Exhibit A
Planning Commission Work Session Discussion Points
March 12, 2014

A. *Is the proposed General Plan land use change, density, and PUD rezoning acceptable?*

B. *Is the proposed positioning of the buildings, on-site circulation, parking location, parking ratio, private open space, common open space, and on-site amenities acceptable?*

C. *Are the building designs, massing, heights, and colors and materials acceptable and compatible with the surrounding area?*

D. *Is the proposed tree removal/replacement plan acceptable?*

E. *Are the proposed Green Building measures and Climate Action Plan measures acceptable?*

F. *What other information would the Planning Commission wish to see to assist its decision on the proposals (i.e. color and material board, photo simulations, etc.)?*

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EXHIBIT B-1

Kottinger Gardens Planned Unit Development Application Narrative

Task Force Planning Process

Kottinger Gardens is the proposed redevelopment of Kottinger Place (50 homes) and Pleasanton Gardens (40 homes) into one integrated affordable housing development with 185 new homes for seniors. The proposed development is the result of thoughtful planning on the part of The Kottinger Place Redevelopment Task Force (Task Force). Formed by the City Council in 2004, the Task Force's goal was to evaluate the condition of the aging senior housing properties located on Kottinger Drive and develop a redevelopment plan that would allow for their continued and expanded use as affordable senior housing. The Task Foce consists of representatives from the City Council, Housing Commission, Parks and Recreation Commission, existing residents, neighbors, and local affordable housing advocates. For nearly ten years, the Task Force has carefully reviewed several options for redevelopment that would meet the City's growing demand for affordable senior housing and address several long-term challenges at both properties, including increasing maintenance requirements and the lack of accessibility and energy-efficient features in the homes. The following Task Force Objectives were established to guide the planning process:

1. Increase the supply of affordable senior housing in Pleasanton;

2. Retain the site's existing character, which has been integral to the historical success of the property, through the inclusion of cottages and open space;

3. Achieve financial efficiency and sustainability both in terms of the amount of public subsidy dollars required and in terms of the long-term management and service delivery at the property;

4. Respect the existing site context and be a good neighbor to the residents of Kottinger Drive and Vineyard by developing a site plan and architecutral details that are complimentary to the neighborhood.

Building Program & Parking

Working with MidPen Housing Corporation and City Staff, the Task Force developed the proposed plan to build 185 new and fully-accessbile homes in a combination of single-, two-, and three-story buildings. It is expected that 183 of the new homes will be affordable to low-income seniors and the remaining 2 homes will be reserved for on-site property managers. The proposed development will also include richly landscaped open space with shared gardens, pedestrian pathways, and a safer pedestrian crossing on Kottinger Drive. MidPen's Property Management and Resident Services will have offices on-site and will provide resident services and programming in the on-site community rooms, resident lounges, and fitness room. Shared laundry facilities with a minimum of one washer/dryer for every ten homes will also be provided on-site for the residents' convenience.

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The proposed parking ratio on both sides of Kottinger Drive is .8:1, which is the same as the current .8:1 parking ratio at Kottinger Place and represents a significant increase to the .47:1 parking ratio currently at Pleasanton Gardens. Car ownership among the existing low-income senior residents also provided a very good indicator and helped determine the proposed parking ratio. Of the 66 residents who responded to the question when asked during resident interviews, only 40 existing households owned a car. This represents a ratio of .6:1, and therefore further supports a .8:1 ratio as more than adequate for residents and visitors. This parking ratio is also higher than what is currently offered at some of Pleasanton's other senior housing properties, such as The Gardens at Ironwood, which has a .7:1 parking ratio. In fact, The Gardens at Ironwood leases 16 additional parking spaces from the neighboring church, which brings their parking ratio to MidPen's proposed .8:1. MidPen is confident that a .8:1 parking ratio will be sufficient at Kottinger Gardens based on its experience developing and managing over 25 affordable senior housing properties, many of which are in similar neighborhoods as Kottinger Gardens.

Kottinger Gardens Site & Parcels

The 6.5 acre site consists of the following four parcels:

1. **240 Kottinger Drive (Kottinger Place) – 3.47 acres**
   Kottinger Place is currently improved with 50 existing affordable senior homes developed in 1972 and owned and operated as a HUD Public Housing property by the City of Pleasanton Housing Authority. There are 32 studio, 16 one-bedroom, and 2 two-bedrooms. The site also includes a small community room, laundry facilities, and open space for gardening and socializing. The existing parking ratio is .8:1, which is sufficient for the current population. The homes are not accessible, making it difficult for residents to age-in-place, and due to demand, the studios often house couples, which can create crowded living environments. The nearly 40-year old homes are also experiencing increasing maintenance and repair needs, which need to be addressed. For these reasons, the Task Force determined that demolition of the existing homes was necessary.

2. **4138 Vineyard Avenue Parcel - .51 acres**
   This parcel is located northwest of the existing Kottinger Place site and is currently vacant. It was purchased by the City of Pleasanton in February 2011 with the redevelopment of Kottinger Place in mind.

3. **4133 Regalia Court - .50 acres**
   This parcel is adjacent to the Kottinger Place and Vineyard Avenue parcels, and is the site of the Regalia House, an under-utilized community facility and its parking. The Regalia House has suffered structural damage and is in poor condition. The proposed parcel is currently a part of Kottinger Village Park and is owned by the City of Pleasanton.

4. **251 Kottinger Drive (Pleasanton Gardens) – 1.95 acres**

Pleasanton Gardens is located directly across Kottinger Drive from the other three parcels and is the site of 40 units of existing affordable senior housing developed in 1970. The site and its improvements are currently owned by Pleasanton Gardens, Inc., a nonprofit entity set up by four local churches in the 1960s. It has many of the same design issues and critical needs as Kottinger Place. In addition some of the existing buildings were constructed over a City culvert and the site has had some drainage issues in the past.

In addition to this PUD Application, MidPen is also requesting a Rezoning and General Plan Amendment that would change the designation on all four parcels to PUD-HDR (Planned Unit Development-High Density Residential). Prior to commencing construction, a formal application will be made to combine the Kottinger Place, Vineyard Avenue, and Regalia Court parcels through a Lot Line Adjustment.

Architecture & Landscape Design

The proposed project's site design, buildings, and landscaping were conceived within the context of Pleasanton's historic downtown, which has roots in both the cottage and farmhouse architectural styles. The buildings downtown are predominantly simple forms with covered front porches that extend the entire width of the home or stoop, lending a sense of symmetry to the building. The materials are generally lap siding with various levels of detailing and trim that is white or a contrasting accent color. The Kottinger Gardens design approach takes a fresh interpretation of these fundamental cottage and farmhouse characteristics, creating design that is suitable for both multi-story and single-story building scales and helping to create a cohesive community. The design creates a pattern of buildings, pedestrian walkways, and gardens that are contextualized, inspired by Pleasanton's downtown, the character of the existing properties, and the surrounding single-family homes.

The proposed project will include one 78,010 square foot two- and three-story building and nine separate single-story buildings ranging in size from 2,830 to 5,800 square feet on the current Kottinger Place, Vineyard Avenue, and Regalia Parcels north of Kottinger Drive. There are a total of 131 homes on this portion of the site, including 126 one-bedroom and 5 two-bedroom homes. One 31,600 square foot two-story building and four separate single-story buildings ranging in size from 1,430 to 8,850 square feet will be located on the current Pleasanton Gardens parcel south of Kottinger Drive. There are a total of 54 homes on this part of the site, including 50 one-bedroom and 4 two-bedroom homes.

The apartments were designed with the future residents in mind, and include ample storage, private patios/balconies, and accessibility features to help residents age-in-place and live independently for as long as possible. A typical one-bedroom home is 584 square feet and a two-bedroom home is 842 square feet. Shared indoor amenities include community rooms on both sides of the street for resident gatherings, resident lounges with computers, a fitness room for group exercise classes, and on-site resident services programming and coordination.

The landscape design provides a hierarchy of outdoor spaces ranging from public to private, seeking to foster a healthy senior community by facilitating social interaction. This hierarchy provides a variety of opportunities for residents to interact with the outdoor space at different times during the day or year. Distinctly themed neighborhood commons can foster a sense of community. There are a variety of outdoor spaces programmed for relaxing, socializing, and recreation. These include large common open spaces adjacent to the community rooms on both sides of Kottinger Drive, as well as a patchwork of courtyards and shared vegetable gardens. Each upper floor home has a private deck, which overlook gardens and toward the surrounding hills and horizon.

The landscape design incorporates as many of the existing healthy and suitable trees as possible. In some cases, the final location of the homes was adjusted to protect the best trees and many have become focal features scattered throughout the project. Using the Arborist's Report as a guide, the Kottinger Gardens design team evaluated each existing tree to determine overall suitability for the proposed development. Each tree's location, species, and health was taken into consideration. Of the 146 trees evaluated on-site, 22 trees will be retained and 124 will be removed. The landscape plan proposes to plant approximately 100 new trees on the site. MidPen will be proactive, working with the City and neighbors to identify new tree species as early as possible, and potentially plant new trees along the site perimeter prior to the start of construction to ensure adequate landscape screening.

