)	0	0	0	0	431	294	5	487	131	303	119	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					20.7	31.7	1.0	20.3	41.0	11.0	30.3	
Effective Green, g (s)					22.7	33.7	2.0	22.3	45.0	12.0	32.3	
Actuated g/C Ratio					0.34	0.51	0.03	0.34	0.68	0.18	0.49	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					629	828	55	1236	1175	645	942	
v/s Ratio Prot					c0.24	0.06	0.00	c0.13	0.04	c0.09	0.06	
v/s Ratio Perm						0.12			0.04			
v/c Ratio					0.69	0.35	0.09	0.39	0.11	0.47	0.13	
Uniform Delay, d1					18.6	9.7	31.1	16.7	3.6	24.2	9.2	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					3.1	0.3	0.7	0.2	0.0	0.5	0.1	
Delay (s)					21.7	9.9	31.8	16.9	3.7	24.7	9.2	
Level of Service					C	A	C	B	A	C	A	
Approach Delay (s)		0.0			15.6			13.3			20.3	
Approach LOS		A			B			B			C	

Intersection Summary				
HCM Average Control Delay	15.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	50.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

2/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	380	59	40	1050	7	117	1	31	7	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.93		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1302		1743	1663	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.73	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1210	1302		1344	1663	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	2	452	70	48	1250	8	139	1	37	8	2	7
RTOR Reduction (vph)	0	0	23	0	0	1	0	30	0	0	6	0
Lane Group Flow (vph)	2	452	47	48	1250	7	139	8	0	8	3	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	63.6	63.6	5.2	67.6	67.6	17.2	17.2		17.2	17.2	
Effective Green, g (s)	2.2	66.6	66.6	6.2	70.6	70.6	18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.02	0.67	0.67	0.06	0.71	0.71	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2436	1032	113	2582	1155	220	237		245	303	
v/s Ratio Prot	0.00	0.12		c0.03	c0.34			0.01			0.00	
v/s Ratio Perm			0.03			0.00	c0.11			0.01		
v/c Ratio	0.05	0.19	0.05	0.42	0.48	0.01	0.63	0.03		0.03	0.01	
Uniform Delay, d1	47.9	6.4	5.8	45.2	6.6	4.3	37.8	33.7		33.7	33.5	
Progression Factor	0.55	2.01	4.44	0.98	0.67	0.72	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2	0.1	1.2	0.3	0.0	5.8	0.1		0.1	0.0	
Delay (s)	26.8	13.0	25.6	45.6	4.7	3.1	43.6	33.7		33.7	33.5	
Level of Service	C	B	C	D	A	A	D	C		C	C	
Approach Delay (s)		14.7			6.2			41.5			33.6	
Approach LOS		B			A			D			C	

Intersection Summary				
HCM Average Control Delay	11.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	53.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

2/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	16	0	0	0	66	665	2	2	444	43
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Hourly flow rate (vph)	28	0	48	0	0	0	105	731	8	8	541	72
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			705	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1172	1526	561	1526	1593	389	633			739		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1153	1527	506	1528	1599	389	582			739		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	90	100	100	100	89			99		
cM capacity (veh/h)	124	95	474	61	86	598	916			863		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	76	0	105	487	252	8	541	72
Volume Left	28	0	105	0	0	8	0	0
Volume Right	48	0	0	0	8	0	0	72
cSH	342	1700	916	1700	1700	863	1700	1700
Volume to Capacity	0.22	0.00	0.11	0.29	0.15	0.01	0.32	0.04
Queue Length 95th (ft)	21	0	10	0	0	1	0	0
Control Delay (s)	23.9	0.0	9.4	0.0	0.0	9.2	0.0	0.0
Lane LOS	C	A	A			A		
Approach Delay (s)	23.9	0.0	1.2			0.1		
Approach LOS	C	A						

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

2/20/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	20	30	20	653	459	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1		4.1	4.1	4.1	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.92		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1734		1829	3657	3584	
Flt Permitted	0.98		0.43	1.00	1.00	
Satd. Flow (perm)	1734		828	3657	3584	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	33	22	726	510	78
RTOR Reduction (vph)	28	0	0	0	17	0
Lane Group Flow (vph)	27	0	22	726	571	0
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	5.7		26.3	26.3	26.3	
Effective Green, g (s)	5.7		26.3	26.3	26.3	
Actuated g/C Ratio	0.14		0.65	0.65	0.65	
Clearance Time (s)	4.1		4.1	4.1	4.1	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	246		542	2393	2345	
v/s Ratio Prot	c0.02			c0.20	0.16	
v/s Ratio Perm			0.03			
v/c Ratio	0.11		0.04	0.30	0.24	
Uniform Delay, d1	15.0		2.5	3.0	2.9	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2		0.1	0.3	0.2	
Delay (s)	15.2		2.6	3.3	3.1	
Level of Service	B		A	A	A	
Approach Delay (s)	15.2			3.3	3.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	40.2	Sum of lost time (s)	8.2
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

2/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	268	585	106	160	344	514	144	657	174	1093	1037	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	279	609	110	167	358	535	150	684	181	1139	1080	217
RTOR Reduction (vph)	0	0	46	0	0	0	0	0	36	0	0	75
Lane Group Flow (vph)	279	609	64	167	358	535	150	684	145	1139	1080	142
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	18.1	23.7	23.7	13.3	18.9	120.0	8.8	28.6	28.6	36.4	56.2	56.2
Effective Green, g (s)	19.1	25.7	25.7	14.3	20.9	120.0	9.8	30.6	30.6	37.4	58.2	58.2
Actuated g/C Ratio	0.16	0.21	0.21	0.12	0.17	1.00	0.08	0.26	0.26	0.31	0.49	0.49
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	565	783	345	218	637	1615	290	933	412	1105	1774	777
v/s Ratio Prot	0.08	c0.17		c0.09	0.10		0.04	c0.19		c0.32	0.30	
v/s Ratio Perm			0.04			0.33			0.09			0.09
v/c Ratio	0.49	0.78	0.19	0.77	0.56	0.33	0.52	0.73	0.35	1.03	0.61	0.18
Uniform Delay, d1	46.0	44.5	38.6	51.2	45.4	0.0	52.8	41.0	36.6	41.3	22.6	17.5
Progression Factor	1.00	1.00	1.00	1.25	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	4.5	0.1	12.4	1.7	0.5	0.6	3.7	1.1	35.3	1.6	0.5
Delay (s)	46.3	48.9	38.7	76.6	41.4	0.5	53.5	44.6	37.7	76.6	24.1	18.0
Level of Service	D	D	D	E	D	A	D	D	D	E	C	B
Approach Delay (s)		47.1			26.3			44.7			48.1	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	43.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	87.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

2/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	1144	89	119	263	302	62	343	538	1158	796	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3285	1489	1829	3657	1599	3547	3582	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3285	1489	1829	3657	1599	3547	3582	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1217	95	127	280	321	66	365	572	1232	847	134
RTOR Reduction (vph)	0	0	61	0	41	123	0	0	0	0	9	0
Lane Group Flow (vph)	182	1217	34	127	374	63	66	365	572	1232	972	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		Prot	Prot		Free	Prot		
Protected Phases	1	6		5	2	2	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	11.5	38.6	38.6	9.4	36.5	36.5	8.5	14.6	120.0	36.4	42.5	
Effective Green, g (s)	12.5	42.6	42.6	10.4	40.5	40.5	9.5	17.6	120.0	37.4	45.5	
Actuated g/C Ratio	0.10	0.36	0.36	0.09	0.34	0.34	0.08	0.15	1.00	0.31	0.38	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	1298	563	307	1109	503	145	536	1599	1105	1358	
v/s Ratio Prot	c0.05	c0.33		0.04	0.11	0.04	0.04	c0.10		c0.35	0.27	
v/s Ratio Perm			0.02						c0.36			
v/c Ratio	0.49	0.94	0.06	0.41	0.34	0.12	0.46	0.68	0.36	1.11	0.72	
Uniform Delay, d1	50.8	37.4	25.5	51.9	29.7	27.5	52.8	48.5	0.0	41.3	31.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.66	
Incremental Delay, d2	1.0	13.9	0.2	0.9	0.2	0.1	2.3	3.6	0.6	61.9	1.4	
Delay (s)	51.8	51.3	25.7	52.8	29.9	27.6	55.0	52.1	0.6	92.8	22.3	
Level of Service	D	D	C	D	C	C	E	D	A	F	C	
Approach Delay (s)		49.8			33.3			22.9			61.5	
Approach LOS		D			C			C			E	

Intersection Summary				
HCM Average Control Delay	47.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	94.3%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

2/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	127	0	225	0	426	567	424	247	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1625		3657	1615	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1625		3657	1615	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	134	0	237	0	448	597	446	260	0
RTOR Reduction (vph)	0	0	0	0	0	116	0	0	179	0	0	0
Lane Group Flow (vph)	0	0	0	0	134	121	0	448	418	446	260	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					13.7	27.3		16.0	29.7	13.6	33.6	
Effective Green, g (s)					15.7	29.3		18.0	33.7	14.6	35.6	
Actuated g/C Ratio					0.27	0.51		0.31	0.59	0.25	0.62	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					501	831		1149	1034	904	1196	
v/s Ratio Prot					0.07	0.04		0.12	c0.11	c0.13	0.14	
v/s Ratio Perm						0.04			0.15			
v/c Ratio					0.27	0.15		0.39	0.40	0.49	0.22	
Uniform Delay, d1					16.3	7.4		15.4	6.4	18.2	4.8	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.3	0.1		0.2	0.3	0.4	0.1	
Delay (s)					16.6	7.5		15.6	6.6	18.6	4.8	
Level of Service					B	A		B	A	B	A	
Approach Delay (s)		0.0			10.8			10.5			13.5	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	11.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

2/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	1299	38	21	417	7	74	3	66	9	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.94		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1573	1829	3657	1636	1540	1314		1783	1602	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.71	1.00	
Satd. Flow (perm)	1829	3657	1573	1829	3657	1636	1219	1314		1330	1602	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	1397	41	23	448	8	80	3	71	10	0	9
RTOR Reduction (vph)	0	0	10	0	0	3	0	57	0	0	7	0
Lane Group Flow (vph)	8	1397	31	23	448	5	80	17	0	10	2	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	0.8	30.4	30.4	2.0	31.6	31.6	10.5	10.5		10.5	10.5	
Effective Green, g (s)	1.8	33.4	33.4	3.0	34.6	34.6	11.5	11.5		11.5	11.5	
Actuated g/C Ratio	0.03	0.59	0.59	0.05	0.61	0.61	0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	58	2147	923	96	2224	995	246	266		269	324	
v/s Ratio Prot	0.00	c0.38		c0.01	0.12			0.01			0.00	
v/s Ratio Perm			0.02			0.00	c0.07			0.01		
v/c Ratio	0.14	0.65	0.03	0.24	0.20	0.00	0.33	0.07		0.04	0.01	
Uniform Delay, d1	26.8	7.9	5.0	25.9	5.0	4.4	19.4	18.4		18.2	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.7	0.0	1.3	0.0	0.0	0.8	0.1		0.1	0.0	
Delay (s)	27.9	8.6	5.0	27.2	5.0	4.4	20.2	18.5		18.3	18.1	
Level of Service	C	A	A	C	A	A	C	B		B	B	
Approach Delay (s)		8.6			6.1			19.3			18.2	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM Average Control Delay	8.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	55.1%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

2/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	32	7	0	20	15	633	10	31	667	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	0	35	8	0	22	16	688	11	34	725	21
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			1270	
pX, platoon unblocked	0.75	0.75	0.75	0.75	0.75		0.75					
vC, conflicting volume	1231	1544	745	1536	1559	369	766			699		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1141	1559	494	1548	1579	369	521			699		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	73	100	91	85	100	96	98			96		
cM capacity (veh/h)	102	77	384	50	75	616	767			894		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	62	29	16	459	240	34	725	21
Volume Left	27	8	16	0	0	34	0	0
Volume Right	35	22	0	0	11	0	0	21
cSH	233	156	767	1700	1700	894	1700	1700
Volume to Capacity	0.27	0.19	0.02	0.27	0.14	0.04	0.43	0.01
Queue Length 95th (ft)	26	17	2	0	0	3	0	0
Control Delay (s)	31.6	33.3	9.8	0.0	0.0	9.2	0.0	0.0
Lane LOS	D	D	A			A		
Approach Delay (s)	31.6	33.3	0.2			0.4		
Approach LOS	D	D						

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		51.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
700: Utah & Bernal

2/25/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	300	50	50	625	700	300
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	333	56	56	694	778	333
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					565	
pX, platoon unblocked	0.78	0.78	0.78			
vC, conflicting volume	1403	556	1111			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	946	0	570			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	93	93			
cM capacity (veh/h)	188	843	776			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	389	56	347	347	519	593
Volume Left	333	56	0	0	0	0
Volume Right	56	0	0	0	0	333
cSH	211	776	1700	1700	1700	1700
Volume to Capacity	1.84	0.07	0.20	0.20	0.31	0.35
Queue Length 95th (ft)	688	6	0	0	0	0
Control Delay (s)	435.3	10.0	0.0	0.0	0.0	0.0
Lane LOS	F	A				
Approach Delay (s)	435.3	0.7			0.0	
Approach LOS	F					

Intersection Summary				
Average Delay		75.5		
Intersection Capacity Utilization		61.9%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	317	293	167	263	440	1124	195	611	145	545	895	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	369	341	194	306	512	1307	227	710	169	634	1041	270
RTOR Reduction (vph)	0	0	144	0	0	0	0	0	29	0	0	91
Lane Group Flow (vph)	369	341	50	306	512	1307	227	710	140	634	1041	179
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	16.6	17.2	17.2	24.3	24.9	120.0	10.5	38.5	38.5	22.0	50.0	50.0
Effective Green, g (s)	17.6	19.2	19.2	25.3	26.9	120.0	11.5	40.5	40.5	23.0	52.0	52.0
Actuated g/C Ratio	0.15	0.16	0.16	0.21	0.22	1.00	0.10	0.34	0.34	0.19	0.43	0.43
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	520	585	258	386	820	1615	340	1234	545	680	1585	695
v/s Ratio Prot	0.10	0.09		0.17	0.14		0.06	0.19		c0.18	0.28	
v/s Ratio Perm			0.03			c0.81			0.09			0.11
v/c Ratio	0.71	0.58	0.19	0.79	0.62	0.81	0.67	0.58	0.26	0.93	0.66	0.26
Uniform Delay, d1	48.8	46.7	43.7	44.9	42.0	0.0	52.4	32.7	28.8	47.7	26.9	21.7
Progression 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
Incremental Delay, d2	3.6	1.0	0.1	10.0	2.1	4.5	3.8	2.0	1.1	19.5	2.1	0.9
Delay (s)	52.4	47.6	43.8	54.9	44.1	4.5	56.2	34.6	30.0	67.2	29.1	22.6
Level of Service	D	D	D	D	D	A	E	C	C	E	C	C
Approach Delay (s)		48.8			21.3			38.4			40.6	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	34.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	3.0	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	204	202	49	185	836	1201	151	504	111	221	312	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3244	1489	1829	3657	1599	3547	3475	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3244	1489	1829	3657	1599	3547	3475	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	224	222	54	203	919	1320	166	554	122	243	343	171
RTOR Reduction (vph)	0	0	31	0	92	141	0	0	0	0	65	0
Lane Group Flow (vph)	224	222	23	203	1447	559	166	554	122	243	449	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		Prot	Prot		Free	Prot		
Protected Phases	1	6		5	2	2	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	7.0	39.3	39.3	8.8	41.1	41.1	8.0	20.4	100.0	10.5	22.9	
Effective Green, g (s)	8.0	43.3	43.3	9.8	45.1	45.1	9.0	23.4	100.0	11.5	25.9	
Actuated g/C Ratio	0.08	0.43	0.43	0.10	0.45	0.45	0.09	0.23	1.00	0.12	0.26	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	1583	689	348	1463	672	165	856	1599	408	900	
v/s Ratio Prot	c0.06	0.06		0.06	c0.45	0.38	c0.09	c0.15		0.07	0.13	
v/s Ratio Perm			0.01						c0.08			
v/c Ratio	0.79	0.14	0.03	0.58	0.99	0.83	1.01	0.65	0.08	0.60	0.50	
Uniform Delay, d1	45.2	17.1	16.3	43.1	27.2	24.1	45.5	34.6	0.0	42.0	31.5	
Progression Factor	0.90	0.95	1.35	1.00	1.00	1.00	0.90	0.78	1.00	1.00	1.00	
Incremental Delay, d2	13.4	0.2	0.1	2.5	21.1	11.5	70.8	1.7	0.1	2.3	0.4	
Delay (s)	54.0	16.5	22.1	45.6	48.3	35.6	111.5	28.7	0.1	44.4	32.0	
Level of Service	D	B	C	D	D	D	F	C	A	D	C	
Approach Delay (s)		33.9			44.5			40.9			35.9	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM Average Control Delay	41.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	82.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Driveway & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	366	0	390	4	423	163	270	130	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1622	1829	3657	1616	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1622	1829	3657	1616	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	431	0	459	5	498	192	303	153	0
RTOR Reduction (vph)	0	0	0	0	0	164	0	0	61	0	0	0
Lane Group Flow (vph)	0	0	0	0	431	295	5	498	131	303	153	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					20.7	31.7	1.0	20.4	41.1	11.0	30.4	
Effective Green, g (s)					22.7	33.7	2.0	22.4	45.1	12.0	32.4	
Actuated g/C Ratio					0.34	0.51	0.03	0.34	0.68	0.18	0.49	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					628	827	55	1239	1176	644	944	
v/s Ratio Prot					c0.24	0.06	0.00	c0.14	0.04	c0.09	0.08	
v/s Ratio Perm						0.12			0.04			
v/c Ratio					0.69	0.36	0.09	0.40	0.11	0.47	0.16	
Uniform Delay, d1					18.6	9.7	31.2	16.7	3.6	24.2	9.3	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					3.1	0.3	0.7	0.2	0.0	0.5	0.1	
Delay (s)					21.8	10.0	31.9	16.9	3.7	24.8	9.4	
Level of Service					C	A	C	B	A	C	A	
Approach Delay (s)		0.0			15.7			13.4			19.6	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	15.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	50.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	392	59	40	1086	7	117	1	31	7	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.93		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1302		1743	1663	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.73	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1210	1302		1344	1663	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	2	467	70	48	1293	8	139	1	37	8	2	7
RTOR Reduction (vph)	0	0	23	0	0	1	0	30	0	0	6	0
Lane Group Flow (vph)	2	467	47	48	1293	7	139	8	0	8	3	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	63.6	63.6	5.2	67.6	67.6	17.2	17.2		17.2	17.2	
Effective Green, g (s)	2.2	66.6	66.6	6.2	70.6	70.6	18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.02	0.67	0.67	0.06	0.71	0.71	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2436	1032	113	2582	1155	220	237		245	303	
v/s Ratio Prot	0.00	0.13		c0.03	c0.35			0.01			0.00	
v/s Ratio Perm			0.03			0.00	c0.11			0.01		
v/c Ratio	0.05	0.19	0.05	0.42	0.50	0.01	0.63	0.03		0.03	0.01	
Uniform Delay, d1	47.9	6.4	5.8	45.2	6.7	4.3	37.8	33.7		33.7	33.5	
Progression Factor	0.59	1.98	4.33	1.01	0.81	0.93	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2	0.1	1.2	0.3	0.0	5.8	0.1		0.1	0.0	
Delay (s)	28.6	12.8	25.0	47.1	5.8	4.1	43.6	33.7		33.7	33.5	
Level of Service	C	B	C	D	A	A	D	C		C	C	
Approach Delay (s)		14.5			7.2			41.5			33.6	
Approach LOS		B			A			D			C	