Plant materials will provide seasonal interest and the plant palette will reflect the architectural character. In addition to the common gardens, a private porch or balcony can accommodate garden ornamentation, and provide an opportunity for residents to personalize their individual space. An automatic water-efficient irrigation system, Bay-Friendly landscape practices for healthy soil and water conservation, and selection of plants that are well-adapted to the local climate and setting will aid overall long-term maintenance. Additionally, planting design will consider the ultimate size of individual species at maturity to minimize need for pruning and green waste.

The adjacent park setting will help maintain the open space feel and character that exists today. An internal path system will link to the perimeter park trail at multiple locations, encouraging residents to access and enjoy park amenities. Visiting grandchildren will be able to enjoy the park's tot lot, and residents will have the opportunity to interact with the greater Pleasanton community as they walk through the park. While it is important to integrate with the park, it is also important to clearly distinguish the Kottinger Gardens open space system and paths. Where the internal path system intersects with the public path on the perimeter, the landscape portals will be designed to distinctly identify these private pedestrian entries.

Construction Phasing & Resident Relocation

The proposed project will involve a limited amount of temporary resident relocation to accommodate the new construction. In order to minimize the number of households who will need to move off-site in order to build the new homes, the construction will be phased. This will allow a majority of residents to stay in their current homes until their new home is constructed and ready for move-in. The first phase is expected to occur on the Vineyard Avenue Parcel, Regalia Parcel, and a portion of the Kottinger Place Parcel. The second phase would include the remainder of the Kottinger Place Parcel and the entire Pleasanton Gardens Parcel. MidPen has communicated frequently with the residents to inform them of their relocation rights and has engaged a relocation consultant to ensure that all relocation activities are conducted according to Federal and State laws and requirements.

Community Outreach & Engagement
An important component of the Task Force's planning process included extensive community outreach to the existing senior residents and neighbors. Since March, 2012, the Task Force has held eleven meetings to discuss the site planning and redevelopment. All of their meetings were open to members of the public and were often well-attended by interested residents and neighbors.

MidPen Housing Corporation conducted individual interviews with each existing resident to understand their likes and dislikes about their current homes and to inform them about the proposed redevelopment plans. In addition to the individual interviews, MidPen held several group resident meetings and also conducted a resident survey to receive important feedback about their interior and exterior design preferences. MidPen also met individually with many of the neighbors and held a neighborhood meeting in July, 2013. With over fifty people in attendance, neighbors received an overview of the proposed plan and were then provided an opportunity to speak directly with key members of the Kottinger Gardens design, development, and operations teams. The proposed site plan reflects the thoughtful and informative resident and neighborhood feedback received during the outreach process.

The project design respects the site's existing character, is thoughtful about building height and location in relationship to the neighborhood, and provides accessible homes in a variety of building types. These design elements reflect the invaluable input MidPen received from the Task Force, residents, and neighbors. MidPen is enthusiastic about the redevelopment of Kottinger Place and Pleasanton Gardens, and believes that the Task Force's thorough planning process and extensive community outreach have informed a well-designed project that will serve as a positive community asset for years to come.

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KOTTINGER GARDENS COLOR PALETTE

HARDIE BOARD AND BATTEN SIDING	ELDER CREEK	BARNWOOD	BLUFF STONE	NOTTINGHAM FOREST	PORCH SWING	MOUNT TAM
HARDIE HORIZONTAL LAP SIDING	ELDER CREEK	BARNWOOD	BLUFF STONE	NOTTINGHAM FOREST	PORCH SWING	
BUILDING BODY PAINT COLORS	ELDER CREEK	BARNWOOD	BLUFF STONE	NOTTINGHAM FOREST	PORCH SWING	MOUNT TAM
ROOF/DOOR AND ACCENT COLORS	GAF "CHARCOAL"	SNOWGLOBE WHITE	TIFFANY AMBER	NECTAR OF THE GODS	DAPPER GREY HOUND	SEVILLE SCARLET

*** ALL PAINT COLORS ARE KELLEY MOORE**

EXHIBIT C

GreenPoint Rated Checklist: Multifamily

The GreenPoint Rated checklist tracks green features incorporated into the home. **A home is only GreenPoint Rated if all features are verified by a Certified GreenPoint Rater through Build It Green**. GreenPoint Rated is provided as a public service by Build It Green, a professional non-profit whose mission is to promote healthy, energy and resource efficient buildings in California.

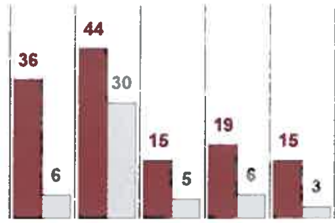
The minimum requirements for a GreenPoint Rated home are: Earn a total of 50 points or more; obtain the following minimum points per category: Community (6), Energy (30), Indoor Air Quality/Health (5), Resources (6), and Water (3); and meet the prerequisites A2a, E2a, H4a. (for 2008 permitted projects), J1a, N1. and Q0.

This checklist accommodates the verification of mandatory CALGreen measures but does not signify compliance unless accepted by jurisdictional authority. All CALGreen measures within the checklist must be selected as "Yes" or "n/a" for compliance with GreenPoint Rated. Build It Green is not a code enforcement agency.

The green building practices listed below are described in the GreenPoint Rated Multifamily Rating Manual. For more information please visit **www.builditgreen.org/greenpointrated.**

GreenPointRATED
A PROGRAM OF BUILD IT GREEN

Total Targeted Points: **129**



Multifamily New Home 2.2 / 2008 Title 24

REQUIRED: ENTER FLOOR AREAS AND LANDSCAPED AREA BEFORE BEGINNING CHECKLIST

Enter Total Conditioned Floor Area of the Project:	**98779**
Enter Total Non-Residential Floor Area of Project:	**0**
Percent of Project Dedicated to Residential Use	**100%**
Percentage of Site Dedicated to Landscaping	**0%**

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	AA. COMMUNITY DESIGN AND PLANNING		Possible Points					
	1. Develop Infill Sites							
Yes	a. Project is an Urban Infill Development	1	1					
28.2	b. Conserve Resources by Increasing Density -15 Units Per Acre or Greater (1 Point for every additional 5 dwelling units/acre) *Enter Project Density Number (In du/acre)*	3	10					
TBD	c. Project Includes the Redevelopment of At Least One Existing Building	0				1		
No	d. Build on Designated Brownfield Site or City-Designated Redevelopment Area	0	1					
	2. Design for Walking & Bicycling							
Yes	a. Sidewalks Are Buffered from Roadways & Are 5 Feet Wide (8 Feet in Retail Areas)	1	1					
Yes	b. Install Traffic Calming Strategies	1	1					
Yes	c. Provide Dedicated, Covered & Secure Bicycle Storage for 15% of Residents	1	1					
Yes	d. Provide Secure Bicycle Storage for 5% of Non-Residential Tenant Employees & Visitors	1	1					
	3. Alternative Transportation							
	a. Site has Pedestrian Access Within ½ Mile of Community Services:							
8	TIER 1: *Enter number of services within ½ Mile:*							
	1) Day Care 2) Community Center 3) Public Park							
	4) Drug Store 5) Restaurant 6) School							
	7) Library 8) Farmer's Market 9) After School Programs							
	10) Convenience Store Where Meat & Produce are Sold							
8	TIER 2: *Enter number of services within ½ Mile:*							
	1) Bank 2) Place of Worship 3) Laundry/Cleaners							