Intersection Summary				
HCM Average Control Delay	12.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	53.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	16	6	0	20	66	673	3	11	471	43
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Hourly flow rate (vph)	28	0	48	7	0	22	105	740	12	44	574	72
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			705	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1304	1643	594	1642	1709	396	666			752		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1283	1659	497	1657	1732	396	577			752		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	69	100	89	85	100	96	88			95		
cM capacity (veh/h)	88	72	460	45	65	593	881			854		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	76	29	105	493	259	44	574	72
Volume Left	28	7	105	0	0	44	0	0
Volume Right	48	22	0	0	12	0	0	72
cSH	244	155	881	1700	1700	854	1700	1700
Volume to Capacity	0.31	0.19	0.12	0.29	0.15	0.05	0.34	0.04
Queue Length 95th (ft)	32	16	10	0	0	4	0	0
Control Delay (s)	31.7	33.5	9.6	0.0	0.0	9.4	0.0	0.0
Lane LOS	D	D	A			A		
Approach Delay (s)	31.7	33.5	1.2			0.6		
Approach LOS	D	D						

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

5/20/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	519	13	8	2222	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	577	14	9	2469	0	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.99		0.99	0.99
vC, conflicting volume			591		1425	199
vC1, stage 1 conf vol					584	
vC2, stage 2 conf vol					841	
vCu, unblocked vol			564		1403	169
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			997		259	839

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	231	231	130	9	823	823	823	26
Volume Left	0	0	0	9	0	0	0	0
Volume Right	0	0	14	0	0	0	0	26
cSH	1700	1700	1700	997	1700	1700	1700	839
Volume to Capacity	0.14	0.14	0.08	0.01	0.48	0.48	0.48	0.03
Queue Length 95th (ft)	0	0	0	1	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	8.6	0.0	0.0	0.0	9.4
Lane LOS				A				A
Approach Delay (s)	0.0			0.0				9.4
Approach LOS								A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	0	30	24	0	78	20	671	9	14	464	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3650		1829	3585	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3650		1829	3585	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	0	33	27	0	87	22	746	10	16	516	78
RTOR Reduction (vph)	0	30	0	0	79	0	0	1	0	0	7	0
Lane Group Flow (vph)	22	3	0	27	8	0	22	755	0	16	587	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.7	8.6		7.8	8.7		3.2	64.2		3.0	64.0	
Effective Green, g (s)	7.7	8.6		7.8	8.7		3.2	64.2		3.0	64.0	
Actuated g/C Ratio	0.08	0.09		0.08	0.09		0.03	0.64		0.03	0.64	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	141		143	142		59	2343		55	2294	
v/s Ratio Prot	0.01	0.00		c0.01	c0.00		c0.01	c0.21		0.01	0.16	
v/s Ratio Perm												
v/c Ratio	0.16	0.02		0.19	0.05		0.37	0.32		0.29	0.26	
Uniform Delay, d1	43.1	41.8		43.1	41.9		47.4	8.1		47.5	7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.75	1.51	
Incremental Delay, d2	0.5	0.1		0.6	0.2		3.9	0.4		2.6	0.2	
Delay (s)	43.6	41.9		43.8	42.0		51.4	8.4		38.1	12.0	
Level of Service	D	D		D	D		D	A		D	B	
Approach Delay (s)		42.6			42.4			9.7			12.7	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.2
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	268	610	106	160	353	546	144	657	174	1138	1037	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	279	635	110	167	368	569	150	684	181	1185	1080	211
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	36	0	0	73
Lane Group Flow (vph)	279	635	67	167	368	569	150	684	145	1185	1080	138
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	18.1	24.4	24.4	12.9	19.2	120.0	8.8	28.3	28.3	36.4	55.9	55.9
Effective Green, g (s)	19.1	26.4	26.4	13.9	21.2	120.0	9.8	30.3	30.3	37.4	57.9	57.9
Actuated g/C Ratio	0.16	0.22	0.22	0.12	0.18	1.00	0.08	0.25	0.25	0.31	0.48	0.48
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	565	805	354	212	646	1615	290	923	408	1105	1765	773
v/s Ratio Prot	0.08	c0.17		c0.09	0.10		0.04	c0.19		c0.33	0.30	
v/s Ratio Perm			0.04			0.35			0.09			0.09
v/c Ratio	0.49	0.79	0.19	0.79	0.57	0.35	0.52	0.74	0.36	1.07	0.61	0.18
Uniform Delay, d1	46.0	44.2	38.1	51.6	45.2	0.0	52.8	41.2	36.8	41.3	22.8	17.6
Progression Factor	1.00	1.00	1.00	1.25	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	4.8	0.1	15.0	1.7	0.6	0.6	3.9	1.1	48.7	1.6	0.5
Delay (s)	46.3	48.9	38.2	79.7	41.5	0.6	53.5	45.1	37.9	90.0	24.4	18.1
Level of Service	D	D	D	E	D	A	D	D	D	F	C	B
Approach Delay (s)		47.1			26.2			45.1			55.3	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	1165	108	119	263	302	93	395	536	1174	849	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3283	1489	1829	3657	1599	3547	3589	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3283	1489	1829	3657	1599	3547	3589	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1239	115	127	280	321	99	420	570	1249	903	129
RTOR Reduction (vph)	0	0	76	0	44	127	0	0	0	0	9	0
Lane Group Flow (vph)	182	1239	39	127	371	59	99	420	570	1249	1023	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		Prot	Prot		Free	Prot		
Protected Phases	1	6		5	2	2	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	9.7	37.0	37.0	7.0	34.3	34.3	10.0	11.0	120.0	44.0	45.0	
Effective Green, g (s)	10.7	41.0	41.0	8.0	38.3	38.3	11.0	14.0	120.0	45.0	48.0	
Actuated g/C Ratio	0.09	0.34	0.34	0.07	0.32	0.32	0.09	0.12	1.00	0.38	0.40	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	316	1249	542	236	1048	475	168	427	1599	1330	1436	
v/s Ratio Prot	c0.05	c0.34		0.04	0.11	0.04	0.05	c0.11		c0.35	0.29	
v/s Ratio Perm			0.02						c0.36			
v/c Ratio	0.58	0.99	0.07	0.54	0.35	0.12	0.59	0.98	0.36	0.94	0.71	
Uniform Delay, d1	52.5	39.3	26.7	54.2	31.4	29.0	52.3	52.9	0.0	36.2	30.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.97	1.00	0.73	0.68	
Incremental Delay, d2	2.5	23.6	0.3	2.4	0.2	0.1	4.7	36.7	0.6	11.5	1.3	
Delay (s)	55.0	63.0	26.9	56.6	31.6	29.1	56.1	87.8	0.6	38.0	22.0	
Level of Service	E	E	C	E	C	C	E	F	A	D	C	
Approach Delay (s)		59.3			35.3			39.3			30.7	
Approach LOS		E			D			D			C	

Intersection Summary				
HCM Average Control Delay	40.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	95.8%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	127	0	225	0	458	567	424	272	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1625		3657	1615	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1625		3657	1615	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	134	0	237	0	482	597	446	286	0
RTOR Reduction (vph)	0	0	0	0	0	116	0	0	178	0	0	0
Lane Group Flow (vph)	0	0	0	0	134	121	0	482	419	446	286	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					13.7	27.3		16.3	30.0	13.6	33.9	
Effective Green, g (s)					15.7	29.3		18.3	34.0	14.6	35.9	
Actuated g/C Ratio					0.27	0.51		0.32	0.59	0.25	0.62	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					499	827		1162	1037	899	1200	
v/s Ratio Prot					0.07	0.04		0.13	c0.11	c0.13	0.15	
v/s Ratio Perm						0.04			0.15			
v/c Ratio					0.27	0.15		0.41	0.40	0.50	0.24	
Uniform Delay, d1					16.4	7.5		15.4	6.3	18.4	4.8	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.3	0.1		0.2	0.3	0.4	0.1	
Delay (s)					16.7	7.6		15.7	6.6	18.8	4.9	
Level of Service					B	A		B	A	B	A	
Approach Delay (s)		0.0			10.9			10.7			13.4	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	11.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	1339	38	21	449	7	74	3	66	9	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.94		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1572	1829	3657	1636	1540	1313		1782	1601	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.71	1.00	
Satd. Flow (perm)	1829	3657	1572	1829	3657	1636	1218	1313		1329	1601	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	1440	41	23	483	8	80	3	71	10	0	9
RTOR Reduction (vph)	0	0	10	0	0	3	0	57	0	0	7	0
Lane Group Flow (vph)	8	1440	31	23	483	5	80	17	0	10	2	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	0.8	31.5	31.5	2.0	32.7	32.7	10.5	10.5		10.5	10.5	
Effective Green, g (s)	1.8	34.5	34.5	3.0	35.7	35.7	11.5	11.5		11.5	11.5	
Actuated g/C Ratio	0.03	0.59	0.59	0.05	0.62	0.62	0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	57	2175	935	95	2251	1007	242	260		264	317	
v/s Ratio Prot	0.00	c0.39		c0.01	0.13			0.01			0.00	
v/s Ratio Perm			0.02			0.00	c0.07			0.01		
v/c Ratio	0.14	0.66	0.03	0.24	0.21	0.00	0.33	0.07		0.04	0.01	
Uniform Delay, d1	27.3	7.9	4.9	26.4	4.9	4.3	19.9	18.9		18.8	18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.8	0.0	1.3	0.0	0.0	0.8	0.1		0.1	0.0	
Delay (s)	28.5	8.6	4.9	27.7	5.0	4.3	20.8	19.0		18.8	18.7	
Level of Service	C	A	A	C	A	A	C	B		B	B	
Approach Delay (s)		8.6			6.0			19.9			18.8	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM Average Control Delay	8.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	56.2%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	32	16	0	48	15	660	15	56	690	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	0	35	17	0	52	16	717	16	61	750	21
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			705	
pX, platoon unblocked	0.75	0.75	0.74	0.75	0.75	0.99	0.74			0.99		
vC, conflicting volume	1355	1658	770	1647	1671	387	791			734		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1240	1646	513	1631	1662	352	540			703		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	91	58	100	92	98			93		
cM capacity (veh/h)	80	66	368	42	64	624	743			878		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	62	70	16	478	255	61	750	21
Volume Left	27	17	16	0	0	61	0	0
Volume Right	35	52	0	0	16	0	0	21
cSH	182	139	743	1700	1700	878	1700	1700
Volume to Capacity	0.34	0.50	0.02	0.28	0.15	0.07	0.44	0.01
Queue Length 95th (ft)	35	59	2	0	0	6	0	0
Control Delay (s)	40.5	54.5	10.0	0.0	0.0	9.4	0.0	0.0
Lane LOS	E	F	A			A		
Approach Delay (s)	40.5	54.5	0.2			0.7		
Approach LOS	E	F						

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

5/20/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2820	61	37	670	0	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3133	68	41	744	0	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.68		0.68	0.68
vC, conflicting volume			3201		3498	1078
vC1, stage 1 conf vol					3167	
vC2, stage 2 conf vol					330	
vCu, unblocked vol			2600		3034	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			63		100	95
cM capacity (veh/h)			112		26	741

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	1253	1253	694	41	248	248	248	34
Volume Left	0	0	0	41	0	0	0	0
Volume Right	0	0	68	0	0	0	0	34
cSH	1700	1700	1700	112	1700	1700	1700	741
Volume to Capacity	0.74	0.74	0.41	0.37	0.15	0.15	0.15	0.05
Queue Length 95th (ft)	0	0	0	37	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	54.8	0.0	0.0	0.0	10.1
Lane LOS				F				B
Approach Delay (s)	0.0			2.9				10.1
Approach LOS								B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		65.8%	ICU Level of Service C
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

5/20/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	0	50	35	0	112	50	624	39	67	694	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3625		1829	3492	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3625		1829	3492	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	333	0	56	39	0	124	56	693	43	74	771	333
RTOR Reduction (vph)	0	43	0	0	113	0	0	3	0	0	34	0
Lane Group Flow (vph)	333	13	0	39	11	0	56	733	0	74	1070	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	26.3	27.5		9.3	10.5		6.5	58.7		8.1	60.3	
Effective Green, g (s)	26.3	27.5		9.3	10.5		6.5	58.7		8.1	60.3	
Actuated g/C Ratio	0.22	0.23		0.08	0.09		0.05	0.49		0.07	0.50	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	401	375		142	143		99	1773		123	1755	
v/s Ratio Prot	c0.18	0.01		0.02	c0.01		0.03	0.20		c0.04	c0.31	
v/s Ratio Perm												
v/c Ratio	0.83	0.03		0.27	0.08		0.57	0.41		0.60	0.61	
Uniform Delay, d1	44.7	35.9		52.2	50.3		55.4	19.6		54.4	21.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.75	1.06	
Incremental Delay, d2	13.6	0.0		1.1	0.2		7.2	0.7		6.3	1.2	
Delay (s)	58.3	36.0		53.2	50.5		62.6	20.3		47.2	24.0	
Level of Service	E	D		D	D		E	C		D	C	
Approach Delay (s)		55.1			51.2			23.3			25.4	
Approach LOS		E			D			C			C	

Intersection Summary				
HCM Average Control Delay	31.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.3	
Intersection Capacity Utilization	66.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	307	287	172	264	360	1055	222	731	179	569	987	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	357	334	200	307	419	1227	258	850	208	662	1148	265
RTOR Reduction (vph)	0	0	152	0	0	0	0	0	30	0	0	81
Lane Group Flow (vph)	357	334	48	307	419	1227	258	850	178	662	1148	184
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	16.2	17.1	17.1	23.3	24.2	120.0	11.1	39.6	39.6	22.0	50.5	50.5
Effective Green, g (s)	17.2	19.1	19.1	24.3	26.2	120.0	12.1	41.6	41.6	23.0	52.5	52.5
Actuated g/C Ratio	0.14	0.16	0.16	0.20	0.22	1.00	0.10	0.35	0.35	0.19	0.44	0.44
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	508	582	256	370	798	1615	358	1268	560	680	1600	701
v/s Ratio Prot	0.10	0.09		0.17	0.11		0.07	0.23		c0.19	0.31	
v/s Ratio Perm			0.03			c0.76			0.11			0.11
v/c Ratio	0.70	0.57	0.19	0.83	0.53	0.76	0.72	0.67	0.32	0.97	0.72	0.26
Uniform Delay, d1	49.0	46.7	43.7	45.9	41.4	0.0	52.3	33.4	28.8	48.2	27.7	21.4
Progression 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
Incremental Delay, d2	3.6	0.9	0.1	13.6	1.2	3.4	5.9	2.8	1.5	27.7	2.8	0.9
Delay (s)	52.6	47.5	43.8	59.5	42.6	3.4	58.3	36.2	30.3	75.9	30.5	22.4
Level of Service	D	D	D	E	D	A	E	D	C	E	C	C
Approach Delay (s)		48.7			20.6			39.6			43.9	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	36.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	3.0	
Intersection Capacity Utilization	73.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	265	65	286	1136	1128	118	326	132	205	302	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3376	1489	1829	3657	1599	3547	3454	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3376	1489	1829	3657	1599	3547	3454	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	287	291	71	314	1248	1240	130	358	145	225	332	195
RTOR Reduction (vph)	0	0	43	0	31	47	0	0	0	0	95	0
Lane Group Flow (vph)	287	291	28	314	1688	722	130	358	145	225	432	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	10.0	35.8	35.8	13.0	38.8	56.8	10.0	19.2	100.0	11.0	20.2	
Effective Green, g (s)	11.0	39.8	39.8	14.0	42.8	60.8	11.0	22.2	100.0	12.0	23.2	
Actuated g/C Ratio	0.11	0.40	0.40	0.14	0.43	0.61	0.11	0.22	1.00	0.12	0.23	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	390	1455	633	497	1445	905	201	812	1599	426	801	
v/s Ratio Prot	c0.08	0.08		0.09	c0.50	c0.49	c0.07	0.10		0.06	c0.12	
v/s Ratio Perm			0.02						0.09			
v/c Ratio	0.74	0.20	0.04	0.63	1.17	0.80	0.65	0.44	0.09	0.53	0.54	
Uniform Delay, d1	43.1	19.7	18.4	40.6	28.6	14.9	42.6	33.5	0.0	41.3	33.7	
Progression Factor	0.93	1.01	1.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.0	0.3	0.1	2.6	83.4	5.0	7.0	0.4	0.1	1.2	0.7	
Delay (s)	46.9	20.2	30.1	43.2	112.0	19.9	49.6	33.9	0.1	42.5	34.4	
Level of Service	D	C	C	D	F	B	D	C	A	D	C	
Approach Delay (s)		33.1			79.0			29.4			36.8	
Approach LOS		C			E			C			D	

Intersection Summary				
HCM Average Control Delay	59.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	85.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	265	65	286	1136	1128	118	326	132	205	302	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5073		3547	3376	1636	1829	3657	1599	3547	3454	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5073		3547	3376	1636	1829	3657	1599	3547	3454	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	287	291	71	314	1248	1240	130	358	145	225	332	195
RTOR Reduction (vph)	0	36	0	0	0	36	0	0	0	0	95	0
Lane Group Flow (vph)	287	326	0	314	1248	1204	130	358	145	225	432	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases									Free			
Actuated Green, G (s)	7.0	38.6		12.4	44.0	61.0	7.8	18.0	100.0	10.0	20.2	
Effective Green, g (s)	8.0	42.6		13.4	48.0	65.0	8.8	21.0	100.0	11.0	23.2	
Actuated g/C Ratio	0.08	0.43		0.13	0.48	0.65	0.09	0.21	1.00	0.11	0.23	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	2161		475	1620	1063	161	768	1599	390	801	
v/s Ratio Prot	c0.08	0.06		0.09	0.37	c0.74	c0.07	0.10		0.06	c0.12	
v/s Ratio Perm									0.09			
v/c Ratio	1.01	0.15		0.66	0.77	1.13	0.81	0.47	0.09	0.58	0.54	
Uniform Delay, d1	46.0	17.6		41.1	21.5	17.5	44.8	34.6	0.0	42.3	33.7	
Progression Factor	0.84	1.05		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	55.9	0.1		3.4	3.6	71.7	24.8	0.4	0.1	2.1	0.7	
Delay (s)	94.6	18.7		44.6	25.1	89.2	69.6	35.0	0.1	44.4	34.4	
Level of Service	F	B		D	C	F	E	D	A	D	C	
Approach Delay (s)		52.2			55.6			34.1			37.4	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	475	0	337	4	455	138	271	211	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1620	1829	3657	1617	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1620	1829	3657	1617	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	559	0	396	5	535	162	304	248	0
RTOR Reduction (vph)	0	0	0	0	0	144	0	0	47	0	0	0
Lane Group Flow (vph)	0	0	0	0	559	252	5	535	115	304	248	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					27.2	38.6	1.1	21.4	48.6	11.4	31.7	
Effective Green, g (s)					29.2	40.6	2.1	23.4	52.6	12.4	33.7	
Actuated g/C Ratio					0.39	0.55	0.03	0.32	0.71	0.17	0.46	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					722	889	52	1156	1215	594	877	
v/s Ratio Prot					c0.31	0.05	0.00	c0.15	0.04	c0.09	0.13	
v/s Ratio Perm						0.11			0.03			
v/c Ratio					0.77	0.28	0.10	0.46	0.09	0.51	0.28	
Uniform Delay, d1					19.5	8.9	35.0	20.3	3.3	28.0	12.6	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					5.2	0.2	0.8	0.3	0.0	0.7	0.2	
Delay (s)					24.7	9.1	35.8	20.6	3.4	28.8	12.8	
Level of Service					C	A	D	C	A	C	B	
Approach Delay (s)		0.0			18.2			16.7			21.6	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	434	72	81	1308	8	131	1	52	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.93		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.96	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1303		1746	1684	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.72	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1212	1303		1316	1684	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1	517	86	96	1557	10	156	1	62	8	2	5
RTOR Reduction (vph)	0	0	31	0	0	1	0	50	0	0	4	0
Lane Group Flow (vph)	1	517	55	96	1557	9	156	13	0	8	3	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	60.5	60.5	7.2	66.5	66.5	18.3	18.3		18.3	18.3	
Effective Green, g (s)	2.2	63.5	63.5	8.2	69.5	69.5	19.3	19.3		19.3	19.3	
Actuated g/C Ratio	0.02	0.64	0.64	0.08	0.70	0.70	0.19	0.19		0.19	0.19	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2322	984	150	2542	1137	234	251		254	325	
v/s Ratio Prot	0.00	0.14		c0.05	c0.43			0.01			0.00	
v/s Ratio Perm			0.04			0.01	c0.13			0.01		
v/c Ratio	0.03	0.22	0.06	0.64	0.61	0.01	0.67	0.05		0.03	0.01	
Uniform Delay, d1	47.9	7.8	6.9	44.5	8.1	4.7	37.4	32.9		32.8	32.6	
Progression Factor	0.50	1.90	4.66	1.08	0.46	0.40	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	2.5	0.3	0.0	7.0	0.1		0.1	0.0	
Delay (s)	24.3	15.0	32.3	50.6	4.0	1.9	44.4	33.0		32.8	32.6	
Level of Service	C	B	C	D	A	A	D	C		C	C	
Approach Delay (s)		17.5			6.7			41.1			32.7	
Approach LOS		B			A			D			C	

Intersection Summary				
HCM Average Control Delay	12.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	0	16	0	0	0	63	674	1	2	550	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Hourly flow rate (vph)	24	0	48	0	0	0	100	741	4	8	671	75
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			1270	
pX, platoon unblocked	0.91	0.91	0.90	0.91	0.91	0.98	0.90			0.98		
vC, conflicting volume	1297	1651	691	1654	1724	392	766			745		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1207	1595	605	1598	1675	347	688			705		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	88	100	100	100	88			99		
cM capacity (veh/h)	108	82	391	50	73	627	801			873		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	73	0	100	494	251	8	671	75
Volume Left	24	0	100	0	0	8	0	0
Volume Right	48	0	0	0	4	0	0	75
cSH	326	1700	801	1700	1700	873	1700	1700
Volume to Capacity	0.22	0.00	0.12	0.29	0.15	0.01	0.39	0.04
Queue Length 95th (ft)	21	0	11	0	0	1	0	0
Control Delay (s)	26.1	0.0	10.1	0.0	0.0	9.2	0.0	0.0
Lane LOS	D	A	B			A		
Approach Delay (s)	26.1	0.0	1.2			0.1		
Approach LOS	D	A						

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	45.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	30	100	562	545	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	33	111	624	606	111
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					565	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	1196	358	717			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1104	224	601			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	88			
cM capacity (veh/h)	172	741	925			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	56	111	312	312	404	313
Volume Left	22	111	0	0	0	0
Volume Right	33	0	0	0	0	111
cSH	319	925	1700	1700	1700	1700
Volume to Capacity	0.17	0.12	0.18	0.18	0.24	0.18
Queue Length 95th (ft)	16	10	0	0	0	0
Control Delay (s)	18.7	9.4	0.0	0.0	0.0	0.0
Lane LOS	C	A				
Approach Delay (s)	18.7	1.4			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	289	488	107	183	321	622	160	871	192	987	1160	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	301	508	111	191	334	648	167	907	200	1028	1208	207
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	30	0	0	65
Lane Group Flow (vph)	301	508	54	191	334	648	167	907	171	1028	1208	142
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	19.2	20.9	20.9	16.6	18.3	120.0	9.0	29.5	29.5	35.0	55.5	55.5
Effective Green, g (s)	20.2	22.9	22.9	17.6	20.3	120.0	10.0	31.5	31.5	36.0	57.5	57.5
Actuated g/C Ratio	0.17	0.19	0.19	0.15	0.17	1.00	0.08	0.26	0.26	0.30	0.48	0.48
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	597	698	307	268	619	1615	296	960	424	1064	1752	768
v/s Ratio Prot	0.08	c0.14		c0.10	0.09		0.05	c0.25		c0.29	0.33	
v/s Ratio Perm			0.03			c0.40			0.11			0.09
v/c Ratio	0.50	0.73	0.18	0.71	0.54	0.40	0.56	0.94	0.40	0.97	0.69	0.19
Uniform Delay, d1	45.3	45.6	40.7	48.8	45.6	0.0	52.9	43.4	36.5	41.4	24.3	17.9
Progression Factor	1.00	1.00	1.00	1.29	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	3.2	0.1	6.7	1.5	0.7	1.5	17.6	1.3	19.6	2.2	0.5
Delay (s)	45.6	48.8	40.8	69.5	41.6	0.7	54.4	61.0	37.8	61.0	26.6	18.4
Level of Service	D	D	D	E	D	A	D	E	D	E	C	B
Approach Delay (s)		46.8			23.5			56.5			40.4	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1096	77	123	329	319	51	340	592	965	662	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3322	1489	1829	3657	1599	3547	3538	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3322	1489	1829	3657	1599	3547	3538	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	222	1166	82	131	350	339	54	362	630	1027	704	195
RTOR Reduction (vph)	0	0	53	0	28	24	0	0	0	0	19	0
Lane Group Flow (vph)	222	1166	29	131	451	186	54	362	630	1027	880	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	12.7	38.5	38.5	9.5	35.3	71.7	7.8	14.6	120.0	36.4	43.2	
Effective Green, g (s)	13.7	42.5	42.5	10.5	39.3	79.7	8.8	17.6	120.0	37.4	46.2	
Actuated g/C Ratio	0.11	0.35	0.35	0.09	0.33	0.66	0.07	0.15	1.00	0.31	0.39	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	405	1295	562	310	1088	989	134	536	1599	1105	1362	
v/s Ratio Prot	c0.06	c0.32		0.04	0.14	0.13	0.03	c0.10		c0.29	0.25	
v/s Ratio Perm			0.02						0.39			
v/c Ratio	0.55	0.90	0.05	0.42	0.41	0.19	0.40	0.68	0.39	0.93	0.65	
Uniform Delay, d1	50.2	36.7	25.5	51.9	31.4	7.7	53.1	48.5	0.0	40.0	30.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.66	
Incremental Delay, d2	1.5	10.2	0.2	0.9	0.3	0.1	2.0	3.4	0.7	11.4	0.8	
Delay (s)	51.7	47.0	25.7	52.8	31.7	7.8	55.1	51.9	0.7	41.5	20.9	
Level of Service	D	D	C	D	C	A	E	D	A	D	C	
Approach Delay (s)		46.5			28.9			21.2			31.9	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	33.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	87.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1096	77	123	329	319	51	340	592	965	662	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5193		3547	3657	1636	1829	3657	1599	3547	3538	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5193		3547	3657	1636	1829	3657	1599	3547	3538	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	222	1166	82	131	350	339	54	362	630	1027	704	195
RTOR Reduction (vph)	0	6	0	0	0	11	0	0	0	0	20	0
Lane Group Flow (vph)	222	1242	0	131	350	328	54	362	630	1027	879	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases									Free			
Actuated Green, G (s)	10.7	31.0		7.0	27.3	73.7	6.3	14.6	120.0	46.4	54.7	
Effective Green, g (s)	11.7	35.0		8.0	31.3	81.7	7.3	17.6	120.0	47.4	57.7	
Actuated g/C Ratio	0.10	0.29		0.07	0.26	0.68	0.06	0.15	1.00	0.39	0.48	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	346	1515		236	954	1114	111	536	1599	1401	1701	
v/s Ratio Prot	c0.06	c0.24		0.04	0.10	0.20	0.03	c0.10		c0.29	0.25	
v/s Ratio Perm									0.39			
v/c Ratio	0.64	0.82		0.56	0.37	0.29	0.49	0.68	0.39	0.73	0.52	
Uniform Delay, d1	52.1	39.6		54.3	36.3	7.6	54.5	48.5	0.0	30.9	21.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.55	
Incremental Delay, d2	4.0	5.1		2.8	0.2	0.1	3.3	3.4	0.7	2.5	0.2	
Delay (s)	56.2	44.6		57.1	36.5	7.8	57.9	51.9	0.7	23.6	12.0	
Level of Service	E	D		E	D	A	E	D	A	C	B	
Approach Delay (s)		46.4			27.9			21.4			18.2	
Approach LOS		D			C			C			B	

Intersection Summary				
HCM Average Control Delay	28.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	80.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	138	0	226	0	534	520	336	251	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1624		3657	1614	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1624		3657	1614	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	145	0	238	0	562	547	354	264	0
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	181	0	0	0
Lane Group Flow (vph)	0	0	0	0	145	117	0	562	366	354	264	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					13.9	25.8		16.8	30.7	11.9	32.7	
Effective Green, g (s)					15.9	27.8		18.8	34.7	12.9	34.7	
Actuated g/C Ratio					0.28	0.49		0.33	0.61	0.23	0.61	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					514	798		1215	1075	808	1180	
v/s Ratio Prot					0.08	0.03		c0.15	c0.10	c0.10	0.14	
v/s Ratio Perm						0.04			0.13			
v/c Ratio					0.28	0.15		0.46	0.34	0.44	0.22	
Uniform Delay, d1					15.9	7.9		14.9	5.4	18.7	4.9	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.3	0.1		0.3	0.2	0.4	0.1	
Delay (s)					16.2	8.0		15.2	5.5	19.1	5.0	
Level of Service					B	A		B	A	B	A	
Approach Delay (s)		0.0			11.1			10.4			13.1	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	11.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	48.9%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1195	80	53	406	7	105	4	102	7	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.95		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1569	1829	3657	1636	1538	1323		1780	1645	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.67	1.00	
Satd. Flow (perm)	1829	3657	1569	1829	3657	1636	1219	1323		1255	1645	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	1285	86	57	437	8	113	4	110	8	1	6
RTOR Reduction (vph)	0	0	26	0	0	3	0	84	0	0	5	0
Lane Group Flow (vph)	5	1285	60	57	437	5	113	30	0	8	2	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	0.9	31.4	31.4	4.5	35.0	35.0	14.3	14.3		14.3	14.3	
Effective Green, g (s)	1.9	34.4	34.4	5.5	38.0	38.0	15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.03	0.54	0.54	0.09	0.59	0.59	0.24	0.24		0.24	0.24	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	54	1960	841	157	2165	968	291	315		299	392	
v/s Ratio Prot	0.00	c0.35		c0.03	0.12			0.02			0.00	
v/s Ratio Perm			0.04			0.00	c0.09			0.01		
v/c Ratio	0.09	0.66	0.07	0.36	0.20	0.00	0.39	0.10		0.03	0.01	
Uniform Delay, d1	30.3	10.7	7.2	27.7	6.1	5.4	20.5	19.1		18.7	18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.8	0.0	1.4	0.0	0.0	0.9	0.1		0.0	0.0	
Delay (s)	31.1	11.5	7.2	29.1	6.1	5.4	21.4	19.2		18.8	18.7	
Level of Service	C	B	A	C	A	A	C	B		B	B	
Approach Delay (s)		11.3			8.7			20.3			18.7	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	11.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	60.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	31	6	0	20	16	743	11	29	620	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	0	34	7	0	22	17	808	12	32	674	18
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			1270	
pX, platoon unblocked	0.83	0.83	0.81	0.83	0.83	0.96	0.81			0.96		
vC, conflicting volume	1237	1611	694	1602	1624	430	712			820		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988	1437	505	1426	1452	313	528			720		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	92	91	100	97	98			96		
cM capacity (veh/h)	147	102	408	69	100	642	824			839		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	61	28	17	538	281	32	674	18
Volume Left	27	7	17	0	0	32	0	0
Volume Right	34	22	0	0	12	0	0	18
cSH	330	220	824	1700	1700	839	1700	1700
Volume to Capacity	0.18	0.13	0.02	0.32	0.17	0.04	0.40	0.01
Queue Length 95th (ft)	17	11	2	0	0	3	0	0
Control Delay (s)	23.7	23.8	9.5	0.0	0.0	9.5	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	23.7	23.8	0.2			0.4		
Approach LOS	C	C						