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	4) Hardware 5) Theater/Entertainment 6) Fitness/Gym 7) Post Office 8) Senior Care Facility 9) Medical/Dental 10) Hair Care 11) Commercial Office or Major Employer 12) Full Scale Supermarket							
	i. 5 Services Listed Above (Tier 2 Services Count as 1/2 Service Value)	1	1					
	ii. 10 Services Listed Above (Tier 2 Services Count as 1/2 Service Value)	1	1					
	b. Proximity to Public Transit: Development is Located Within							
Yes	i. 1/4 Mile of One Planned or Current Bus Line Stop	1	1					
TBD	ii. 1/2 Mile of a Major Transit Stop (Commuter Train/Light Rail Transit System OR Two or More Planned/Current Bus Line Stops	0	1					
	c. Reduced Parking Capacity							
TBD	i. Less than 1.5 Parking Spaces Per Unit	1	1					
Yes	ii. Less than 1.0 Parking Spaces Per Unit	1	1					
	4. Mixed-Use Developments							
No	a. At least 2% of Development Floor Space Supports Mixed-Use (Non-Residential Tenants)	0	1					
No	b. Half of the Non-Residential Floor Space is Dedicated to Community Services (See AA3a)	0	1					
	5. Outdoor Gathering Places							
Yes	a. Private or Semi-Public Outdoor Gathering Places for Residents (Minimum of 50 sf Per Unit) (mutually exclusive with AA5b)	1	1					
Yes	b. Outdoor Gathering Place of Compact Site Provides Natural Elements (mutually exclusive with AA5a) (Projects Must Be a Minimum of 50 du/acre)	0	1					
Yes	c. Public Outdoor Gathering Places have Direct Access to At Least Two Tier 1 Community Services (See AA3a)	1	1					
	6. Design for Safety and Vandalism Deterrence							
Yes	a. Residence Entries Have Views to Callers (Windows or Double Peep Holes) & Can Be Seen By Neighbors	1	1					
TBD	b. All Main Entrances to the Building and Site are Prominent and Visible from the Street	0	1					
	7. Passive Solar Design							
Yes	a. Provide Appropriate Orientation for Maximum Energy Efficiency	2		2				
No	b. Provide Appropriate Shading On All South-Facing Windows for Effective Passive Solar Control	0		1				
TBD	c. Provide Thermal Mass	0		2				
	8. Adaptable Buildings							
	a. Include Universal Design Principles in Units							
TBD	i. 50% of Units	1	1					
Yes	ii. 80% of Units	1	1					
No	b. Live/Work Units Include A Dedicated Commercial Entrance	0	1					
	9. Affordability							
	a. Units are Dedicated to Households Making 80% or Less of AMI							
TBD	i. 10% of All Units	1	1					
TBD	ii. 25%	1	1					
Yes	iii. 50% or More	1	1					
TBD	b. Development Includes Multiple Bedroom Units (Minimum of 2 3-Bdrm Units At or Less Than 80% AMI)	0	1					

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
No	c. At least 20% of Units at 120% or Less of AMI are For-Sale	0	1					
	Total Available Points in Community Design and Planning: 42	23						
A. SITE			Possible Points					
	1. Protect Topsoil and Minimize Disruption of Existing Plants & Trees							
Yes	a. Protect Topsoil and Reuse After Construction	2	1			1		
Yes	b. Limit and Delineate Construction Footprint for Maximum Protection	1				1		
	2. Divert/Recycle Job Site Construction Waste (Including Green Waste and Existing Structures)							
Yes	a. Required: Divert 50% (by weight) of All Construction & Demolition Waste (Recycling or Reuse) (CALGreen code)	Y				R		
TBD	b. Divert 100% of Asphalt and Concrete and 65% (by weight) of Remaining Materials	0				2		
TBD	c. Divert 100% of Asphalt and Concrete and 80% (by weight) of Remaining Materials	0				2		
	3. Construction Environmental Quality Management Plan, Duct Sealing, and Pre-Occupancy Flush-Out [*This credit is a requirement associated with PJ1: EPA IAP]							
Yes	a. Duct openings and other related air distribution component openings shall be covered during construction. (CALGreen code if applicable)	1			1			
Yes	b. Full environmental quality management plan and pre-occupancy flush out is conducted (Prerequisite is A5a)	1			1			
Yes	**4. Use Recycled Content Aggregate (Minimum 25%)**	1				1		
TBD	**5. Cool Site: Reduce Heat Island Effect on Site**	0	1					
	Total Available Points in Site: 11	6						
B. LANDSCAPE			Possible Points					
No	**1. Landscaping** *Is the landscape ≥ 10% of the site area? Sites with less than 10% of the total site area dedicated to landscaping can only earn up to 4 points for measure B1a through B1g. Calculate the landscape area percentage by dividing the landscape area by the total site area. Include the building footprint(s) and all other developed portions of the site up to the site boundary.*							
Yes	a. Group Plants by Water Needs (Hydrozoning)	2					2	
Yes	b. Mulch All Planting Beds to the Greater of 3 Inches or Local Water Ordinance Requirement	2					2	
	c. Construct Resource-Efficient Landscapes							
Yes	i. No Invasive Species Listed by Cal-IPC Are Planted	0				1		
Yes	ii. No Plant Species will Require Shearing	0				1		
TBD	iii. 75% of Plants are Drought-tolerant, California Natives, Mediterranean or Other Appropriate Species	0					3	
	d. Minimize Turf in Landscape Installed by Builder							
Yes	i. Turf Shall Not Be Installed on Slopes Exceeding 10% and No Overhead Sprinklers Installed in Areas Less than 8 Feet Wide	0					2	
Yes	ii. Turf Is ≤ 25% of Landscaped Area	0					2	
	e. Install High-Efficiency Irrigation Systems							
Yes	i. System Uses Only Low-Flow Drip, Bubblers or Sprinklers	0					2	
Yes	ii. System Has Smart (Weather-based) Controller (CALGreen code if applicable)	0					3	
Yes	f. Incorporate Two Inches of Compost in the Top 6 to 12 Inches of Soil	0					3	
	g. Design Landscape to Meet Water Budget							

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
Yes	i. Install Irrigation System That Will Be Operated at <70% Reference ET (B1a. and B1b. are Prerequisites for Credit)	0					1	
No	ii. Install Irrigation System That Will Be Operated at <50% Reference ET (B1a., B1b. and B1ei. or B1eii. are Prerequisites for Credit)	0					1	
Yes	h. Incorporate Community Garden	1	1					
	2. Source Water Efficiency							
No	a. Use Recycled Water for Indoor and/or Outdoor Water Use	0					2	
No	b. Use Rainwater for Indoor and/or Outdoor Water Use	0					4	
	3. Outdoor Play Structures and Outdoor Furniture							
No	a. Play Structures & Surfaces Have an Average Recycled Content ≥20%	0				1		
Yes	b. Environmentally Preferable Exterior Site Furnishings	1				1		
Yes	**4. Reduce Light Pollution by Shielding Fixtures and Directing Light Downward**	1	1					
	Total Available Points in Landscape: 33	7						
C. DESIGN CONSIDERATIONS			Possible Points					
	1. Acoustics: Noise and Vibration Control (minimum 2 points for credit, including 1 Tier 1 measure, maximum of 4 points)							
TBD	TIER 1: 1) Exterior Noise Reduction	0	1					
Yes	2) Loud Single-Event Noise Reduction in Noise-Sensitive Spaces	1	1					
Yes	3) Airborne and Structure-borne Noise Reduction (e.g., walls, floor-ceilings)	1	1					
Yes	4) Mechanical Ventilation Noise and Vibration Control	1	1					
Yes	5) Plumbing Noise and Vibration Reduction	1	1					
TBD	TIER 2: 1) Minimize Stair Impact Noise	0	0.5					
TBD	2) Minimize Floor Squeaks	0	0.5					
TBD	3) Minimize Trash Chute Noise	0	0.5					
TBD	4) Mixed-Use Noise and Vibration Reduction	0	0.5					
	2. Mixed-Use Design Strategies							
TBD	a. Develop Green Tenant Improvement Requirements for Build Outs	0	2					
TBD	b. Commercial Loading Area Separated from Residential area	0			1			
TBD	c. Separate Mechanical and Plumbing Systems	0			1			
	3. Commissioning							
TBD	a. Design Phase (Define Owner's Project Requirements, Basis of Design, and Develop Plan)	0		1	1			
TBD	b. Construction Phase (Perform Functional Testing)	0		2				
TBD	c. Post-Construction Phase (Verify Compliance, Commissioning Report, Training and Warranty Review)	0	1	1				
	Total Available Points in Design Considerations: 14	4						
D. FOUNDATION, STRUCTURAL FRAME & BUILDING ENVELOPE			Possible Points					
≥20%	**1. Replace Portland Cement in Concrete with Recycled Fly Ash and/or Slag (Minimum 20%)**	2				3		
TBD	**2. Design, Build and Maintain Structural Pest and Rot Controls (for low-rise projects)**	0			1	1		
	3. Construction Material Efficiencies							
TBD	a. Wall and Floor Assemblies (excluding solid wall assemblies) are Delivered Panelized from Supplier (Minimum of 80% square feet)	0				1		
TBD	b. Modular Components are Delivered Assembled to the Project (Minimum 25%)	0				6		