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	49.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	330	125	140	650	550	300
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	367	139	156	722	611	333
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					565	
pX, platoon unblocked	0.82	0.82	0.82			
vC, conflicting volume	1450	472	944			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099	0	479			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	84	82			
cM capacity (veh/h)	139	884	880			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	506	156	361	361	407	537
Volume Left	367	156	0	0	0	0
Volume Right	139	0	0	0	0	333
cSH	181	880	1700	1700	1700	1700
Volume to Capacity	2.80	0.18	0.21	0.21	0.24	0.32
Queue Length 95th (ft)	1121	16	0	0	0	0
Control Delay (s)	864.2	10.0	0.0	0.0	0.0	0.0
Lane LOS	F	A				
Approach Delay (s)	864.2	1.8			0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	188.4			
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	307	294	172	264	382	1091	222	731	179	581	987	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	357	342	200	307	444	1269	258	850	208	676	1148	265
RTOR Reduction (vph)	0	0	149	0	0	0	0	0	30	0	0	81
Lane Group Flow (vph)	357	342	51	307	444	1269	258	850	178	676	1148	184
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	16.2	17.2	17.2	23.4	24.4	120.0	11.1	39.4	39.4	22.0	50.3	50.3
Effective Green, g (s)	17.2	19.2	19.2	24.4	26.4	120.0	12.1	41.4	41.4	23.0	52.3	52.3
Actuated g/C Ratio	0.14	0.16	0.16	0.20	0.22	1.00	0.10	0.34	0.34	0.19	0.44	0.44
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	508	585	258	372	805	1615	358	1262	557	680	1594	699
v/s Ratio Prot	0.10	0.09		0.17	0.12		0.07	0.23		c0.19	0.31	
v/s Ratio Perm			0.03			c0.79			0.11			0.11
v/c Ratio	0.70	0.58	0.20	0.83	0.55	0.79	0.72	0.67	0.32	0.99	0.72	0.26
Uniform Delay, d1	49.0	46.7	43.7	45.8	41.5	0.0	52.3	33.5	28.9	48.4	27.8	21.6
Progression 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
Incremental Delay, d2	3.6	1.0	0.1	13.2	1.4	3.9	5.9	2.9	1.5	32.8	2.8	0.9
Delay (s)	52.6	47.7	43.9	59.0	42.9	3.9	58.3	36.4	30.4	81.2	30.7	22.5
Level of Service	D	D	D	E	D	A	E	D	C	F	C	C
Approach Delay (s)		48.8			20.9			39.8			46.0	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	37.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	3.0	
Intersection Capacity Utilization	73.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	272	70	286	1136	1128	154	384	132	210	316	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3376	1489	1829	3657	1599	3547	3460	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3376	1489	1829	3657	1599	3547	3460	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	287	299	77	314	1248	1240	169	422	145	231	347	195
RTOR Reduction (vph)	0	0	47	0	32	36	0	0	0	0	86	0
Lane Group Flow (vph)	287	299	30	314	1687	733	169	422	145	231	456	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	10.0	35.2	35.2	13.0	38.2	56.2	10.2	19.8	100.0	11.0	20.6	
Effective Green, g (s)	11.0	39.2	39.2	14.0	42.2	60.2	11.2	22.8	100.0	12.0	23.6	
Actuated g/C Ratio	0.11	0.39	0.39	0.14	0.42	0.60	0.11	0.23	1.00	0.12	0.24	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	390	1434	624	497	1425	896	205	834	1599	426	817	
v/s Ratio Prot	c0.08	0.08		0.09	c0.50	c0.49	c0.09	0.12		0.07	c0.13	
v/s Ratio Perm			0.02						0.09			
v/c Ratio	0.74	0.21	0.05	0.63	1.18	0.82	0.82	0.51	0.09	0.54	0.56	
Uniform Delay, d1	43.1	20.1	18.8	40.6	28.9	15.6	43.4	33.7	0.0	41.4	33.6	
Progression Factor	0.93	1.02	1.69	1.00	1.00	1.00	0.84	0.79	1.00	1.00	1.00	
Incremental Delay, d2	7.0	0.3	0.1	2.6	90.3	5.9	22.5	0.5	0.1	1.4	0.8	
Delay (s)	46.9	20.9	31.9	43.2	119.2	21.5	59.0	27.0	0.1	42.8	34.4	
Level of Service	D	C	C	D	F	C	E	C	A	D	C	
Approach Delay (s)		33.4			83.8			29.1			36.9	
Approach LOS		C			F			C			D	

Intersection Summary				
HCM Average Control Delay	61.7	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	87.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	272	70	286	1136	1128	154	384	132	210	316	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5065		3547	3376	1636	1829	3657	1599	3547	3460	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5065		3547	3376	1636	1829	3657	1599	3547	3460	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	287	299	77	314	1248	1240	169	422	145	231	347	195
RTOR Reduction (vph)	0	40	0	0	0	31	0	0	0	0	88	0
Lane Group Flow (vph)	287	336	0	314	1248	1209	169	422	145	231	454	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases									Free			
Actuated Green, G (s)	8.0	36.1		13.0	41.1	59.1	9.3	18.9	100.0	11.0	20.6	
Effective Green, g (s)	9.0	40.1		14.0	45.1	63.1	10.3	21.9	100.0	12.0	23.6	
Actuated g/C Ratio	0.09	0.40		0.14	0.45	0.63	0.10	0.22	1.00	0.12	0.24	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	2031		497	1523	1032	188	801	1599	426	817	
v/s Ratio Prot	c0.08	0.07		0.09	0.37	c0.74	c0.09	0.12		0.07	c0.13	
v/s Ratio Perm									0.09			
v/c Ratio	0.90	0.17		0.63	0.82	1.17	0.90	0.53	0.09	0.54	0.56	
Uniform Delay, d1	45.1	19.2		40.6	23.9	18.4	44.3	34.5	0.0	41.4	33.6	
Progression Factor	0.88	1.05		1.00	1.00	1.00	0.86	0.80	1.00	1.00	1.00	
Incremental Delay, d2	26.2	0.2		2.6	5.0	87.8	37.7	0.6	0.1	1.4	0.8	
Delay (s)	66.0	20.4		43.2	29.0	106.3	75.8	28.1	0.1	42.8	34.4	
Level of Service	E	C		D	C	F	E	C	A	D	C	
Approach Delay (s)		40.1			64.8			33.6			36.9	
Approach LOS		D			E			C			D	

Intersection Summary				
HCM Average Control Delay	52.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	102.9%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	475	0	337	4	464	138	271	240	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1620	1829	3657	1617	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1620	1829	3657	1617	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	559	0	396	5	546	162	304	282	0
RTOR Reduction (vph)	0	0	0	0	0	142	0	0	47	0	0	0
Lane Group Flow (vph)	0	0	0	0	559	254	5	546	115	304	282	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					27.3	38.7	1.1	21.5	48.8	11.4	31.8	
Effective Green, g (s)					29.3	40.7	2.1	23.5	52.8	12.4	33.8	
Actuated g/C Ratio					0.39	0.55	0.03	0.32	0.71	0.17	0.46	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					722	889	52	1158	1216	593	877	
v/s Ratio Prot					c0.31	0.05	0.00	c0.15	0.04	c0.09	0.15	
v/s Ratio Perm						0.11			0.03			
v/c Ratio					0.77	0.29	0.10	0.47	0.09	0.51	0.32	
Uniform Delay, d1					19.6	9.0	35.1	20.4	3.3	28.1	12.9	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					5.2	0.2	0.8	0.3	0.0	0.8	0.2	
Delay (s)					24.8	9.1	35.9	20.7	3.3	28.9	13.1	
Level of Service					C	A	D	C	A	C	B	
Approach Delay (s)		0.0			18.3			16.8			21.3	
Approach LOS		A			B			B			C	

Intersection Summary				
HCM Average Control Delay	18.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	57.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	446	72	81	1344	8	131	1	52	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.93		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.96	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1303		1746	1684	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.72	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1212	1303		1316	1684	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1	531	86	96	1600	10	156	1	62	8	2	5
RTOR Reduction (vph)	0	0	31	0	0	1	0	50	0	0	4	0
Lane Group Flow (vph)	1	531	55	96	1600	9	156	13	0	8	3	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	60.5	60.5	7.2	66.5	66.5	18.3	18.3		18.3	18.3	
Effective Green, g (s)	2.2	63.5	63.5	8.2	69.5	69.5	19.3	19.3		19.3	19.3	
Actuated g/C Ratio	0.02	0.64	0.64	0.08	0.70	0.70	0.19	0.19		0.19	0.19	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2322	984	150	2542	1137	234	251		254	325	
v/s Ratio Prot	0.00	0.15		c0.05	c0.44			0.01			0.00	
v/s Ratio Perm			0.04			0.01	c0.13			0.01		
v/c Ratio	0.03	0.23	0.06	0.64	0.63	0.01	0.67	0.05		0.03	0.01	
Uniform Delay, d1	47.9	7.8	6.9	44.5	8.3	4.7	37.4	32.9		32.8	32.6	
Progression Factor	0.50	1.90	4.66	1.07	0.45	0.40	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	2.1	0.3	0.0	7.0	0.1		0.1	0.0	
Delay (s)	24.3	15.1	32.3	49.5	4.0	1.9	44.4	33.0		32.8	32.6	
Level of Service	C	B	C	D	A	A	D	C		C	C	
Approach Delay (s)		17.5			6.5			41.1			32.7	
Approach LOS		B			A			D			C	

Intersection Summary				
HCM Average Control Delay	12.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	65.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	0	16	6	0	20	63	682	2	11	580	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Hourly flow rate (vph)	24	0	48	7	0	22	100	749	8	44	707	75
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			705	
pX, platoon unblocked	0.86	0.86	0.85	0.86	0.86	0.98	0.85			0.98		
vC, conflicting volume	1432	1773	727	1773	1844	399	802			757		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1321	1717	590	1717	1799	338	679			705		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	69	100	87	82	100	96	87			95		
cM capacity (veh/h)	78	62	376	37	55	632	758			869		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	73	29	100	500	258	44	707	75
Volume Left	24	7	100	0	0	44	0	0
Volume Right	48	22	0	0	8	0	0	75
cSH	235	134	758	1700	1700	869	1700	1700
Volume to Capacity	0.31	0.22	0.13	0.29	0.15	0.05	0.42	0.04
Queue Length 95th (ft)	32	19	11	0	0	4	0	0
Control Delay (s)	34.1	39.0	10.5	0.0	0.0	9.4	0.0	0.0
Lane LOS	D	E	B			A		
Approach Delay (s)	34.1	39.0	1.2			0.5		
Approach LOS	D	E						

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

3/6/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	14	600	8	2550	0	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	667	9	2833	0	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			682		1311	339
vC1, stage 1 conf vol					349	
vC2, stage 2 conf vol					962	
vCu, unblocked vol			579		1225	226
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			964		268	756

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	6	6	670	9	944	944	944	22
Volume Left	0	0	0	9	0	0	0	0
Volume Right	0	0	667	0	0	0	0	22
cSH	1700	1700	1700	964	1700	1700	1700	756
Volume to Capacity	0.00	0.00	0.39	0.01	0.56	0.56	0.56	0.03
Queue Length 95th (ft)	0	0	0	1	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	8.8	0.0	0.0	0.0	9.9
Lane LOS				A				A
Approach Delay (s)	0.0			0.0				9.9
Approach LOS								A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		52.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	0	30	24	0	78	100	580	9	15	550	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3649		1829	3573	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3649		1829	3573	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	0	33	27	0	87	111	644	10	17	611	111
RTOR Reduction (vph)	0	30	0	0	79	0	0	1	0	0	10	0
Lane Group Flow (vph)	22	3	0	27	8	0	111	653	0	17	712	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.7	8.6		7.8	8.7		11.3	64.2		3.0	55.9	
Effective Green, g (s)	7.7	8.6		7.8	8.7		11.3	64.2		3.0	55.9	
Actuated g/C Ratio	0.08	0.09		0.08	0.09		0.11	0.64		0.03	0.56	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	141		143	142		207	2343		55	1997	
v/s Ratio Prot	0.01	0.00		c0.01	c0.00		c0.06	0.18		0.01	c0.20	
v/s Ratio Perm												
v/c Ratio	0.16	0.02		0.19	0.05		0.54	0.28		0.31	0.36	
Uniform Delay, d1	43.1	41.8		43.1	41.9		41.9	7.8		47.5	12.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.76	0.91	
Incremental Delay, d2	0.5	0.1		0.6	0.2		2.7	0.3		2.8	0.4	
Delay (s)	43.6	41.9		43.8	42.0		44.5	8.1		38.9	11.4	
Level of Service	D	D		D	D		D	A		D	B	
Approach Delay (s)		42.6			42.4			13.4			12.1	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM Average Control Delay	15.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.3	
Intersection Capacity Utilization	42.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	289	515	107	183	340	654	160	871	192	1027	1160	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	301	536	111	191	354	681	167	907	200	1070	1208	207
RTOR Reduction (vph)	0	0	53	0	0	0	0	0	30	0	0	65
Lane Group Flow (vph)	301	536	58	191	354	681	167	907	170	1070	1208	142
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	18.9	21.7	21.7	16.0	18.8	120.0	9.0	29.3	29.3	35.0	55.3	55.3
Effective Green, g (s)	19.9	23.7	23.7	17.0	20.8	120.0	10.0	31.3	31.3	36.0	57.3	57.3
Actuated g/C Ratio	0.17	0.20	0.20	0.14	0.17	1.00	0.08	0.26	0.26	0.30	0.48	0.48
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	588	722	318	259	634	1615	296	954	421	1064	1746	765
v/s Ratio Prot	0.08	c0.15		c0.10	0.10		0.05	c0.25		c0.30	0.33	
v/s Ratio Perm			0.04			c0.42			0.11			0.09
v/c Ratio	0.51	0.74	0.18	0.74	0.56	0.42	0.56	0.95	0.40	1.01	0.69	0.19
Uniform Delay, d1	45.6	45.3	40.1	49.4	45.4	0.0	52.9	43.6	36.7	42.0	24.5	18.0
Progression Factor	1.00	1.00	1.00	1.27	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	3.6	0.1	8.4	1.7	0.8	1.5	18.7	1.3	29.0	2.3	0.5
Delay (s)	45.9	48.9	40.2	71.2	42.1	0.8	54.4	62.3	38.0	71.0	26.7	18.5
Level of Service	D	D	D	E	D	A	D	E	D	E	C	B
Approach Delay (s)		46.9			23.7			57.5			45.1	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1117	96	123	329	319	84	390	590	981	710	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3322	1489	1829	3657	1599	3547	3545	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3322	1489	1829	3657	1599	3547	3545	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	222	1188	102	131	350	339	89	415	628	1044	755	195
RTOR Reduction (vph)	0	0	66	0	28	22	0	0	0	0	18	0
Lane Group Flow (vph)	222	1188	36	131	451	188	89	415	628	1044	932	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	12.7	38.5	38.5	9.5	35.3	71.5	11.2	14.8	120.0	36.2	39.8	
Effective Green, g (s)	13.7	42.5	42.5	10.5	39.3	79.5	12.2	17.8	120.0	37.2	42.8	
Actuated g/C Ratio	0.11	0.35	0.35	0.09	0.33	0.66	0.10	0.15	1.00	0.31	0.36	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	405	1295	562	310	1088	986	186	542	1599	1100	1264	
v/s Ratio Prot	c0.06	c0.32		0.04	0.14	0.13	0.05	c0.11		c0.29	0.26	
v/s Ratio Perm			0.02						0.39			
v/c Ratio	0.55	0.92	0.06	0.42	0.41	0.19	0.48	0.77	0.39	0.95	0.74	
Uniform Delay, d1	50.2	37.1	25.6	51.9	31.4	7.8	50.9	49.1	0.0	40.5	33.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.76	0.70	
Incremental Delay, d2	1.5	11.7	0.2	0.9	0.3	0.1	1.7	5.5	0.6	13.8	1.7	
Delay (s)	51.7	48.8	25.8	52.8	31.7	7.9	52.7	52.7	0.6	44.3	25.3	
Level of Service	D	D	C	D	C	A	D	D	A	D	C	
Approach Delay (s)		47.7			29.0			23.8			35.3	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1117	96	123	329	319	84	390	590	981	710	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5180		3547	3657	1636	1829	3657	1599	3547	3545	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5180		3547	3657	1636	1829	3657	1599	3547	3545	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	222	1188	102	131	350	339	89	415	628	1044	755	195
RTOR Reduction (vph)	0	9	0	0	0	9	0	0	0	0	19	0
Lane Group Flow (vph)	222	1282	0	131	350	330	89	415	628	1044	931	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases									Free			
Actuated Green, G (s)	10.7	31.0		7.0	27.3	73.5	9.9	14.8	120.0	46.2	51.1	
Effective Green, g (s)	11.7	35.0		8.0	31.3	81.5	10.9	17.8	120.0	47.2	54.1	
Actuated g/C Ratio	0.10	0.29		0.07	0.26	0.68	0.09	0.15	1.00	0.39	0.45	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	346	1511		236	954	1111	166	542	1599	1395	1598	
v/s Ratio Prot	c0.06	c0.25		0.04	0.10	0.20	0.05	c0.11		c0.29	0.26	
v/s Ratio Perm									0.39			
v/c Ratio	0.64	0.85		0.56	0.37	0.30	0.54	0.77	0.39	0.75	0.58	
Uniform Delay, d1	52.1	40.0		54.3	36.3	7.7	52.1	49.1	0.0	31.3	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.23	1.08	1.00	0.68	0.60	
Incremental Delay, d2	4.0	6.1		2.8	0.2	0.2	2.8	5.5	0.6	2.7	0.4	
Delay (s)	56.2	46.1		57.1	36.5	7.9	67.1	58.3	0.6	24.1	15.1	
Level of Service	E	D		E	D	A	E	E	A	C	B	
Approach Delay (s)		47.6			28.0			27.0			19.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	138	0	226	0	566	520	336	276	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1624		3657	1614	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1624		3657	1614	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	145	0	238	0	596	547	354	291	0
RTOR Reduction (vph)	0	0	0	0	0	122	0	0	181	0	0	0
Lane Group Flow (vph)	0	0	0	0	145	116	0	596	366	354	291	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					13.9	25.9		17.1	31.0	12.0	33.1	
Effective Green, g (s)					15.9	27.9		19.1	35.0	13.0	35.1	
Actuated g/C Ratio					0.28	0.49		0.34	0.61	0.23	0.62	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					510	795		1225	1076	809	1185	
v/s Ratio Prot					0.08	0.03		c0.16	c0.09	c0.10	0.15	
v/s Ratio Perm						0.04			0.13			
v/c Ratio					0.28	0.15		0.49	0.34	0.44	0.25	
Uniform Delay, d1					16.1	8.0		15.1	5.4	18.9	5.0	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.3	0.1		0.3	0.2	0.4	0.1	
Delay (s)					16.4	8.1		15.4	5.6	19.2	5.1	
Level of Service					B	A		B	A	B	A	
Approach Delay (s)		0.0			11.2			10.7			12.8	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1235	80	53	438	7	105	4	102	7	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.94		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1568	1829	3657	1636	1538	1322		1779	1645	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.67	1.00	
Satd. Flow (perm)	1829	3657	1568	1829	3657	1636	1219	1322		1248	1645	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	1328	86	57	471	8	113	4	110	8	1	6
RTOR Reduction (vph)	0	0	24	0	0	3	0	84	0	0	5	0
Lane Group Flow (vph)	5	1328	62	57	471	5	113	30	0	8	2	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	0.9	32.6	32.6	4.5	36.2	36.2	14.4	14.4		14.4	14.4	
Effective Green, g (s)	1.9	35.6	35.6	5.5	39.2	39.2	15.4	15.4		15.4	15.4	
Actuated g/C Ratio	0.03	0.54	0.54	0.08	0.60	0.60	0.24	0.24		0.24	0.24	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	53	1988	852	154	2189	979	287	311		293	387	
v/s Ratio Prot	0.00	c0.36		c0.03	0.13			0.02			0.00	
v/s Ratio Perm			0.04			0.00	c0.09			0.01		
v/c Ratio	0.09	0.67	0.07	0.37	0.22	0.00	0.39	0.10		0.03	0.01	
Uniform Delay, d1	31.0	10.7	7.1	28.4	6.1	5.3	21.1	19.6		19.3	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9	0.0	1.5	0.0	0.0	0.9	0.1		0.0	0.0	
Delay (s)	31.7	11.6	7.1	29.9	6.1	5.3	22.0	19.7		19.3	19.2	
Level of Service	C	B	A	C	A	A	C	B		B	B	
Approach Delay (s)		11.4			8.6			20.9			19.3	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	11.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	61.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	0	31	15	0	48	16	770	16	64	643	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	0	34	16	0	52	17	837	17	70	699	18
Pedestrians		20									20	
Lane Width (ft)		13.0									13.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		2									2	
Right turn flare (veh)			8									
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								835			705	
pX, platoon unblocked	0.80	0.80	0.77	0.80	0.80	0.94	0.77			0.94		
vC, conflicting volume	1383	1747	719	1735	1757	447	737			854		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1074	1529	484	1515	1542	285	508			718		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	100	92	70	100	92	98			92		
cM capacity (veh/h)	112	81	399	55	80	657	795			826		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	61	68	17	558	296	70	699	18
Volume Left	27	16	17	0	0	70	0	0
Volume Right	34	52	0	0	17	0	0	18
cSH	251	181	795	1700	1700	826	1700	1700
Volume to Capacity	0.24	0.38	0.02	0.33	0.17	0.08	0.41	0.01
Queue Length 95th (ft)	23	41	2	0	0	7	0	0
Control Delay (s)	29.2	36.5	9.6	0.0	0.0	9.8	0.0	0.0
Lane LOS	D	E	A			A		
Approach Delay (s)	29.2	36.5	0.2			0.9		
Approach LOS	D	E						

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	57.6%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

3/6/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2615	61	37	771	0	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2906	68	41	857	0	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.71		0.71	0.71
vC, conflicting volume			2973		3307	1002
vC1, stage 1 conf vol					2939	
vC2, stage 2 conf vol					368	
vCu, unblocked vol			2351		2821	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			72		100	96
cM capacity (veh/h)			146		37	770

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	1162	1162	649	41	286	286	286	34
Volume Left	0	0	0	41	0	0	0	0
Volume Right	0	0	68	0	0	0	0	34
cSH	1700	1700	1700	146	1700	1700	1700	770
Volume to Capacity	0.68	0.68	0.38	0.28	0.17	0.17	0.17	0.04
Queue Length 95th (ft)	0	0	0	27	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	39.0	0.0	0.0	0.0	9.9
Lane LOS				E				A
Approach Delay (s)	0.0			1.8				9.9
Approach LOS								A

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		61.9%	ICU Level of Service B
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	0	125	35	0	112	140	649	39	67	544	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3626		1829	3462	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3626		1829	3462	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	389	0	139	39	0	124	156	721	43	74	604	333
RTOR Reduction (vph)	0	104	0	0	113	0	0	3	0	0	55	0
Lane Group Flow (vph)	389	35	0	39	11	0	156	761	0	74	882	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	29.3	30.4		9.3	10.4		13.6	56.1		7.8	50.3	
Effective Green, g (s)	29.3	30.4		9.3	10.4		13.6	56.1		7.8	50.3	
Actuated g/C Ratio	0.24	0.25		0.08	0.09		0.11	0.47		0.06	0.42	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	447	414		142	142		207	1695		119	1451	
v/s Ratio Prot	c0.21	c0.02		0.02	0.01		c0.09	0.21		0.04	c0.25	
v/s Ratio Perm												
v/c Ratio	0.87	0.09		0.27	0.08		0.75	0.45		0.62	0.61	
Uniform Delay, d1	43.5	34.2		52.2	50.4		51.6	21.5		54.7	27.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.89	1.50	
Incremental Delay, d2	16.6	0.1		1.1	0.2		14.4	0.9		7.7	1.5	
Delay (s)	60.2	34.3		53.2	50.6		65.9	22.4		56.5	42.3	
Level of Service	E	C		D	D		E	C		E	D	
Approach Delay (s)		53.4			51.2			29.8			43.3	
Approach LOS		D			D			C			D	

Intersection Summary				
HCM Average Control Delay	41.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.3	
Intersection Capacity Utilization	71.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	311	419	188	278	384	1002	216	691	254	788	992	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	362	487	219	323	447	1165	251	803	295	916	1153	273
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	49	0	0	92
Lane Group Flow (vph)	362	487	108	323	447	1165	251	803	246	916	1153	181
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	15.7	19.8	19.8	22.8	26.9	120.0	10.1	28.4	28.4	31.0	49.3	49.3
Effective Green, g (s)	16.7	21.8	21.8	23.8	28.9	120.0	11.1	30.4	30.4	32.0	51.3	51.3
Actuated g/C Ratio	0.14	0.18	0.18	0.20	0.24	1.00	0.09	0.25	0.25	0.27	0.43	0.43
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	494	664	293	363	881	1615	328	926	409	946	1563	685
v/s Ratio Prot	0.10	0.13		c0.18	0.12		0.07	c0.22		c0.26	0.32	
v/s Ratio Perm			0.07			c0.72			0.15			0.11
v/c Ratio	0.73	0.73	0.37	0.89	0.51	0.72	0.77	0.87	0.60	0.97	0.74	0.26
Uniform Delay, d1	49.5	46.4	43.1	46.8	39.4	0.0	53.2	42.9	39.5	43.5	28.7	22.2
Progression 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
Incremental Delay, d2	4.8	3.6	0.3	21.8	1.0	2.8	9.2	10.8	6.4	21.5	3.2	0.9
Delay (s)	54.3	50.0	43.3	68.6	40.4	2.8	62.4	53.6	45.9	65.0	31.9	23.1
Level of Service	D	D	D	E	D	A	E	D	D	E	C	C
Approach Delay (s)		50.1			22.5			53.6			43.8	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	566	99	372	1395	909	150	250	229	221	236	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3498	1457	1829	3657	1599	3547	3451	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3498	1457	1829	3657	1599	3547	3451	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	264	622	109	409	1533	999	165	275	252	243	259	156
RTOR Reduction (vph)	0	0	66	0	9	71	0	0	0	0	103	0
Lane Group Flow (vph)	264	622	43	409	1754	698	165	275	252	243	312	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases			6			2			Free			
Actuated Green, G (s)	7.0	35.0	35.0	13.7	41.7	54.0	12.1	18.0	100.0	12.3	18.2	
Effective Green, g (s)	8.0	39.0	39.0	14.7	45.7	62.0	13.1	21.0	100.0	13.3	21.2	
Actuated g/C Ratio	0.08	0.39	0.39	0.15	0.46	0.62	0.13	0.21	1.00	0.13	0.21	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	1426	620	521	1599	903	240	768	1599	472	732	
v/s Ratio Prot	c0.07	0.17		c0.12	c0.50	c0.13	0.09	0.08		0.07	c0.09	
v/s Ratio Perm			0.03			0.35			0.16			
v/c Ratio	0.93	0.44	0.07	0.79	1.10	0.77	0.69	0.36	0.16	0.51	0.43	
Uniform Delay, d1	45.7	22.4	19.1	41.1	27.1	13.9	41.5	33.7	0.0	40.3	34.1	
Progression Factor	0.85	1.27	2.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.7	0.9	0.2	7.6	53.9	4.2	7.9	0.3	0.2	1.0	0.4	
Delay (s)	72.4	29.5	54.8	48.8	81.0	18.0	49.4	34.0	0.2	41.3	34.5	
Level of Service	E	C	D	D	F	B	D	C	A	D	C	
Approach Delay (s)		43.6			60.1			25.4			37.0	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	3.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	566	99	372	1395	909	150	250	229	221	236	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5116		3547	3498	1609	1829	3657	1599	3547	3451	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5116		3547	3498	1609	1829	3657	1599	3547	3451	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	264	622	109	409	1533	999	165	275	252	243	259	156
RTOR Reduction (vph)	0	23	0	0	0	4	0	0	0	0	95	0
Lane Group Flow (vph)	264	708	0	409	1533	995	165	275	252	243	320	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases						2			Free			
Actuated Green, G (s)	7.0	31.6		15.1	39.7	63.0	8.0	9.0	100.0	23.3	24.3	
Effective Green, g (s)	8.0	35.6		16.1	43.7	71.0	9.0	12.0	100.0	24.3	27.3	
Actuated g/C Ratio	0.08	0.36		0.16	0.44	0.71	0.09	0.12	1.00	0.24	0.27	
Clearance Time (s)	4.0	7.0		4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	1821		571	1529	1142	165	439	1599	862	942	
v/s Ratio Prot	c0.07	0.14		0.12	c0.44	c0.24	c0.09	c0.08		0.07	0.09	
v/s Ratio Perm						0.38			0.16			
v/c Ratio	0.93	0.39		0.72	1.00	0.87	1.00	0.63	0.16	0.28	0.34	
Uniform Delay, d1	45.7	24.1		39.8	28.1	11.0	45.5	41.9	0.0	30.8	29.1	
Progression Factor	0.86	1.27		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.7	0.6		4.3	23.6	7.5	70.1	2.8	0.2	0.2	0.2	
Delay (s)	73.2	31.1		44.1	51.8	18.5	115.6	44.7	0.2	30.9	29.3	
Level of Service	E	C		D	D	B	F	D	A	C	C	
Approach Delay (s)		42.3			39.4			45.4			29.9	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	595	0	329	4	655	160	265	316	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1619	1829	3657	1617	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1619	1829	3657	1617	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	700	0	387	5	771	188	298	372	0
RTOR Reduction (vph)	0	0	0	0	0	119	0	0	48	0	0	0
Lane Group Flow (vph)	0	0	0	0	700	268	5	771	140	298	372	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					33.2	44.7	1.2	25.3	58.5	11.5	35.6	
Effective Green, g (s)					35.2	46.7	2.2	27.3	62.5	12.5	37.6	
Actuated g/C Ratio					0.42	0.56	0.03	0.33	0.74	0.15	0.45	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					766	900	48	1189	1261	528	862	
v/s Ratio Prot					c0.38	0.04	0.00	c0.21	0.05	c0.08	0.19	
v/s Ratio Perm						0.12			0.04			
v/c Ratio					0.91	0.30	0.10	0.65	0.11	0.56	0.43	
Uniform Delay, d1					23.0	9.9	39.9	24.2	3.0	33.2	15.9	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					15.3	0.2	1.0	1.2	0.0	1.4	0.3	
Delay (s)					38.3	10.1	40.9	25.5	3.0	34.6	16.2	
Level of Service					D	B	D	C	A	C	B	
Approach Delay (s)		0.0			28.2			21.2			24.4	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	702	125	158	1496	10	160	1	101	13	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.96	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1309		1757	1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.60	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1209	1309		1106	1756	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1	836	149	188	1781	12	190	1	120	15	5	5
RTOR Reduction (vph)	0	0	61	0	0	1	0	94	0	0	4	0
Lane Group Flow (vph)	1	836	88	188	1781	11	190	27	0	15	6	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	56.1	56.1	9.0	63.9	63.9	20.9	20.9		20.9	20.9	
Effective Green, g (s)	2.2	59.1	59.1	10.0	66.9	66.9	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.02	0.59	0.59	0.10	0.67	0.67	0.22	0.22		0.22	0.22	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2161	916	183	2447	1094	265	287		242	385	
v/s Ratio Prot	0.00	0.23		c0.10	c0.49			0.02			0.00	
v/s Ratio Perm			0.06			0.01	c0.16			0.01		
v/c Ratio	0.03	0.39	0.10	1.03	0.73	0.01	0.72	0.10		0.06	0.02	
Uniform Delay, d1	47.9	10.8	8.9	45.0	10.7	5.5	36.2	31.1		30.9	30.6	
Progression Factor	0.45	1.72	4.73	1.16	0.70	0.42	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5	0.2	47.1	0.7	0.0	8.9	0.1		0.1	0.0	
Delay (s)	21.6	19.1	42.1	99.5	8.2	2.3	45.1	31.3		31.0	30.6	
Level of Service	C	B	D	F	A	A	D	C		C	C	
Approach Delay (s)		22.6			16.9			39.7			30.9	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay	20.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	71.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	37	0	0	0	73	795	2	2	652	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0				3.0	3.0		3.0	3.0	3.0
Lane Util. Factor		1.00	1.00				1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00				1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes		0.98	1.00				0.99	1.00		1.00	1.00	1.00
Frt		1.00	0.85				1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1391				1816	3652		1829	1925	1561
Flt Permitted		0.76	1.00				0.27	1.00		0.30	1.00	1.00
Satd. Flow (perm)		1434	1391				521	3652		587	1925	1561
Peak-hour factor, PHF	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Adj. Flow (vph)	28	0	112	0	0	0	116	874	8	8	795	72
RTOR Reduction (vph)	0	0	93	0	0	0	0	1	0	0	0	22
Lane Group Flow (vph)	0	28	19	0	0	0	116	881	0	8	795	50
Confl. Peds. (#/hr)	20						20					20
Parking (#/hr)	10		10									
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		6.1	6.1				28.2	28.2		28.2	28.2	28.2
Effective Green, g (s)		7.2	7.2				29.3	29.3		29.3	29.3	29.3
Actuated g/C Ratio		0.17	0.17				0.69	0.69		0.69	0.69	0.69
Clearance Time (s)		4.1	4.1				4.1	4.1		4.1	4.1	4.1
Vehicle Extension (s)		3.0	3.0				3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		243	236				359	2518		405	1327	1076
v/s Ratio Prot								0.24			c0.41	
v/s Ratio Perm		c0.02	0.01				0.22			0.01		0.03
v/c Ratio		0.12	0.08				0.32	0.35		0.02	0.60	0.05
Uniform Delay, d1		15.0	14.9				2.6	2.7		2.1	3.5	2.1
Progression Factor		1.00	1.00				1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1				0.5	0.1		0.0	0.7	0.0
Delay (s)		15.2	15.0				3.2	2.8		2.1	4.2	2.1
Level of Service		B	B				A	A		A	A	A
Approach Delay (s)		15.0			0.0			2.8			4.0	
Approach LOS		B			A			A			A	