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	c. Optimal Value Engineering							
Yes	i. Studs at 24 Inch on Center at Interior Non-Bearing Walls and Top Floor	1				1		
Yes	ii. Door & Window Headers Sized for Load	1				1		
TBD	iii. Use Only Cripple Studs Required for Load	0				1		
	4. Use Engineered Lumber							
TBD	a. Engineered Beams and Headers	0				1		
Yes	b. Wood I-Joists or Web Trusses for Floors	1				1		
TBD	c. Engineered Lumber for Roof Rafters	0				1		
TBD	d. Engineered or Finger-Jointed Studs for Vertical Applications	0				1		
Yes	e. Oriented Strand Board for Subfloor	1				1		
TBD	f. Oriented Strand Board for Wall and Roof Sheathing	0				1		
TBD	**5. Insulated Headers**	0		1				
	6. Use FSC-Certified Wood							
TBD	a. Dimensional Lumber, Studs and Timber (Minimum 40%)	0				4		
TBD	b. Panel Products (Minimum 40%)	0				2		
Yes	**7. Energy Heels on Roof Trusses for Low-Rise Projects**	1		1				
	8. Use Solid Wall Systems (Includes SIPS, ICFs, & Any Non-Stick Frame Assembly)							
TBD	a. Floors	0				2		
TBD	b. Walls	0				2		
TBD	c. Roofs	0				1		
	Total Available Points in Foundation, Structural Frame & Building Envelope: 34	7						
E. EXTERIOR			Possible Points					
	1. Drainage Planes and Durable Siding							
TBD	a. Install a Rain Screen Wall System	0				2		
Yes	b. Use Durable and Non-Combustible Siding Materials	1				1		
	2. Durable Roofing Options							
Yes	a. ***Required:*** All Roofing Has 3-Year Subcontractor Warranty and a 20-Year Manufacturer Warranty	Y				R		
Yes	b. Use Durable and Fire Resistant Roofing Materials or Assembly	1				1		
TBD	**3. Vegetated Roof** (2 points for 25%, 4 points for 50%)	0	4					
	Total Available Points in Exterior: 8	2						
F. INSULATION			Possible Points					
	1. Install Insulation with 75% Recycled Content							
TBD	a. Walls	0				1		
TBD	b. Ceilings	0				1		
TBD	c. Floors	0				1		
	Total Available Points in Insulation: 3	0						
G. PLUMBING			Possible Points					
	1. Water Efficient Fixtures							
	a. Install High Efficiency Toilets (Dual Flush or ≤ 1.28 Gallons Per Flush (gpf)) (CALGreen code if applicable)							
Yes	i. In All Residences	2					2	
Yes	ii. In All Non-Residential Areas	0					0	

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	b. High Efficiency Urinals or No-Water Urinals Are Specified:							
Yes	i. Average Flush Rate is ≤0.5 gpf (CALGreen code if applicable)	1					1	
TBD	ii. Average Flush Rate is ≤0.1 gpf	0					1	
Yes	c. High Efficiency Showerheads Use ≤ 2.0 Gallons Per Minute (gpm) at 80 psi (CALGreen code if applicable)	3					3	
	d. Flow Limiters Or Flow Control Valves Are Installed on All Faucets							
Yes	i. Residences: Kitchen - ≤ 1.8 gpm (CALGreen code if applicable)	1					1	
Yes	ii. Non-Residential Areas: Kitchen - ≤ 1.8 gpm (CALGreen code applicable)	0					0	
Yes	iii. Residences: Bathroom Faucets- ≤ 1.5 gpm at 60psi	1					1	
TBD	iv. Non-Residential Areas: Bath Faucets - ≤ .5 gpm or .25 gal for meter faucets (CALGreen code if applicable)	N					0	
	2. Distribute Domestic Hot Water Efficiently (G2a is a Prerequisite for credit for G2 b-e. Maximum 5 Points)							
TBD	a. Insulate All Hot Water Pipes [*This credit is a requirement associated with PJ1: EPA IAP]	0		1			1	
TBD	b. Use Engineered Parallel Plumbing	0					1	
TBD	c. Use Engineered Parallel Plumbing with Demand Controlled Circulation Loop(s)	0					1	
TBD	d. Use Traditional Trunk, Branch and Twig Plumbing with Demand Controlled Circulation Loop(s)	0		1			2	
TBD	e. Use Central Core Plumbing	0		1		1	1	
No	**3. Water Submetering: Bill Tenants for Actual Usage**	0					4	
	Total Available Points in Plumbing: 18	8						
H. HEATING VENTILATION AND AIR CONDITIONING			Possible Points					
No	**1. Install High Performing Zoned Radiant Hydronic Heating**	0			2			
TBD	**2. Install High Efficiency Air Conditioning with Environmentally Preferable Refrigerants**	0	1					
	3. Advanced Ventilation Practices for Cooling							
TBD	a. Operable Windows or Skylights Are Placed To Induce Cross Ventilation In At Least One Room In 80% of Units	0		1	1			
	b. Mechanical Ventilation System for Cooling:							
TBD	i. ENERGY STAR Ceiling Fans and Light Kits in Living Areas & All Bedrooms	0		1				
TBD	ii. Whole House Fan (CALGreen code if applicable)	0		1				
	4. Advanced Mechanical Ventilation for IAQ							
Yes	a. ***Required:*** Compliance with ASHRAE 62.2 Mechanical Ventilation Standard (As Adopted in Title 24 Part 6). *N/A for projects permitted under 2005 Title 24.*	Y			R			
TBD	b. Advanced Ventilation Practices (Continuous Operation, Sone Limit, Minimum Efficiency, Minimum Ventilation Rate, Homeowner Instructions)	0			1			
TBD	c. Outdoor Air Ducted to Bedroom and Living Areas of Home	0			2			
Yes	d. ENERGY STAR Bathroom Fans on Timer or Humidistat (CALGreen code if applicable)	1			1			
No	**5. Garage Ventilation Fans Are Controlled by Carbon Monoxide Sensors** (Passive Ventilation Not Eligible) [*This credit is a requirement associated with PJ1: EPA IAP]	0			1			
Yes	**6. Install Carbon Monoxide Alarms** (or No Combustion Appliances in Living Space and No Attached Garage) [*This credit is a requirement associated with PJ1: EPA IAP]	1			1			
	Total Available Points in Heating Ventilation and Air Conditioning: 13	2						

	KOTTINGER GARDENS (DRAFT) 1/13/14	Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
I. RENEWABLE ENERGY			Possible Points					
TBD	**1. Solar Hot Water System Preheats Domestic Hot Water**	0		4				
	2. Offset a Percentage of the Project's Estimated Electricity Demand with Onsite Renewable Generation							
Yes	a. 60% of Common Area Load	4	2	2				
No	b. 90% of Common Area Load	0	2	2				
No	c. 10% or More of Residential Units Load	0	2	2				
	Total Available Points in Renewable Energy: 16	**4**						
J. BUILDING PERFORMANCE			Possible Points					
	1. Building Performance Exceeds Title 24							
2008	*Is project permitted under 2005 Title 24 or 2008 Title 24?*							
	Enter the Percent Better Than Title 24 for Residential and Non-Residential Portions of the Project.							
15%	a. ***Required:*** Residences: Minimum 15% Better Than Title 24. 2 Points for Every 1% Better Than Title 24	**30**		30+				
15%	b. Non-Residential Spaces: 1 Point for Every 1% Better Than Title 24, adjusted for square footage	0		1+				
	2. Building Envelope Diagnostic Evaluations							
TBD	a. Duct Testing Results in Leakage < 6% [*This credit is a requirement associated with PJ1: EPA IAP]	0		1				
TBD	b. Blower Door Testing Results for Air Change per Hour is < 3.5 ACH_{50} [*This credit is a requirement associated with PJ1: EPA IAP]	0		2				
TBD	c. Verify Quality of Insulation Installation & Thermal Bypass Checklist before Drywall [*This credit is a requirement associated with PJ1: EPA IAP]	0		1				
TBD	**3. Design and Build Near Zero Energy Homes** *(Enter number of points, minimum of 2 and maximum of 6 points)*	0		6				
Yes	**4. Title 24 Prepared and Signed by a CABEC Certified Energy Plans Examiner (CEPE)**	1		1				
	5. Participation in Utility Program with Third Party Plan Review							
TBD	a. Energy Efficiency Program [*This credit is a requirement associated with PJ1: EPA IAP]	0		1				
TBD	b. Renewable Energy Program with Min. 30% Better Than Title 24 (High Performing Home)	0		1				
	Total Available Points in Building Performance: 43+	31						
K. FINISHES			Possible Points					
	1. Entryways							
Yes	a. Design Entryways to Reduce Tracked-In Contaminants for All Home Entrances	1			1			
TBD	b. Permanent Walk-Off Systems Are Provided at All Main Building Entrances & In Common Areas	0			1			
TBD	**2. Use Recycled Content Paint**	0				1		
	3. Low/No-VOC Paints & Coatings [*This credit is a requirement associated with PJ1: EPA IAP]							
	a. Low-VOC Interior Wall/Ceiling Paints (<50 grams per liter (gpl) VOCs regardless of sheen) (CALGreen code if applicable)							
Yes	i. In All Residences	1			1			
Yes	ii. In All Non-Residential Areas	0			0			
	b. Zero-VOC: Interior Wall/Ceiling Paints (<5 gpl regardless of sheen)							
TBD	i. In All Residences	0			1			
TBD	ii. In All Non-Residential Areas	0			0			