Intersection Summary				
HCM Average Control Delay	4.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	52.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	50	200	600	630	80
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	44	56	222	667	700	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				705	565	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	1522	394	789			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1505	364	763			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	91	73			
cM capacity (veh/h)	81	626	836			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	100	222	333	333	467	322
Volume Left	44	222	0	0	0	0
Volume Right	56	0	0	0	0	89
cSH	157	836	1700	1700	1700	1700
Volume to Capacity	0.64	0.27	0.20	0.20	0.27	0.19
Queue Length 95th (ft)	88	27	0	0	0	0
Control Delay (s)	61.1	10.9	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	61.1	2.7			0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	474	110	254	504	798	176	833	194	887	1005	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	273	494	115	265	525	831	183	868	202	924	1047	205
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	32	0	0	77
Lane Group Flow (vph)	273	494	55	265	525	831	183	868	170	924	1047	128
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	15.9	20.5	20.5	19.5	24.1	120.0	9.3	27.0	27.0	35.0	52.7	52.7
Effective Green, g (s)	16.9	22.5	22.5	20.5	26.1	120.0	10.3	29.0	29.0	36.0	54.7	54.7
Actuated g/C Ratio	0.14	0.19	0.19	0.17	0.22	1.00	0.09	0.24	0.24	0.30	0.46	0.46
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	500	686	302	312	795	1615	304	884	390	1064	1667	731
v/s Ratio Prot	0.08	c0.14		c0.14	c0.14		0.05	c0.24		c0.26	0.29	
v/s Ratio Perm			0.03			0.51			0.11			0.08
v/c Ratio	0.55	0.72	0.18	0.85	0.66	0.51	0.60	0.98	0.44	0.87	0.63	0.17
Uniform Delay, d1	48.0	45.8	41.0	48.3	42.9	0.0	52.9	45.2	38.6	39.8	24.9	19.3
Progression Factor	1.00	1.00	1.00	1.14	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	3.2	0.1	14.5	2.1	0.9	2.3	25.9	1.6	7.4	1.8	0.5
Delay (s)	48.6	49.0	41.1	69.7	37.6	0.9	55.2	71.1	40.2	47.2	26.7	19.8
Level of Service	D	D	D	E	D	A	E	E	D	D	C	B
Approach Delay (s)		47.8			24.0			63.8			34.7	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	1203	124	254	741	363	107	296	646	648	658	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3471	1468	1829	3657	1599	3547	3544	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3471	1468	1829	3657	1599	3547	3544	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1280	132	270	788	386	114	315	687	689	700	182
RTOR Reduction (vph)	0	0	87	0	3	36	0	0	0	0	18	0
Lane Group Flow (vph)	170	1280	45	270	824	311	114	315	687	689	864	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases			6			2			Free			
Actuated Green, G (s)	11.1	37.0	37.0	11.0	36.9	73.8	12.4	14.1	120.0	36.9	38.6	
Effective Green, g (s)	12.1	41.0	41.0	12.0	40.9	81.8	13.4	17.1	120.0	37.9	41.6	
Actuated g/C Ratio	0.10	0.34	0.34	0.10	0.34	0.68	0.11	0.14	1.00	0.32	0.35	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	358	1249	542	355	1183	1001	204	521	1599	1120	1229	
v/s Ratio Prot	0.05	c0.35		c0.08	0.24	0.11	0.06	c0.09		0.19	c0.24	
v/s Ratio Perm			0.03			0.11			c0.43			
v/c Ratio	0.47	1.02	0.08	0.76	0.70	0.31	0.56	0.60	0.43	0.62	0.70	
Uniform Delay, d1	50.9	39.5	26.8	52.6	34.2	7.7	50.5	48.3	0.0	34.9	33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.77	
Incremental Delay, d2	1.0	32.0	0.3	9.3	1.8	0.2	3.3	2.0	0.8	2.3	1.7	
Delay (s)	51.9	71.5	27.1	61.9	36.0	7.9	53.8	50.3	0.8	29.3	27.7	
Level of Service	D	E	C	E	D	A	D	D	A	C	C	
Approach Delay (s)		65.7			34.1			20.2			28.4	
Approach LOS		E			C			C			C	

Intersection Summary				
HCM Average Control Delay	38.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	84.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	1203	124	254	741	363	107	296	646	648	658	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5166		3547	3657	1612	1829	3657	1599	3547	3544	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5166		3547	3657	1612	1829	3657	1599	3547	3544	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1280	132	270	788	386	114	315	687	689	700	182
RTOR Reduction (vph)	0	10	0	0	0	19	0	0	0	0	19	0
Lane Group Flow (vph)	170	1402	0	270	788	367	114	315	687	689	863	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases						2			Free			
Actuated Green, G (s)	8.8	36.9		13.1	41.2	75.0	11.5	15.2	120.0	33.8	37.5	
Effective Green, g (s)	9.8	40.9		14.1	45.2	83.0	12.5	18.2	120.0	34.8	40.5	
Actuated g/C Ratio	0.08	0.34		0.12	0.38	0.69	0.10	0.15	1.00	0.29	0.34	
Clearance Time (s)	4.0	7.0		4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1761		417	1377	1115	191	555	1599	1029	1196	
v/s Ratio Prot	0.05	c0.27		c0.08	0.22	0.10	c0.06	c0.09		0.19	c0.24	
v/s Ratio Perm						0.12			0.43			
v/c Ratio	0.59	0.80		0.65	0.57	0.33	0.60	0.57	0.43	0.67	0.72	
Uniform Delay, d1	53.1	35.8		50.6	29.7	7.4	51.3	47.2	0.0	37.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.77	
Incremental Delay, d2	3.0	3.8		3.4	0.6	0.2	4.9	1.3	0.8	3.1	2.0	
Delay (s)	56.2	39.6		54.0	30.3	7.6	56.3	48.6	0.8	33.0	28.9	
Level of Service	E	D		D	C	A	E	D	A	C	C	
Approach Delay (s)		41.4			28.7			20.0			30.7	
Approach LOS		D			C			B			C	

Intersection Summary				
HCM Average Control Delay	31.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	77.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	153	0	218	0	690	462	384	505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1625		3657	1614	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1625		3657	1614	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	161	0	229	0	726	486	404	532	0
RTOR Reduction (vph)	0	0	0	0	0	117	0	0	171	0	0	0
Lane Group Flow (vph)	0	0	0	0	161	112	0	726	315	404	532	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					14.5	27.7		18.8	33.3	13.2	36.0	
Effective Green, g (s)					16.5	29.7		20.8	37.3	14.2	38.0	
Actuated g/C Ratio					0.27	0.49		0.34	0.62	0.23	0.63	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					499	798		1257	1075	833	1209	
v/s Ratio Prot					0.09	0.03		c0.20	c0.08	c0.11	0.28	
v/s Ratio Perm						0.04			0.12			
v/c Ratio					0.32	0.14		0.58	0.29	0.48	0.44	
Uniform Delay, d1					17.5	8.4		16.3	5.4	20.0	5.8	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.4	0.1		0.6	0.2	0.4	0.3	
Delay (s)					17.9	8.5		16.9	5.6	20.4	6.0	
Level of Service					B	A		B	A	C	A	
Approach Delay (s)		0.0			12.4			12.4			12.3	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	12.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	50.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1175	173	226	711	13	235	10	260	5	8	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1552	1829	3657	1636	1530	1330		1785	1840	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.34	1.00	
Satd. Flow (perm)	1829	3657	1552	1829	3657	1636	1207	1330		631	1840	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	1263	186	243	765	14	253	11	280	5	9	3
RTOR Reduction (vph)	0	0	65	0	0	3	0	194	0	0	2	0
Lane Group Flow (vph)	5	1263	121	243	765	11	253	97	0	5	10	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.1	42.4	42.4	16.1	57.4	57.4	24.5	24.5		24.5	24.5	
Effective Green, g (s)	2.1	45.4	45.4	17.1	60.4	60.4	25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.02	0.47	0.47	0.18	0.62	0.62	0.26	0.26		0.26	0.26	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	1712	726	322	2277	1019	317	350		166	484	
v/s Ratio Prot	0.00	c0.35		c0.13	0.21			0.07			0.01	
v/s Ratio Perm			0.08			0.01	c0.21			0.01		
v/c Ratio	0.12	0.74	0.17	0.75	0.34	0.01	0.80	0.28		0.03	0.02	
Uniform Delay, d1	46.5	21.0	14.9	38.0	8.7	6.9	33.3	28.4		26.6	26.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.7	0.1	9.6	0.1	0.0	13.1	0.4		0.1	0.0	
Delay (s)	48.0	22.7	15.0	47.6	8.8	7.0	46.4	28.9		26.6	26.5	
Level of Service	D	C	B	D	A	A	D	C		C	C	
Approach Delay (s)		21.8			18.0			37.0			26.5	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay	23.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	74.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	0	70	15	0	11	31	898	23	17	873	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes		0.98	1.00		1.00		0.99	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1391		1763		1819	3643		1829	1925	1559
Flt Permitted		0.74	1.00		0.83		0.22	1.00		0.27	1.00	1.00
Satd. Flow (perm)		1400	1391		1500		420	3643		520	1925	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	0	76	16	0	12	34	976	25	18	949	10
RTOR Reduction (vph)	0	0	66	0	10	0	0	2	0	0	0	3
Lane Group Flow (vph)	0	15	10	0	18	0	34	999	0	18	949	7
Confl. Peds. (#/hr)	20						20					20
Parking (#/hr)	10		10									
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		4.6	4.6		4.6		31.8	31.8		31.8	31.8	31.8
Effective Green, g (s)		5.7	5.7		5.7		32.9	32.9		32.9	32.9	32.9
Actuated g/C Ratio		0.13	0.13		0.13		0.74	0.74		0.74	0.74	0.74
Clearance Time (s)		4.1	4.1		4.1		4.1	4.1		4.1	4.1	4.1
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		179	178		192		310	2687		384	1420	1150
v/s Ratio Prot								0.27			c0.49	
v/s Ratio Perm		0.01	0.01		c0.01		0.08			0.03		0.00
v/c Ratio		0.08	0.05		0.09		0.11	0.37		0.05	0.67	0.01
Uniform Delay, d1		17.1	17.1		17.2		1.7	2.1		1.6	3.0	1.5
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1		0.2		0.2	0.1		0.1	1.2	0.0
Delay (s)		17.4	17.2		17.4		1.8	2.2		1.6	4.2	1.5
Level of Service		B	B		B		A	A		A	A	A
Approach Delay (s)		17.2			17.4			2.2			4.2	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	3.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	44.6	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	64.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	300	150	175	745	700	300
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	333	167	194	828	778	333
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				705	565	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	1747	556	1111			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1447	0	659			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	81	74			
cM capacity (veh/h)	73	875	746			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	500	194	414	414	519	593
Volume Left	333	194	0	0	0	0
Volume Right	167	0	0	0	0	333
cSH	105	746	1700	1700	1700	1700
Volume to Capacity	4.76	0.26	0.24	0.24	0.31	0.35
Queue Length 95th (ft)	Err	26	0	0	0	0
Control Delay (s)	Err	11.5	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	Err	2.2			0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	1899.4			
Intersection Capacity Utilization	74.4%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	311	426	188	278	406	1038	216	691	254	800	992	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	362	495	219	323	472	1207	251	803	295	930	1153	273
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	49	0	0	92
Lane Group Flow (vph)	362	495	110	323	472	1207	251	803	246	930	1153	181
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	15.7	20.0	20.0	22.7	27.0	120.0	10.1	28.3	28.3	31.0	49.2	49.2
Effective Green, g (s)	16.7	22.0	22.0	23.7	29.0	120.0	11.1	30.3	30.3	32.0	51.2	51.2
Actuated g/C Ratio	0.14	0.18	0.18	0.20	0.24	1.00	0.09	0.25	0.25	0.27	0.43	0.43
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	494	670	295	361	884	1615	328	923	408	946	1560	684
v/s Ratio Prot	0.10	0.14		c0.18	0.13		0.07	c0.22		c0.26	0.32	
v/s Ratio Perm			0.07			c0.75			0.15			0.11
v/c Ratio	0.73	0.74	0.37	0.89	0.53	0.75	0.77	0.87	0.60	0.98	0.74	0.27
Uniform Delay, d1	49.5	46.3	42.9	46.9	39.6	0.0	53.2	43.0	39.6	43.7	28.8	22.2
Progression 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
Incremental Delay, d2	4.8	3.7	0.3	22.9	1.1	3.2	9.2	11.0	6.5	24.9	3.2	0.9
Delay (s)	54.3	50.0	43.2	69.8	40.8	3.2	62.4	53.9	46.0	68.7	32.0	23.2
Level of Service	D	D	D	E	D	A	E	D	D	E	C	C
Approach Delay (s)		50.1			22.8			53.8			45.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	573	104	372	1395	909	186	308	229	226	250	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1591	3547	3498	1489	1829	3657	1599	3547	3459	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1591	3547	3498	1489	1829	3657	1599	3547	3459	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	264	630	114	409	1533	999	204	338	252	248	275	156
RTOR Reduction (vph)	0	0	71	0	9	50	0	0	0	0	90	0
Lane Group Flow (vph)	264	630	43	409	1754	719	204	338	252	248	341	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases			6						Free			
Actuated Green, G (s)	7.0	33.6	33.6	13.7	40.3	60.5	12.7	18.5	100.0	13.2	19.0	
Effective Green, g (s)	8.0	37.6	37.6	14.7	44.3	64.5	13.7	21.5	100.0	14.2	22.0	
Actuated g/C Ratio	0.08	0.38	0.38	0.15	0.44	0.64	0.14	0.22	1.00	0.14	0.22	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	1375	598	521	1550	960	251	786	1599	504	761	
v/s Ratio Prot	c0.07	0.17		c0.12	c0.50	c0.48	0.11	0.09		0.07	c0.10	
v/s Ratio Perm			0.03						0.16			
v/c Ratio	0.93	0.46	0.07	0.79	1.13	0.75	0.81	0.43	0.16	0.49	0.45	
Uniform Delay, d1	45.7	23.5	20.0	41.1	27.9	12.2	41.9	34.0	0.0	39.6	33.8	
Progression Factor	0.86	1.27	2.89	1.00	1.00	1.00	0.80	0.81	1.00	1.00	1.00	
Incremental Delay, d2	33.6	1.0	0.2	7.6	67.8	3.2	17.6	0.4	0.2	0.8	0.4	
Delay (s)	73.1	30.8	58.1	48.8	95.7	15.4	50.9	28.0	0.2	40.3	34.2	
Level of Service	E	C	E	D	F	B	D	C	A	D	C	
Approach Delay (s)		45.0			68.2			25.1			36.4	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	53.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	3.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	573	104	372	1395	909	186	308	229	226	250	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5113		3547	3498	1489	1829	3657	1599	3547	3459	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5113		3547	3498	1489	1829	3657	1599	3547	3459	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	264	630	114	409	1533	999	204	338	252	248	275	156
RTOR Reduction (vph)	0	22	0	0	10	42	0	0	0	0	88	0
Lane Group Flow (vph)	264	722	0	409	1753	727	204	338	252	248	343	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pt+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	2 7	3	8		7	4	
Permitted Phases									Free			
Actuated Green, G (s)	7.0	35.4		15.1	43.5	61.3	8.0	17.7	100.0	10.8	20.5	
Effective Green, g (s)	8.0	39.4		16.1	47.5	65.3	9.0	20.7	100.0	11.8	23.5	
Actuated g/C Ratio	0.08	0.39		0.16	0.48	0.65	0.09	0.21	1.00	0.12	0.24	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	2015		571	1662	972	165	757	1599	419	813	
v/s Ratio Prot	c0.07	0.14		0.12	c0.50	c0.49	c0.11	0.09		0.07	c0.10	
v/s Ratio Perm									0.16			
v/c Ratio	0.93	0.36		0.72	1.05	0.75	1.24	0.45	0.16	0.59	0.42	
Uniform Delay, d1	45.7	21.4		39.8	26.2	11.8	45.5	34.6	0.0	41.8	32.5	
Progression Factor	0.80	1.33		1.00	1.00	1.00	0.87	0.82	1.00	1.00	1.00	
Incremental Delay, d2	33.6	0.5		4.3	38.1	3.2	146.8	0.4	0.2	2.2	0.4	
Delay (s)	70.2	28.8		44.1	64.4	14.9	186.5	28.9	0.2	44.1	32.8	
Level of Service	E	C		D	E	B	F	C	A	D	C	
Approach Delay (s)		39.7			48.6			60.3			36.9	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	47.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	595	0	329	4	664	160	265	345	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00	1.00	0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1619	1829	3657	1617	3547	1925	
Flt Permitted					0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1619	1829	3657	1617	3547	1925	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.85	0.85
Adj. Flow (vph)	0	0	0	700	0	387	5	781	188	298	406	0
RTOR Reduction (vph)	0	0	0	0	0	119	0	0	48	0	0	0
Lane Group Flow (vph)	0	0	0	0	700	268	5	781	140	298	406	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					33.2	44.7	1.2	25.5	58.7	11.5	35.8	
Effective Green, g (s)					35.2	46.7	2.2	27.5	62.7	12.5	37.8	
Actuated g/C Ratio					0.42	0.55	0.03	0.33	0.74	0.15	0.45	
Clearance Time (s)					5.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					765	898	48	1194	1262	527	864	
v/s Ratio Prot					c0.38	0.04	0.00	c0.21	0.05	c0.08	0.21	
v/s Ratio Perm						0.12			0.04			
v/c Ratio					0.92	0.30	0.10	0.65	0.11	0.57	0.47	
Uniform Delay, d1					23.1	10.0	40.0	24.3	3.0	33.3	16.2	
Progression Factor					1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2					15.4	0.2	1.0	1.3	0.0	1.4	0.4	
Delay (s)					38.5	10.2	41.0	25.6	3.0	34.7	16.6	
Level of Service					D	B	D	C	A	C	B	
Approach Delay (s)		0.0			28.4			21.3			24.3	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	84.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	714	125	158	1532	10	160	1	101	13	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.96	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1529	1309		1757	1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.60	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1209	1309		1106	1756	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	1	850	149	188	1824	12	190	1	120	15	5	5
RTOR Reduction (vph)	0	0	61	0	0	1	0	94	0	0	4	0
Lane Group Flow (vph)	1	850	88	188	1824	11	190	27	0	15	6	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.2	56.1	56.1	9.0	63.9	63.9	20.9	20.9		20.9	20.9	
Effective Green, g (s)	2.2	59.1	59.1	10.0	66.9	66.9	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.02	0.59	0.59	0.10	0.67	0.67	0.22	0.22		0.22	0.22	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	2161	916	183	2447	1094	265	287		242	385	
v/s Ratio Prot	0.00	0.23		c0.10	c0.50			0.02			0.00	
v/s Ratio Perm			0.06			0.01	c0.16			0.01		
v/c Ratio	0.03	0.39	0.10	1.03	0.75	0.01	0.72	0.10		0.06	0.02	
Uniform Delay, d1	47.9	10.9	8.9	45.0	10.9	5.5	36.2	31.1		30.9	30.6	
Progression Factor	0.44	1.70	4.68	1.13	0.72	0.51	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5	0.2	43.2	0.6	0.0	8.9	0.1		0.1	0.0	
Delay (s)	21.2	19.1	41.7	94.3	8.4	2.8	45.1	31.3		31.0	30.6	
Level of Service	C	B	D	F	A	A	D	C		C	C	
Approach Delay (s)		22.5			16.4			39.7			30.9	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay	20.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	37	6	0	20	73	803	3	11	677	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes		0.98	1.00		1.00		0.99	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1801	1391		1707		1817	3650		1829	1925	1561
Flt Permitted		0.74	1.00		0.94		0.25	1.00		0.30	1.00	1.00
Satd. Flow (perm)		1400	1391		1617		483	3650		577	1925	1561
Peak-hour factor, PHF	0.29	0.90	0.33	0.90	0.90	0.90	0.63	0.91	0.25	0.25	0.82	0.60
Adj. Flow (vph)	28	0	112	7	0	22	116	882	12	44	826	72
RTOR Reduction (vph)	0	0	93	0	18	0	0	1	0	0	0	23
Lane Group Flow (vph)	0	28	19	0	11	0	116	893	0	44	826	49
Confl. Peds. (#/hr)	20						20					20
Parking (#/hr)	10		10									
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		6.2	6.2		6.2		27.7	27.7		27.7	27.7	27.7
Effective Green, g (s)		7.3	7.3		7.3		28.8	28.8		28.8	28.8	28.8
Actuated g/C Ratio		0.17	0.17		0.17		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)		4.1	4.1		4.1		4.1	4.1		4.1	4.1	4.1
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		243	241		280		330	2497		395	1317	1068
v/s Ratio Prot								0.24			c0.43	
v/s Ratio Perm		c0.02	0.01		0.01		0.24			0.08		0.03
v/c Ratio		0.12	0.08		0.04		0.35	0.36		0.11	0.63	0.05
Uniform Delay, d1		14.7	14.6		14.5		2.8	2.8		2.3	3.7	2.2
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1		0.1		0.6	0.1		0.1	0.9	0.0
Delay (s)		14.9	14.7		14.5		3.4	2.9		2.4	4.6	2.2
Level of Service		B	B		B		A	A		A	A	A
Approach Delay (s)		14.8			14.5			2.9			4.3	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	4.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	56.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