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	c. Use Low-VOC Coatings That Meet SCAQMD Rule 1113 (CALGreen code if applicable)							
Yes	i. In All Residences	2			2			
Yes	ii. In All Non-Residential Areas	0			0			
Yes	**4. Use Low VOC Caulks, Construction Adhesives and Sealants that Meet SCAQMD Rule 1168 (CALGreen code if applicable)**	1			1			
	5. Environmentally Preferable Materials for Interior Finish: A) FSC-Certified Wood, B) Reclaimed Lumber, C) Rapidly Renewable, D) Recycled-Content, E) Finger-Jointed, or F) Local							
	a. Residences: At Least 50% of Each Material:							
TBD	i. Cabinets	0				4		
TBD	ii. Interior Trim	0				2		
TBD	iii. Shelving	0				2		
TBD	iv. Doors	0				2		
TBD	v. Countertops	0				2		
	b. Non-Residential Areas: At Least 50% of Each Material:							
TBD	i. Cabinets	0				0		
TBD	ii. Interior Trim	0				0		
TBD	iii. Shelving	0				0		
TBD	iv. Doors	0				0		
TBD	v. Countertops	0				0		
Yes	**6. Reduce Formaldehyde in Interior Finish – Meet Current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates (CALGreen code if applicable) [*This credit is a requirement associated with PJ1: EPA IAP]**	Y			0			
	7. Reduce Formaldehyde in Interior Finish - Exceed Current CARB ATCM for Composite Wood Formaldehyde Limits Prior to Mandatory Compliance Dates							
	a. Residences: At Least 90% of Each Material:							
Yes	i. Doors	1			1			
Yes	ii. Cabinets and Countertops	2			2			
TBD	iii. Interior Trim and Shelving	0			1			
	b. Non-Residential Areas: At Least 90% of Each Material							
Yes	i. Doors	0			0			
Yes	ii. Cabinets and Countertops	0			0			
Yes	iii. Interior Trim and Shelving	0			0			
	8. Durable Cabinets							
Yes	a. Residences	1				1		
Yes	b. Non-Residential Areas	0				0		
Yes	**9. At Least 25% of All Newly Supplied Interior Furniture has Environmentally Preferable Attributes**	1				1		
	Total Available Points in Finishes: 26	**10**						
L. FLOORING			Possible Points					

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	1. Use Environmentally Preferable Flooring (Minimum 15% of Floor Area) A) FSC-Certified Wood, B) Reclaimed or Refinished, C) Rapidly Renewable, D) Recycled-Content, E) Exposed Concrete, or F) Local. *Flooring Adhesives Must Meet SCAQMD Rule 1168 for VOCs*							
TBD	a. Residences	0				4		
≥50%	b. Non-Residential Areas	0				0		
	2. Low-Emitting Flooring [*This credit is a requirement associated with PJ1: EPA IAP]							
Yes	a. Residences: Low Emitting Flooring (50% Minimum) (Section 01350, CRI Green Label Plus, Floorscore)	2			2			
Yes	b. Non-Residential Areas: Low-Emitting Flooring (50% Minimum) (Section 01350, CRI Green Label Plus, Floorscore)	0			0			
Yes	**3. All carpet and 50% of Resilient Flooring is low emitting.** (CALGreen code if applicable)	Y			0			
	Total Available Points in Flooring: 6	2						
M. APPLIANCES & LIGHTING			Possible Points					
	1. ENERGY STAR Appliances							
TBD	a. Install ENERGY STAR Dishwasher (Must Meet Current Specifications)	0		1			1	
	b. install ENERGY STAR Clothes Washer							
Yes	i. Meets ENERGY STAR and CEE Tier 2 Requirements (Modified Energy Factor ≥2.0; Water Factor ≤6.0) (Total 3 Points)	3		1			2	
TBD	ii Meets ENERGY STAR and CEE Tier 3 Requirements (Modified Energy Factor ≥2.2; Water Factor ≤4.5) (Total 5 Points)	0					2	
	c. Install ENERGY STAR Refrigerators in All Locations							
Yes	i. ENERGY STAR-Qualified & < 25 Cubic Feet Capacity	1		1				
Yes	ii. ENERGY STAR-Qualified & < 20 Cubic Feet Capacity	1		1				
Yes	**2. Common Laundry Facilities Are Provided for All Occupants**	1				1		
TBD	**3. Provide Built-In Recycling Center in Each Residential Unit**	0				1		
	4. Low-Mercury Lamps							
Yes	a. Low-Mercury Products Are Installed Wherever Linear Fluorescent Lamps Are Used or Replaced	1				1		
Yes	b. Low-Mercury Products Are Installed Wherever Compact Fluorescent Lamps Are Used or Replaced	1				1		
	5. Install High-Efficacy Lighting and Design Lighting System							
Yes	a. Install High-Efficacy Lighting	1		1				
TBD	b. Install a Lighting System to IESNA Footcandle Standards or Hire Lighting Consultant	0		1				
TBD	**6. Gearless Elevators Are Installed**	0		1				
	Total Available Points in Appliances & Lighting: 16	9						
N. OTHER			Possible Points					
Yes	**1.** ***Required:*** **Incorporate GreenPoint Rated Checklist in Blueprints** [*This credit is a requirement associated with PJ1: EPA IAP]	Y	R					
Yes	**2. Pre-Construction Kick-Off Meeting with Rater and Subs**	1	1					
	3. Operations & Maintenance Manuals and Training [*This credit is a requirement associated with PJ1: EPA IAP]							
Yes	a. Provide O&M Manual to Building Maintenance Staff (CALGreen code if applicable)	1		1				
Yes	b. Provide O&M Manual to Occupants and Orientation	2		1			1	

KOTTINGER GARDENS (DRAFT) 1/13/14

	KOTTINGER GARDENS (DRAFT) 1/13/14	Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
TBD	**4. Residents Are Offered Free or Discounted Transit Passes**	0	2					
Yes	**5. Educational Signage of Project's Green Features**	1	1					
Yes	**6. Install Home/Building System Monitor(s)**	1		1				
Yes	**7. Use Vandalism Deterrence Practices and Develop Vandalism Management Plan**	1	1					
	Total Available Points in Other: 9	7						
O. (Not Used)								
P. INNOVATIONS			Possible Points					
	A. Site							
	1. Stormwater Control: Prescriptive Path (Maximum of 3 Points, Mutually Exclusive With PA2)							
TBD	a. Use Permeable Paving for 25% of Driveways, Patios and Walkways	0	1					
Yes	b. Install Bio-Retention and Filtration Features	2	2					
Yes	c. Route Downspout Through Permeable Landscape	1	1					
Yes	d. Use Non-Leaching Roofing Materials	0	1					
TBD	e. Include Smart Street/Driveway Design	0	1					
	2. Stormwater Control: Performance Path (Mutually Exclusive With PA1):	0						
TBD	Perform a Soil Percolation Test and Capture and Treat 85% of Total Annual Runoff	0	3					
	D. Foundation, Structural Frame and Building Envelope							
TBD	1. Use Radon Resistant Construction [*This credit is a requirement associated with PJ1: EPA IAP]	0			2			
TBD	2. Install a Foundation Drainage System [*This credit is a requirement associated with PJ1: EPA IAP]	0				2		
TBD	3. Moisture Controlled Crawlspace [*For projects with crawlspaces, this credit is a requirement associated with PJ1: EPA IAP]	0			2			
	E. Exterior							
Yes	1. Flashing Installation Techniques Specified and Third-Party Verified [*This credit is a requirement associated with PJ1: EPA IAP]	1				1		
	H. Heating Ventilation and Air Conditioning							
TBD	1. Design and Install HVAC System to ACCA Manual J, D, and S Recommendations (CALGreen code if applicable) [*This credit is a requirement associated with PJ1: EPA IAP]	0		4				
TBD	2. Pressure Relieve the Ductwork System (Mutually exclusive with H1) [*For projects with ducted systems, this credit is a requirement associated with PJ1: EPA IAP]	0		1				
Yes	3. Install High Efficiency HVAC Filter (MERV 6+, Mutually exclusive with H1.) [*This credit is a requirement associated with PJ1: EPA IAP]	1		1				
	J. Building Performance							
TBD	1. Obtain EPA Indoor airPlus Certification *(Total 39 possible points, not including Title 24 performance; read comment)*	0		2				
TBD	2. Third-Party Testing of Mechanical Ventilation Rates for IAQ (Meet ASHRAE 62.2) [*This credit is a requirement associated with PJ1: EPA IAP]	0			2			
TBD	3. ENERGY STAR New Homes: High-Rise Pilot Program	0		1				
	K. Finishes							
Yes	1. Use Moisture Resistant Material in Wet Areas: Kitchens, Bathrooms, Utility Rooms and Basements [*This credit is a requirement associated with PJ1: EPA IAP]	2			1	1		
TBD	2. Materials Meet SMaRT Criteria *(Select number of points, up to 5 points)*	0				5		

KOTTINGER GARDENS (DRAFT) 1/13/14

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
	N. Other							
	1. Innovation: List innovative measures that meet green building objectives. Enter in the number of points in each category in the blue cells for a maximum of 4 points for the measure. The "points achieved" column will be automatically fill in based on the sum of the points in each category. Points and measures will be evaluated by Build It Green.							
TBD	Innovation: Enter up to 4 Points in blue cells at right. Enter description here	0						
TBD	Innovation: Enter up to 4 Points in blue cells at right. Enter description here	0						
TBD	Innovation: Enter up to 4 Points in blue cells at right. Enter description here	0						
TBD	Innovation: Enter up to 4 Points in blue cells at right. Enter description here	0						
TBD	Innovation: Enter up to 4 Points in blue cells at right. Enter description here	0						
	Total Available Points in Innovation: 26+	7						
Q. CALGreen CODE			Possible Points					
No	**0. Home meets all applicable CALGreen measures listed in above Sections A - P of the GreenPoint Rated checklist.**	N	R					
	The following measures are mandatory in the CALGreen code and do not earn points in the GreenPoint Rated Checklist but have been included in the Checklist for the convenience of jurisdictions. *The GreenPoint Rater is not a code enforcement official. The measures in this section may be verified by the GreenPoint Rater at their own discretion and/or discretion of the building official.*							
TBD	1. CALGreen 4.106.2 Storm water management during construction.	N						
TBD	2. CALGreen 4.106.3 Design for surface water drainage away from buildings.	N						
TBD	3. CALGreen 4.303.1 As an alternative to perscriptive compliance, a 20% reduction in baseline water use shall be demonstrated through calculation	N						
TBD	4. CALGreen 4.406.1 Joints and openings. Annular spaces around pipes, electric cables, conduits, or other openings in plates at exterior walls shall be protected	N						
TBD	5. CALGreen4.503.1 Gas fireplace shall be a direct-vent sealed-combustion type. Woodstove or pellet stove shall comply with US EPA Phase II emission limits	N						
TBD	6. CALGreen 4.505.2 Vapor retarder and capillary break is installed at slab on grade foundations.	N						
TBD	7. CALGreen 4.505.3 19% moisture content of building framing materials	N						
TBD	8. CALGreen 702.1 HVAC system installers are trained and certified in the proper installation of HVAC systems.	N						
	Total Available Points in CALGreen Code: 0	0						

Summary

		Points Achieved	Community	Energy	IAQ/Health	Resources	Water
	Total Available Points		62	86+	35	87	48
	Minimum Points Required	sion 2.2/1.9	6	30	5	6	3

KOTTINGER GARDENS (DRAFT) 1/13/14

	Points Achieved	Community	Energy	IAQ/Health	Resources	Water	Notes
Total Points Achieved	129	36	44	15	19	15	

Project has not yet met the recommended minimum requirements

- Required measures:

EXHIBIT D

CLIMATE ACTION PLAN CHECKLIST

Project Name: KOTTINGER GARDENS **Project Address:240, 251** Kottinger Drive; 4138 Vineyard Ave; 4133 Regalia ct.

Case No.: P14-0011 **Residential Units:** 185 **Sqft. of Com./Senior housing:** 162,500

	Project Aspects that reduce Greenhouse Gas (GHG) Emissions	Yes	No	N/A	Comments
LU1: Support Infill and High Density Development					
LU1-2	Project is infill development within the existing urban fabric that helps complete, reinforce, and repair the surrounding area.	X			
LU1-3	Project is mixed-use development which incorporates higher density and affordable residential units consistent and with the Downtown Specific Plan with easy access to activity areas. (Applies to projects in the downtown area only).	X			NOT FULL MIX-USE BUT DOES INCREASE DENSITY
LU1-4	Project is transit-oriented development near BART station, along transportation corridors, in business parks, and/or in the downtown area.			X	
LU1-5	Project is high density development near and/or around transportation hubs and employment centers.	X			
LU1-6	Project is TOD (transit oriented development): located within 1/4 mile of commuter rail, BART, and other transportation hubs.			X	
LU1-7	Project incorporates affordable housing on a vacant infill site.	X			
LU2: Support Mixed-use Infill and New Development near Local-serving Commercial Areas					
LU2-1	Project is located within convenient walking distance to work, residences, and services.	X			
LU2-2	Project provides new housing and/or new employment located within ½-mile walking/biking proximity of complementary land uses, including retail, employment, institutional, or recreational.	X			
LU2-4	Project reconnects streets and adds streets; minimizes parking to below code requirements; and includes attractive and functional urban plazas. (Applies to development near Pleasanton BART station in Hacienda and development near West Pleasanton BART)	X			DOES RECONNECT AND ADDS URBAN PLAZAS BUT IS NOT NEAR BART
LU2-9	Project includes live-work units.		X		
LU2-10	Project incorporates elements of LEED for Neighborhood Development (LEED ND)	X			
LU3: Improve Transportation Efficiency through Design Improvements					
LU3-1	Project provides key services within a ½-mile walking distance of residential clusters or areas. (Applies to non-residential projects)			X	
LU3-2	Project provides building, landscape, and streetscape development design features that encourage transit, bicycle, and pedestrian access.	X			NEW CONNECTING PATHS TO THE PARK AND TRAIL
LU3-3	Project encourages transit use and provides pedestrian and bicycle facilities.	X			
LU3-4	Project provides infrastructure to facilitate 'NextBus' technologies for tracking buses and predicting arrival times. (Applies to projects that include two or more bus shelters.)	X			2 BUS STOPS
LU3-5	Project provides street improvements that meet the municipal street standards and AB 1358 Complete Streets and increase the safety, convenience, and efficiency of pedestrians, bicyclists, motorists, and transit riders.	X			NEW PEDESTRIAN CROSSWALK
LU3-6	Project includes pedestrian and bicycle access through cul-de-sacs in new projects, except where prohibited by topography.	X			MULTIPLE PATHS
LU3-7	Project includes neighborhood traffic calming to slow traffic speeds, reduce cut-through traffic and traffic-related noise, improve the aesthetics of the street, and increase safety for pedestrians, bicyclists, and vehicles.	X			
TR1: Improve and Increase Transit Ridership with Incentives, Partnerships, and Related Investments					
TR1-6	The project offers discounted transit passes as part of HOA amenities, payable through the HOA dues. (Applies to residential development within 1/2 mile of transit.)			X	

	Project Aspects that reduce Greenhouse Gas (GHG) Emissions	Yes	No	N/A	Comments
TR1-9	The project includes a condition of approval to limit diesel vehicle idling. (Applies to projects with associated bus or truck traffic.)	X			WILL INCORPORATE ONE

NM1: Enhance and Maintain a Safe, Convenient, and Effective System for Pedestrians and Bicyclists

NM1-1	Project provides a community trail, bike lane, staging area or other facility consistent with the Community Trails Master Plan or the Pedestrian and Bicycle Master Plan.	X			
NM1-4	Project provides bicycle-related improvements (i.e., work-place provision for showers, bicycle storage, bicycle lanes, etc.).			X	
NM1-5	Project provides bike parking. (Applies to non-residential and multi-family projects.)	X			
NM1-7	Project provides bicycle detection at signalized intersections.		X		
NM1-8	Project provides safe and convenient bike racks. (Applies to private schools, business and office projects.)	X			
NM1-9	Project completes a section of the Iron Horse Trail. (Applies to developments adjacent to the trail location.)			X	
NM1-10	Project contributes to the bicycle/pedestrian underpass at 580/680 interchange (Johnson Drive canal) for connection to Dublin. (Applies to new projects in the immediate vicinity.)			X	

TDM1: Use Parking Policy/Pricing to Discourage Single Occupancy Vehicle (SOV) Travel

TDM1-1	Project shares parking with adjacent use to reduce paved areas that contribute to urban heat islands and reduce stormwater infiltration.		X		DOES HAVE REDUCED PARKING FOR SENIORS .8 RATIO
TDM1-2	Project separates fee-based parking from home rents/purchase prices or office leases. (Applies to projects within 1/2 mile of BART stations to increase housing and office affordability for those without a car or cars.)			X	
TDM1-3	Project tenants will participate in the City's TSM program to reduce auto trips. (Applies to non-residential projects.)			X	
TDM1-5	Project will participate in a parking demand management program.		X		
TDM1-6	Project provides one or more electric charging stations for plug-in vehicles.		X		
TDM1-7	Project provides motorcycle or scooter parking. (Applies to projects located in Downtown.)		X		

TDM2: Promote Alternatives to Work and School Commutes

TDM2-4	Project provides a neighborhood telecommuting center.		X		
TDM2-7	Project provides transit passes or other transit use incentives for an interim period to establish transit use patterns for employees. (Applies to new non-residential projects of more than 20,000 s.f. within 1/4 mile of transit)			X	
TDM2-10	Project provides dedicated parking spaces for carpool, vanpool, alternative-fuel, and car-share vehicles.	X			
TDM2-11	Project incorporates a car-sharing service.		X		

EC1: Use City Codes, Ordinances and Permitting to Enhance Green Building, Energy Efficiency, and Energy Conservation

EC1-1	Project meets LEED *Certified* rating level and achieves 25% above T-24, and incorporates new requirements for shade trees, cool roofs and landscape lighting. (Applies to civic projects and commercial projects over 20,000 s.f.)			X	THIS PROJECT WILL MEET A LEED RATING LEVEL
EC1-2	Project meets the City's residential green rating standard, including 25% above T-24, and incorporates new requirements for shade trees, cool roofs and landscape lighting. (Applies to residential projects.)	X			THIS PROJECT WILL MEET A LEED RATING LEVEL
EC1-3	Project provides light-colored paving material for roads and parking areas, as well as parking lot shade trees.		X		