3/6/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1013	14	8	2668	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1126	16	9	2964	0	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.90		0.90	0.90
vC, conflicting volume			1141		2139	383
vC1, stage 1 conf vol					1133	
vC2, stage 2 conf vol					1006	
vCu, unblocked vol			754		1867	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			764		183	972

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	450	450	241	9	988	988	988	26
Volume Left	0	0	0	9	0	0	0	0
Volume Right	0	0	16	0	0	0	0	26
cSH	1700	1700	1700	764	1700	1700	1700	972
Volume to Capacity	0.26	0.26	0.14	0.01	0.58	0.58	0.58	0.03
Queue Length 95th (ft)	0	0	0	1	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	9.8	0.0	0.0	0.0	8.8
Lane LOS				A				A
Approach Delay (s)	0.0			0.0				8.8
Approach LOS								A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		54.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	0	50	24	0	78	200	616	9	14	635	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3649		1829	3596	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3649		1829	3596	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	0	56	27	0	87	222	684	10	16	706	89
RTOR Reduction (vph)	0	51	0	0	76	0	0	1	0	0	7	0
Lane Group Flow (vph)	44	5	0	27	11	0	222	693	0	16	788	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.1	8.6		7.8	12.3		16.6	64.4		2.8	50.6	
Effective Green, g (s)	4.1	8.6		7.8	12.3		16.6	64.4		2.8	50.6	
Actuated g/C Ratio	0.04	0.09		0.08	0.12		0.17	0.64		0.03	0.51	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	75	141		143	201		304	2350		51	1820	
v/s Ratio Prot	c0.02	0.00		0.01	c0.01		c0.12	0.19		0.01	c0.22	
v/s Ratio Perm												
v/c Ratio	0.59	0.03		0.19	0.05		0.73	0.30		0.31	0.43	
Uniform Delay, d1	47.1	41.9		43.1	38.7		39.6	7.8		47.7	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.54	1.59	
Incremental Delay, d2	11.2	0.1		0.6	0.1		8.7	0.3		3.0	0.6	
Delay (s)	58.3	42.0		43.8	38.8		48.3	8.1		28.8	25.5	
Level of Service	E	D		D	D		D	A		C	C	
Approach Delay (s)		49.2			40.0			17.9			25.6	
Approach LOS		D			D			B			C	

Intersection Summary				
HCM Average Control Delay	24.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	50.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Valley & Santa Rita

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	499	110	254	523	830	176	833	194	927	1005	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3547	3657	1611	1829	3657	1615	3547	3657	1614	3547	3657	1603
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	273	520	115	265	545	865	183	868	202	966	1047	205
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	32	0	0	77
Lane Group Flow (vph)	273	520	58	265	545	865	183	868	170	966	1047	128
Confl. Peds. (#/hr)			2			4			1			6
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			Free			2			6
Actuated Green, G (s)	15.3	21.2	21.2	18.8	24.7	120.0	9.3	27.0	27.0	35.0	52.7	52.7
Effective Green, g (s)	16.3	23.2	23.2	19.8	26.7	120.0	10.3	29.0	29.0	36.0	54.7	54.7
Actuated g/C Ratio	0.14	0.19	0.19	0.17	0.22	1.00	0.09	0.24	0.24	0.30	0.46	0.46
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	1.8	1.8	1.8	1.8	5.0		1.8	5.0	5.0	1.8	5.0	5.0
Lane Grp Cap (vph)	482	707	311	302	814	1615	304	884	390	1064	1667	731
v/s Ratio Prot	0.08	c0.14		c0.14	c0.15		0.05	c0.24		c0.27	0.29	
v/s Ratio Perm			0.04			0.54			0.11			0.08
v/c Ratio	0.57	0.74	0.19	0.88	0.67	0.54	0.60	0.98	0.44	0.91	0.63	0.17
Uniform Delay, d1	48.5	45.5	40.5	48.9	42.6	0.0	52.9	45.2	38.6	40.4	24.9	19.3
Progression Factor	1.00	1.00	1.00	1.14	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	3.4	0.1	18.7	2.1	1.0	2.3	25.9	1.6	10.8	1.8	0.5
Delay (s)	49.5	49.0	40.6	74.5	38.0	1.0	55.2	71.1	40.2	51.2	26.7	19.8
Level of Service	D	D	D	E	D	A	E	E	D	D	C	B
Approach Delay (s)		48.0			24.7			63.8			36.8	
Approach LOS		D			C			E			D	

Intersection Summary				
HCM Average Control Delay	40.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	91.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	1224	143	254	741	363	140	346	644	666	706	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1586	3547	3471	1468	1829	3657	1599	3547	3551	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1586	3547	3471	1468	1829	3657	1599	3547	3551	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1302	152	270	788	386	149	368	685	709	751	180
RTOR Reduction (vph)	0	0	100	0	3	35	0	0	0	0	17	0
Lane Group Flow (vph)	170	1302	52	270	824	312	149	368	685	709	914	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases			6			2			Free			
Actuated Green, G (s)	11.1	37.0	37.0	11.0	36.9	73.3	13.9	14.6	120.0	36.4	37.1	
Effective Green, g (s)	12.1	41.0	41.0	12.0	40.9	81.3	14.9	17.6	120.0	37.4	40.1	
Actuated g/C Ratio	0.10	0.34	0.34	0.10	0.34	0.68	0.12	0.15	1.00	0.31	0.33	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	358	1249	542	355	1183	995	227	536	1599	1105	1187	
v/s Ratio Prot	0.05	c0.36		c0.08	0.24	0.11	0.08	c0.10		0.20	c0.26	
v/s Ratio Perm			0.03			0.11			c0.43			
v/c Ratio	0.47	1.04	0.10	0.76	0.70	0.31	0.66	0.69	0.43	0.64	0.77	
Uniform Delay, d1	50.9	39.5	26.9	52.6	34.2	7.9	50.1	48.6	0.0	35.5	35.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.79	0.79	
Incremental Delay, d2	1.0	37.2	0.4	9.3	1.8	0.2	5.7	3.1	0.7	2.6	2.9	
Delay (s)	51.9	76.7	27.2	61.9	36.0	8.1	50.6	46.3	0.7	30.7	31.2	
Level of Service	D	E	C	E	D	A	D	D	A	C	C	
Approach Delay (s)		69.5			34.1			20.8			31.0	
Approach LOS		E			C			C			C	

Intersection Summary				
HCM Average Control Delay	40.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	87.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	1224	143	254	741	363	140	346	644	666	706	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	5156		3547	3657	1613	1829	3657	1599	3547	3551	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	5156		3547	3657	1613	1829	3657	1599	3547	3551	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1302	152	270	788	386	149	368	685	709	751	180
RTOR Reduction (vph)	0	12	0	0	0	16	0	0	0	0	17	0
Lane Group Flow (vph)	170	1442	0	270	788	370	149	368	685	709	914	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		
Protected Phases	1	6		5	2	7	3	8		7	4	
Permitted Phases						2			Free			
Actuated Green, G (s)	8.8	35.3		11.7	38.2	73.9	12.9	16.3	120.0	35.7	39.1	
Effective Green, g (s)	9.8	39.3		12.7	42.2	81.9	13.9	19.3	120.0	36.7	42.1	
Actuated g/C Ratio	0.08	0.33		0.11	0.35	0.68	0.12	0.16	1.00	0.31	0.35	
Clearance Time (s)	4.0	7.0		4.0	7.0	4.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	1689		375	1286	1101	212	588	1599	1085	1246	
v/s Ratio Prot	0.05	c0.28		c0.08	0.22	0.11	c0.08	c0.10		0.20	c0.26	
v/s Ratio Perm						0.12			c0.43			
v/c Ratio	0.59	0.85		0.72	0.61	0.34	0.70	0.63	0.43	0.65	0.73	
Uniform Delay, d1	53.1	37.7		51.9	32.1	7.9	51.1	47.0	0.0	36.1	34.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.94	0.86	1.00	0.80	0.78	
Incremental Delay, d2	3.0	5.7		6.5	0.9	0.2	8.7	1.8	0.7	2.8	2.1	
Delay (s)	56.2	43.4		58.4	33.0	8.0	56.6	42.0	0.7	31.6	28.6	
Level of Service	E	D		E	C	A	E	D	A	C	C	
Approach Delay (s)		44.7			31.1			20.3			29.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Vineyard & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	153	0	218	0	722	462	384	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	0.97	1.00	
Frpb, ped/bikes					1.00	0.99		1.00	0.99	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1829	1625		3657	1613	3547	1925	
Flt Permitted					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)					1829	1625		3657	1613	3547	1925	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	161	0	229	0	760	486	404	558	0
RTOR Reduction (vph)	0	0	0	0	0	117	0	0	170	0	0	0
Lane Group Flow (vph)	0	0	0	0	161	112	0	760	316	404	558	0
Confl. Peds. (#/hr)						2			4	4		
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)					14.5	27.7		19.2	33.7	13.2	36.4	
Effective Green, g (s)					16.5	29.7		21.2	37.7	14.2	38.4	
Actuated g/C Ratio					0.27	0.49		0.35	0.62	0.23	0.63	
Clearance Time (s)					5.0	4.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					496	792		1273	1078	827	1214	
v/s Ratio Prot					0.09	0.03		c0.21	c0.08	c0.11	0.29	
v/s Ratio Perm						0.04			0.12			
v/c Ratio					0.32	0.14		0.60	0.29	0.49	0.46	
Uniform Delay, d1					17.7	8.6		16.3	5.4	20.2	5.9	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.4	0.1		0.8	0.2	0.5	0.3	
Delay (s)					18.1	8.7		17.1	5.5	20.7	6.1	
Level of Service					B	A		B	A	C	A	
Approach Delay (s)		0.0			12.6			12.6			12.2	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
91: Stanley Blvd & Reflection