Project Aspects that reduce Greenhouse Gas (GHG) Emissions		Yes	No	N/A	Discussion

EC4: Develop Programs to Increase Energy Efficiency and Conservation

EC4-4	Project incorporates solar tubes, skylights, and other daylighting systems within the design .		X		

ER1: Implement Local Ordinances and Permitting Processes to Support Renewable Energy

ER1-1	Project provides residential renewable energy installations (e.g., wind turbines). (Applies to residential projects.)	X			SOLAR

ER2: Develop Programs to Promote On-Site Renewable Energy in the Community

ER2-3	Project incorporates distributed generation, especially PV, solar thermal, solar hot water, and solar cooling, and/or providing bloom box or other fuel cell technologies.	X			

ER2-5	Project includes a solar grid to power one or more EV charging stations.		X		

SW2: Increase Recycling, Organics Diversion, and Waste Reduction Associated with the Entire Community

SW2-12	Project provides adequate space and logistics for handling of recyclable and compostable materials. (Applies to commercial and multifamily residential projects.)	X			

WA1: Conserve Community Water through Building and Landscape Design and Improvements

WA 1-7	Project incorporates a water-saving landscape plan that includes xeriscaping and drought-resistant planting in lieu of lawns.	X			50% OF THE LANDSCAPING WILL BE DROUGHT TOLERANT SPECIES
WA 1-8	Project limits lawn areas to designated play areas.	X			MANY LANDSCAPED AREAS AND COMMUNITY GARDENS INCORPORATED INTO SITE

WA3: Increase or Establish use of Reclaimed/Grey Water Systems

WA3-2	Project utilizes reclaimed wastewater.		X		
WA3-4	Project incorporates rain harvesting.		X		

EXHIBIT E

Preliminary Tree Report

Kottinger Senior Housing Project
Pleasanton, CA

Prepared for:
MidPen Housing Corp.
303 Vintage Park Dr. Suite 250
Foster City, CA 94404

Prepared by:
HortScience, Inc.
325 Ray St.
Pleasanton, CA 94566

July 3, 2013

HORT SCIENCE

Preliminary Tree Report
Kottinger Place
Pleasanton, CA

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Preliminary Tree Report
Kottinger Senior Housing Project
Pleasanton, CA

Introduction and Overview

MidPen Housing is planning to redevelop four properties in Pleasanton: Kottinger Place, Pleasanton Gardens, Regalia House, and 4138 Vineyard Ave. Kottinger Place and Pleasanton Gardens are active low-income senior housing units; Regalia House contains one building, and 4138 Vineyard Ave. is a mostly cleared empty lot. HortScience, Inc. was asked to prepare a **Preliminary Tree Report** for the site as part of the development application to the City of Pleasanton. This report is preliminary in nature as the plans are in conceptual stage and accurate tree trunk locations have yet to be established.

This report provides the following information:

1. An evaluation of the health and structural condition of the trees within and adjacent to the proposed project area based on a visual inspection from the ground.
2. A preliminary assessment of the development impacts to the trees based on the plans provided by the client.
3. Preliminary guidelines for tree preservation during the design, construction and maintenance phases of development.

Tree Assessment Methods

Trees were assessed in June 2013. The survey included trees 6" in diameter and greater, located within the proposed project area. Trees located off-site that were either near the proposed project or had canopies extending over the site were included. The assessment procedure consisted of the following steps:

1. Identifying the tree as to species;
2. Tagging each tree with an identifying number and recording its location on a map;
3. Measuring the trunk diameter at a point 4.5' above grade;
4. Evaluating the health and structural condition using a scale of 1 – 5:

   5 - A healthy, vigorous tree, reasonably free of signs and symptoms of disease, with good structure and form typical of the species.

   4 - Tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.

   3 - Tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that might be mitigated with regular care.

   2 - Tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.

   1 - Tree in severe decline, dieback of scaffold branches and/or trunk; most of foliage from epicormics; extensive structural defects that cannot be abated.

5. Rating the suitability for preservation as "high", "moderate" or "low". Suitability for preservation considers the health, age and structural condition of the tree, and its potential to remain an asset to the site for years to come.

High: Trees with good health and structural stability that have the potential for longevity at the site.

Moderate: Trees with somewhat declining health and/or structural defects than can be abated with treatment. The tree will require more intense management and monitoring, and may have shorter life span than those in 'good' category.

Low: Tree in poor health or with significant structural defects that cannot be mitigated. Tree is expected to continue to decline, regardless of treatment. The species or individual may have characteristics that are undesirable for landscapes, and generally are unsuited for use areas.

City of Pleasanton Urban Tree Protection Requirements

The Pleasanton Municipal Code Chapter 17.16 controls the removal and preservation of heritage trees within the city. Heritage trees are defined as:

1. Any single-trunked tree with a circumference of 55" (18" in diameter) or more measured four and on half feet above ground level;
2. Any multi-trunked tree of which the two largest trunks have a circumference of 55" or more measured four and one half feet above ground level;
3. Any tree 35' or more in height;
4. Any tree of particular historical significance specifically designated by official action;
5. A stand of trees, the nature of which makes each dependent upon the other for survival or the area's natural beauty.

All trees with heritage designation are protected and require a permit for removal.

Description of Trees

The project site was characterized by a diverse tree population. One hundred seventy-seven (177) trees representing 52 species were evaluated (**Table 1**). All but seven trees were planted in the landscape surrounding the homes and in the adjacent Kottinger Village Park and adjacent private residences. Descriptions of each tree are found in the ***Tree Assessment Form*** and approximate locations are plotted on the ***Tree Assessment Map*** (see Exhibits).

Table 1. Condition Ratings and Frequency of Occurrence of Trees
Kottinger Senior Housing Project, Pleasanton, CA

Common name	Scientific name	Condition			
		Poor (1-2)	Fair (3)	Good (4-5)	Total
Bailey acacia	*Acacia baileyana*	1	-	-	1
Blackwood acacia	*Acacia melanoxylon*	-	1	-	1
Silver maple	*Acer saccharinum*	-	-	1	1
Strawberry tree	*Arbutus unedo*	-	-	1	1
European white birch	*Betula pendula*	2	-	-	2
Incense cedar	*Calocedrus decurrens*	-	1	-	1
Catalpa	*Catalpa sp.*	3	4	1	8
Hackberry	*Celtis occidentalis*	-	-	1	1
Chitalpa	*Chitalpa tashkentensis*	-	1	-	1
Arizona cypress	*Cupressus arizonica*	-	1	-	1

Common name	Scientific name	Condition			
		Poor (1-2)	Fair (3)	Good (4-5)	Total
Cabbage tree	*Cordyline australis*	-	1	-	1
Bronze loquat	*Eriobotrya deflexa*	-	1	-	1
River red gum	*Eucalyptus camaldulensis*	3	5	1	9
Silver dollar gum	*Eucalyptus polyanthemos*	-	4	2	6
Raywood ash	*Fraxinus augustifolia 'Raywood'*	-	3	5	8
Modesto ash	*Fraxinus velutina*	3	6	-	9
Ginkgo	*Ginkgo biloba*	-	1	1	2
California black walnut	*Juglans nigra*	1	3	-	4
English walnut	*Juglans regis*	-	2	-	2
Hollywood juniper	*Juniperus chinensis 'Torulosa'*	-	2	-	2
Crape myrtle	*Lagerstroemia indica*	-	-	1	1
Glossy privet	*Ligustrum lucidum*	1	1	1	3
Sweetgum	*Liquidambar styraciflua*	-	10	1	11
Southern magnolia	*Magnolia grandiflora*	-	1	2	3
Mayten	*Maytenus boaria*	2	3	-	5
Avocado	*Persea americana*	-	1	-	1
Canary Island date palm	*Phoenix canariensis*	-	-	1	1
Colorado spruce	*Picea pungens*	-	-	1	1
Canary Island pine	*Pinus canariensis*	-	4	16	20
Aleppo pine	*Pinus halepensis*	1	3	-	4
Italian stone pine	*Pinus pinea*	1	1	-	2
Monterey pine	*Pinus radiata*	1	-	-	1
Scots pine	*Pinus sylvestris*	1	-	-	1
London plane	*Plantanus x hispanica*	1	-	1	2
Lombardy poplar	*Populus nigra*	-	-	1	1
Almond	*Prunis dulcis*	1	3	-	4
Purpleleaf plum	*Prunus cerasifera*	1	-	-	1
Peach	*Prunus persica*	-	-	1	1
Cherry	*Prunus avium*	-	1	-	1
Plum	*Prunus domestica*	-	2	-	2
Pyracantha	*Pyracantha coccinea*	-	1	-	1
Callery pear	*Pyrus calleryana*	1	2	3	6
Evergreen pear	*Pyrus kawakamii*	-	5	2	7
Coast live oak	*Quercus agrifolia*	-	-	2	2
Valley oak	*Quercus lobata*	-	2	3	5
Cork oak	*Quercus suber*	-	-	1	1
Idaho locust	*Robinia idahoensis*	-	2	-	2
California pepper	*Schinus molle*	1	1	1	3
Coast redwood	*Sequoia sempervirens*	-	3	11	14
Chinese tallow	*Triadica sebifera*	-	-	1	1
Siberian elm	*Ulmus pumila*	-	5	-	5
Zelkova	*Zelkova serrata*	-	1	1	2
Total		**25**	**88**	**64**	177