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1215	173	226	743	13	235	10	260	5	8	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	3657	1550	1829	3657	1636	1530	1329		1784	1840	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00		0.33	1.00	
Satd. Flow (perm)	1829	3657	1550	1829	3657	1636	1207	1329		618	1840	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	1306	186	243	799	14	253	11	280	5	9	3
RTOR Reduction (vph)	0	0	62	0	0	3	0	192	0	0	2	0
Lane Group Flow (vph)	5	1306	124	243	799	11	253	99	0	5	10	0
Confl. Peds. (#/hr)			12				12		36	36		12
Parking (#/hr)							10	10	10			
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	1.1	44.3	44.3	16.1	59.3	59.3	24.7	24.7		24.7	24.7	
Effective Green, g (s)	2.1	47.3	47.3	17.1	62.3	62.3	25.7	25.7		25.7	25.7	
Actuated g/C Ratio	0.02	0.48	0.48	0.17	0.63	0.63	0.26	0.26		0.26	0.26	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	39	1745	740	316	2299	1028	313	345		160	477	
v/s Ratio Prot	0.00	c0.36		c0.13	0.22			0.07			0.01	
v/s Ratio Perm			0.08			0.01	c0.21			0.01		
v/c Ratio	0.13	0.75	0.17	0.77	0.35	0.01	0.81	0.29		0.03	0.02	
Uniform Delay, d1	47.6	21.1	14.7	39.1	8.7	6.9	34.4	29.4		27.4	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.8	0.1	10.7	0.1	0.0	14.2	0.5		0.1	0.0	
Delay (s)	49.1	22.9	14.8	49.8	8.8	6.9	48.6	29.8		27.5	27.3	
Level of Service	D	C	B	D	A	A	D	C		C	C	
Approach Delay (s)		22.0			18.2			38.5			27.4	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay	23.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	75.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
610: Nevada & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	0	70	24	0	39	31	925	28	42	896	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1802	1391		1731		1820	3641		1829	1925	1559
Flt Permitted		0.92	1.00		0.87		0.20	1.00		0.26	1.00	1.00
Satd. Flow (perm)		1744	1391		1538		390	3641		497	1925	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	0	76	26	0	42	34	1005	30	46	974	10
RTOR Reduction (vph)	0	0	66	0	36	0	0	2	0	0	0	3
Lane Group Flow (vph)	0	15	10	0	32	0	34	1033	0	46	974	7
Confl. Peds. (#/hr)	20						20					20
Parking (#/hr)	10		10									
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		4.8	4.8		4.8		31.3	31.3		31.3	31.3	31.3
Effective Green, g (s)		5.9	5.9		5.9		32.4	32.4		32.4	32.4	32.4
Actuated g/C Ratio		0.13	0.13		0.13		0.73	0.73		0.73	0.73	0.73
Clearance Time (s)		4.1	4.1		4.1		4.1	4.1		4.1	4.1	4.1
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		232	185		205		285	2663		363	1408	1140
v/s Ratio Prot								0.28			c0.51	
v/s Ratio Perm		0.01	0.01		c0.02		0.09			0.09		0.00
v/c Ratio		0.06	0.05		0.15		0.12	0.39		0.13	0.69	0.01
Uniform Delay, d1		16.8	16.8		17.0		1.8	2.2		1.8	3.2	1.6
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1		0.4		0.2	0.1		0.2	1.5	0.0
Delay (s)		16.9	16.9		17.3		1.9	2.3		1.9	4.7	1.6
Level of Service		B	B		B		A	A		A	A	A
Approach Delay (s)		16.9			17.3			2.3			4.6	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	4.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	65.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
699: Stanley Blvd & Project Driveway

3/6/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2473	61	37	1358	0	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2748	68	41	1509	0	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	1			1		
Upstream signal (ft)	382					
pX, platoon unblocked			0.68		0.68	0.68
vC, conflicting volume			2816		3367	950
vC1, stage 1 conf vol					2782	
vC2, stage 2 conf vol					585	
vCu, unblocked vol			2027		2836	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			78		100	95
cM capacity (veh/h)			188		52	739

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	1099	1099	617	41	503	503	503	37
Volume Left	0	0	0	41	0	0	0	0
Volume Right	0	0	68	0	0	0	0	37
cSH	1700	1700	1700	188	1700	1700	1700	739
Volume to Capacity	0.65	0.65	0.36	0.22	0.30	0.30	0.30	0.05
Queue Length 95th (ft)	0	0	0	20	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	29.4	0.0	0.0	0.0	10.1
Lane LOS				D				B
Approach Delay (s)	0.0			0.8				10.1
Approach LOS								B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
700: Utah & Bernal

3/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	0	150	35	0	112	175	744	39	67	694	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1829	1636		1829	1636		1829	3630		1829	3492	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1829	1636		1829	1636		1829	3630		1829	3492	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	333	0	167	39	0	124	194	827	43	74	771	333
RTOR Reduction (vph)	0	122	0	0	112	0	0	3	0	0	37	0
Lane Group Flow (vph)	333	45	0	39	12	0	194	867	0	74	1067	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	25.1	32.3		4.1	11.3		15.8	59.5		7.7	51.4	
Effective Green, g (s)	25.1	32.3		4.1	11.3		15.8	59.5		7.7	51.4	
Actuated g/C Ratio	0.21	0.27		0.03	0.09		0.13	0.50		0.06	0.43	
Clearance Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	383	440		62	154		241	1800		117	1496	
v/s Ratio Prot	c0.18	c0.03		0.02	0.01		c0.11	0.24		0.04	c0.31	
v/s Ratio Perm												
v/c Ratio	0.87	0.10		0.63	0.08		0.80	0.48		0.63	0.71	
Uniform Delay, d1	45.9	33.0		57.2	49.6		50.6	20.0		54.8	28.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.73	1.60	
Incremental Delay, d2	18.5	0.1		18.3	0.2		17.5	0.9		7.6	2.1	
Delay (s)	64.3	33.1		75.5	49.8		68.1	21.0		47.6	47.4	
Level of Service	E	C		E	D		E	C		D	D	
Approach Delay (s)		53.9			55.9			29.6			47.4	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix B

Queuing Calculations

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	R	L	T
Maximum Queue (ft)	168	167	70	78	24	113	122	361	340	120	96	134
Average Queue (ft)	114	121	44	56	12	76	88	244	251	45	69	93
95th Queue (ft)	189	193	83	90	34	130	136	409	382	170	109	152
Link Distance (ft)			1252	1252				624	624			492
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			470	290	290			510	210	
Storage Blk Time (%)								3				
Queuing Penalty (veh)								8				

Intersection: 28: Stanley Blvd & Valley

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	TR
Maximum Queue (ft)	154	33	71	88	148	189
Average Queue (ft)	105	7	46	62	104	157
95th Queue (ft)	166	65	90	105	161	213
Link Distance (ft)	492				567	567
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		180	300	300		
Storage Blk Time (%)	1	0				
Queuing Penalty (veh)	1	0				

Zone Summary

Zone wide Queuing Penalty: 9

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	R	L	T
Maximum Queue (ft)	151	149	9	68	142	107	223	307	299	127	159	151
Average Queue (ft)	98	102	2	49	83	75	141	253	256	50	100	109
95th Queue (ft)	175	179	10	84	156	121	279	340	325	163	166	169
Link Distance (ft)			1252	1252				294	294	294		492
Upstream Blk Time (%)								4	4			
Queuing Penalty (veh)								30	31			
Storage Bay Dist (ft)	280	280			470	250	250				210	
Storage Blk Time (%)	0	1					0	7				0
Queuing Penalty (veh)	0	1					0	21				0

Intersection: 28: Stanley Blvd & Valley

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	TR
Maximum Queue (ft)	161	60	14	212	175	218
Average Queue (ft)	124	18	4	160	103	151
95th Queue (ft)	177	105	13	234	189	239
Link Distance (ft)	492				567	567
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		180	300	300		
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				

Intersection: 699: Stanley Blvd & Project Driveway

Movement	EB	WB	WB	WB	NB
Directions Served	TR	L	T	T	R
Maximum Queue (ft)	136	4	94	52	34
Average Queue (ft)	27	2	29	18	17
95th Queue (ft)	190	14	107	74	43
Link Distance (ft)	294		272	272	135
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)		250			
Storage Blk Time (%)				0	
Queuing Penalty (veh)				2	

Zone Summary

Zone wide Queuing Penalty: 86

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	L	T	T
Maximum Queue (ft)	96	304	1164	1176	495	110	123	115	142	92	240	300
Average Queue (ft)	65	187	738	738	420	72	85	87	100	48	159	175
95th Queue (ft)	113	368	1271	1280	619	152	157	138	165	118	296	356
Link Distance (ft)			1252	1252				624	624		492	492
Upstream Blk Time (%)			2	3								1
Queuing Penalty (veh)			0	0								0
Storage Bay Dist (ft)	280	280			470	290	290			210		
Storage Blk Time (%)		0	59	43	1						7	9
Queuing Penalty (veh)		0	122	190	3						3	56

Intersection: 28: Stanley Blvd & Valley

Movement	NB	SB	SB	SB	SB	B128
Directions Served	R	L	L	T	TR	T
Maximum Queue (ft)	158	311	324	638	330	232
Average Queue (ft)	61	296	310	468	211	93
95th Queue (ft)	208	342	360	823	353	307
Link Distance (ft)				567	567	541
Upstream Blk Time (%)				12		1
Queuing Penalty (veh)				0		0
Storage Bay Dist (ft)	180	300	300			
Storage Blk Time (%)	0	10	24	0		
Queuing Penalty (veh)	1	33	80	0		

Zone Summary

Zone wide Queuing Penalty: 489

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	L	T	T
Maximum Queue (ft)	77	304	1144	1133	493	106	116	110	119	177	339	417
Average Queue (ft)	53	146	726	733	402	71	76	85	87	95	241	282
95th Queue (ft)	94	334	1293	1279	607	146	152	164	146	201	401	488
Link Distance (ft)			1252	1252				292	292		492	492
Upstream Blk Time (%)			5	5							0	1
Queuing Penalty (veh)			0	0							0	0
Storage Bay Dist (ft)	280	280			470	250	250			210		
Storage Blk Time (%)			59	42	6						16	26
Queuing Penalty (veh)			122	198	22						14	152

Intersection: 28: Stanley Blvd & Valley

Movement	NB	SB	SB	SB	SB	B131	B131
Directions Served	R	L	L	T	TR	T	T
Maximum Queue (ft)	205	312	324	597	492	154	34
Average Queue (ft)	146	286	300	482	298	70	11
95th Queue (ft)	288	355	371	807	531	239	83
Link Distance (ft)				567	567	541	541
Upstream Blk Time (%)				8	0		
Queuing Penalty (veh)				0	0		
Storage Bay Dist (ft)	180	300	300				
Storage Blk Time (%)	1	9	20	0			
Queuing Penalty (veh)	2	31	73	4			

Intersection: 699: Stanley Blvd & Project Driveway

Movement	EB	EB	WB	NB
Directions Served	T	TR	L	R
Maximum Queue (ft)	415	251	72	31
Average Queue (ft)	307	75	39	18
95th Queue (ft)	587	322	98	43
Link Distance (ft)	292	292		127
Upstream Blk Time (%)	8	2		
Queuing Penalty (veh)	70	16		
Storage Bay Dist (ft)			250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 702

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B1032	B1032
Directions Served	L	L	T	T	TR	L	L	T	T	R	T	T
Maximum Queue (ft)	119	127	99	132	148	190	314	592	544	287	71	77
Average Queue (ft)	90	98	59	87	111	139	215	438	427	83	17	17
95th Queue (ft)	145	156	110	152	175	212	364	660	624	379	121	128
Link Distance (ft)			1252	1252				624	624		1982	1982
Upstream Blk Time (%)								2	1			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	280	280			470	290	290			510		
Storage Blk Time (%)							0	18	2	0		
Queuing Penalty (veh)							0	65	15	0		

Intersection: 28: Stanley Blvd & Valley

Movement	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	T	R	L	L	T	TR
Maximum Queue (ft)	188	183	124	52	68	83	144	186
Average Queue (ft)	151	117	90	10	38	59	85	132
95th Queue (ft)	243	241	142	63	76	97	160	202
Link Distance (ft)		492	492				567	567
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	210			180	300	300		
Storage Blk Time (%)	11							
Queuing Penalty (veh)	13							

Zone Summary

Zone wide Queuing Penalty: 94

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	TR	R	L	T
Maximum Queue (ft)	145	156	88	110	143	151	281	311	314	275	184	202
Average Queue (ft)	100	114	63	84	110	83	195	301	302	189	150	136
95th Queue (ft)	188	211	99	127	162	161	362	312	317	319	244	303
Link Distance (ft)			1253	1253				290	290	290		492
Upstream Blk Time (%)							0	37	47	2		
Queuing Penalty (veh)							0	328	414	18		
Storage Bay Dist (ft)	280	280			470	250	250				210	
Storage Blk Time (%)	0	0						42			14	
Queuing Penalty (veh)	0	1						156			22	

Intersection: 28: Stanley Blvd & Valley

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	TR
Maximum Queue (ft)	155	59	85	109	124	160
Average Queue (ft)	106	22	57	73	67	117
95th Queue (ft)	219	97	112	132	127	173
Link Distance (ft)	492				564	564
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		180	300	300		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 699: Stanley Blvd & Project Driveway

Movement	EB	WB	WB	WB	WB	B1032	B1032	NB
Directions Served	TR	L	T	T	T	T	T	R
Maximum Queue (ft)	62	50	350	349	180	1997	2000	30
Average Queue (ft)	12	10	341	342	107	1524	1528	19
95th Queue (ft)	123	90	368	363	249	2554	2549	43
Link Distance (ft)	290		277	277		1982	1982	171
Upstream Blk Time (%)	0		19	28		15	16	
Queuing Penalty (veh)	0		0	0		0	0	
Storage Bay Dist (ft)		250			120			
Storage Blk Time (%)			23	42	0			
Queuing Penalty (veh)			2	375	1			

Zone Summary

Zone wide Queuing Penalty: 1317

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	L	T	T
Maximum Queue (ft)	95	159	379	394	383	137	149	212	243	137	176	166
Average Queue (ft)	70	98	314	323	334	101	112	158	174	83	114	114
95th Queue (ft)	159	223	422	425	410	168	184	231	265	154	203	188
Link Distance (ft)			1252	1252				624	624		492	492
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			470	290	290			210		
Storage Blk Time (%)			12	0				0			1	3
Queuing Penalty (veh)			20	1				0			1	20

Intersection: 28: Stanley Blvd & Valley

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	152	263	272	390	400
Average Queue (ft)	49	186	212	280	310
95th Queue (ft)	172	290	306	439	447
Link Distance (ft)				567	567
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	0	1	2	1	
Queuing Penalty (veh)	0	4	6	10	

Zone Summary

Zone wide Queuing Penalty: 60

Intersection: 28: Stanley Blvd & Valley

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	TR	L	L	T	T	L	T	T
Maximum Queue (ft)	66	159	431	415	415	164	202	259	264	181	213	207
Average Queue (ft)	49	81	315	317	324	122	141	194	197	133	140	139
95th Queue (ft)	75	185	499	476	463	197	238	286	288	224	224	224
Link Distance (ft)			1252	1252				293	293		492	492
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	1			
Storage Bay Dist (ft)	280	280			470	250	250			210		
Storage Blk Time (%)			13	1	1	0	0	1		1	1	3
Queuing Penalty (veh)			21	4	2	0	0	3		2	2	20

Intersection: 28: Stanley Blvd & Valley

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	L	T	TR
Maximum Queue (ft)	159	242	290	417	442
Average Queue (ft)	69	175	211	307	344
95th Queue (ft)	198	275	327	525	536
Link Distance (ft)				567	567
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	180	300	300		
Storage Blk Time (%)	0	0	1	5	
Queuing Penalty (veh)	0	0	5	34	

Intersection: 699: Stanley Blvd & Project Driveway

Movement	EB	EB	WB	NB
Directions Served	T	TR	L	R
Maximum Queue (ft)	66	402	54	42
Average Queue (ft)	13	273	33	22
95th Queue (ft)	130	567	66	51
Link Distance (ft)	293	293		118
Upstream Blk Time (%)	0	7		
Queuing Penalty (veh)	1	59		
Storage Bay Dist (ft)			250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 156

Appendix C

Collision Rate Calculations

INTERSECTION COLLISION RATE CALCULATIONS

City of Pleasanton

Intersection # 1: Valley Avenue & Santa Rita Road

Number of Collisions: 31
Number of Injuries: 18
Number of Fatalities: 0
ADT: 51500
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{31 \times 1{,}000{,}000}{51{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.33 c/mve**	**0.0%**	**58.1%**
Statewide Average*	**0.36 c/mve**	**0.5%**	**39.5%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans

Intersection # 2: Stanley Boulevard & California Avenue-Reflections Drive

Number of Collisions: 5
Number of Injuries: 0
Number of Fatalities: 0
ADT: 17000
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

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

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.16 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.36 c/mve**	**0.5%**	**39.5%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of Pleasanton

Intersection # 3: Valley Avenue & Stanley Boulevard

Number of Collisions: 15
Number of Injuries: 6
Number of Fatalities: 0
ADT: 40100
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{15 \times 1{,}000{,}000}{40{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.20 c/mve**	**0.0%**	**40.0%**
Statewide Average*	**0.36 c/mve**	**0.5%**	**39.5%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans

Intersection # 4: Bernal Avenue & Utah Street

Number of Collisions: 3
Number of Injuries: 2
Number of Fatalities: 0
ADT: 12500
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{12{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.13 c/mve**	**0.0%**	**66.7%**
Statewide Average*	**0.15 c/mve**	**0.8%**	**39.7%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans

INTERSECTION COLLISION RATE CALCULATIONS

City of Pleasanton

Intersection # 5: Bernal Avenue & Nevada Street

Number of Collisions: 1
Number of Injuries: 1
Number of Fatalities: 0
ADT: 12500
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Stop & Yield Controls
Area: Urban

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{12{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.04 c/mve**	**0.0%**	**100.0%**
Statewide Average*	**0.15 c/mve**	**0.8%**	**39.5%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans

Intersection # 6: Bernal Avenue & Vineyard Avenue

Number of Collisions: 8
Number of Injuries: 5
Number of Fatalities: 0
ADT: 17100
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS x 1 MILLION}}{\text{ADT x 365 DAYS PER YEAR x NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{8 \times 1{,}000{,}000}{17{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.26 c/mve**	**0.0%**	**62.5%**
Statewide Average*	**0.36 c/mve**	**0.5%**	**39.5%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2009 Collision Data on California State Highways, Caltrans