Most of the trees were mature in size. Trunk diameters ranged from 6” (peach #6) to 56” (river red gum #123) for single-trunked trees. The median trunk diameter was 17”. There were 29 trees with more than one trunk. Trees were generally in good to fair condition. Only 14% were in poor condition. A total of 78 or 46% of the trees evaluated qualified as Heritage trees. Heritage status of individual trees is provided in the *Tree Assessment Form* (see Exhibits). Twenty-six of the trees were off-site: 18 in Kottinger Village Park, five along the 4138 Vineyard Ave. fence line, and three just outside the Pleasanton Gardens property line

Canary Island pine was the most common species present, with 20 trees (12% of the population). They were planted around structures and along pedestrian pathways adjacent to Kottinger Village Park (photo 1). The trees ranged in condition from fair to good, some with somewhat thin canopies. The majority of the trees was tall and upright exhibiting good form and structure, and averaged 18” in diameter. Within the group were 15 Heritage trees.

Coast redwood was the second most common species with 14 trees (8% of the population). Averaging 30” in diameter, 11 trees were in good or excellent condition, and 12 were large enough to qualify as Heritage trees (Photo 2). Off-site trees (#62, 63, 66-68, 70, 71, 75 and 76) were located on the east side of Kottinger Place in Kottinger Village Park along the edge of a pedestrian path. Coast redwood #70 was distinctive among the off-site trees, with an extensive wound resulting from a codominant stem failure (Photo 3).

Photo 1: Canary Island pines along path bordering Kottinger Village Park. #55-58 are Heritage trees.

Photo 2: Heritage coast redwood #162 located at 4138 Vineyard Ave.

Photo 3: Heritage coast redwood #70 was located in the park on the outside of a pedestrian path. It had a large trunk wound created when the codominant stem failed several years ago.

Sweetgum, another species present in larger numbers with 11 trees (6% of the population), was planted in small clusters in Pleasanton Gardens and Kottinger Place. Characteristic of the species, they exhibited codominant stems, multiple attachments and poor form. All were in fair condition with one exception; #116 was in good condition. The average diameter was less than 16”, and only two sweetgums were Heritage trees.

The Modesto ash species was represented by nine trees (5% of the population). They were all in fair to poor condition, resulting collectively from poor structure, branch failures, decay and extensive dieback due to repeated infection with anthracnose leaf disease. Located along the perimeter of the project in Kottinger Place and Regalia House, they averaged 23” in diameter; seven were Heritage trees.

Two eucalyptus species were present; river red gum and silver dollar gum. Many were multi-trunked trees, inter-planted in a linear plane along the western perimeter of Kottinger Place and Regalia House. The red river gum was represented by nine trees (5% of the population) and the silver dollar gum by six trees (less than 4% of the population). As a group, eucalyptus ranged from fair to good, and was predominately characterized by poor structure, multiple attachments, branch failure, and wound decay. All eucalyptus trees with the exception of silver dollar gum #109 had Heritage status.

Photo 4: Heritage river red gums were the largest trees on the site. These were located on the northeast corner of Kottinger Place.

Two ornamental pear species were also present: seven evergreen pear (4%) and six Callery pear (3.5%). The evergreen pear was planted in Kottinger Place, and the Callery pear in Pleasanton Gardens. Exhibiting multiple attachments and codominant stems characteristic of both pear species, the collective condition rating ranged from fair to good, with the exception of Callery pear #21 rated poor from extensive dieback. With an average diameter less than 12", none of the pear trees were large enough for Heritage status.

Photo 5: Catalpas #80 (Heritage) and 81 were in poor condition due to extensive branch dieback and trunk decay. Heritage tree #82 was in fair condition.

Located primarily inside the pedestrian pathway in Kottinger Place, the *Catalpa* species was represented by eight trees (less than 4% of the population). All the trees had a single trunk, with the exception of tree #52, which was multi-trunked. Large in stature (average diameter 22"), all but one of the trees had Heritage status and an average. It was noteworthy that trees #77, 80 and 81 exhibited extensive trunk and branch wounds, dieback and decay (Photo 5).

Eight Raywood ash were present that were in good to fair condition (Photo 6). Several had symptoms of Ash Dieback, a disease caused by the fungus *Botryosphaeria*. All were located along the parking area between Regalia House and the park.

Photo 6. Raywood ash #175-177, 161 (left to right).

Five small mayten trees were planted in the interior at Kottinger Place. Two were multi-trunked (#136, 137), collectively they exhibited decay, dieback, and poor structure, and their condition ranged from poor to fair. The average diameter of the trees was less than 10".

Four Siberian elms were inter-planted with coast redwoods along the eastern pedestrian path in Kottinger Place. A cluster of small Siberian elms (#171) were located off-site adjacent to the Vineyard Ave. parcel in the north-west corner of the site. Two of the four on-site trees had Heritage status; all were in fair condition.

Five semi-mature valley oaks were scattered throughout Pleasanton Gardens, Kottinger Place and Regalia House. Tree #8 was located off-site in the southeast portion of the project. Nearby, trees #1 and 2 were located close together with inter-dependent canopies (Photo 7). These trees had fill soil and pavers place over the root collar many years ago. Two multi-trunked trees (#114, 152) were in fair condition; one suppressed in form and the other with twig dieback and power lines running through the crown. The remaining three were in good condition and all but one was a Heritage tree.

Photo 7. Valley oaks #1 and #2 have grown next to each other and now form one canopy.

Three species were each represented by four trees and included the following:

- Aleppo pine generally in fair to good condition; two heritage trees on the west side (#90, 113) and two off-site trees on the east side, one with heritage status (#61). Tree #90 was impressively large, but had a significant structural defect that compromises its structural stability (Photo 8).
- Almond in a linear planting at Regalia House (#149-151,154). Trees had poor form and structure with an average diameter of nine inches.
- California black walnut (#166-169) in linear planting on the west side of Vineyard Ave. with three trees off-site. Two trees were multi-trunked and two had heritage status. Tree #167 was in poor condition with poor form and two dead stems. The other three were in fair condition with codominant stems and multiple attachments.

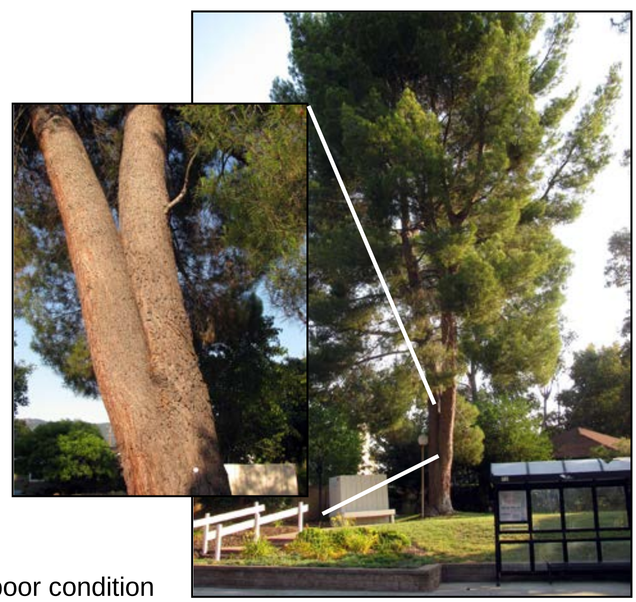

Photo 8. Aleppo pine #90 had codominant stems with included bark (see inset). This is a structurally weak condition that is likely to result in tree failure. A cable had been installed between the two stems to provide some support.

Three species were represented by two trees each and included the following:

- California pepper at Kottinger Place; one each in good (#105), fair (#107) and poor (#106) condition. The trees had heritage status, the largest of which was in poor condition with extensive trunk and branch decay.
- Glossy privet were small, multi-trunked trees. One was located in Kottinger Place (#92), and one in Pleasanton Gardens (#25); #27 was a hedge of 30 stems located off-site on the fence line.
- Southern magnolia. Two planted in Pleasanton Gardens (#18, 33) had heritage status and were in good condition and #121 in Kottinger Place was fair with a thin crown and dieback.

Twelve species were each represented by two trees. Trees of note included:

- Coast live oak #164 in good condition, albeit with codominant trunks, and #165 in excellent condition were both heritage trees (Photo 9). These are naturally-occurring trees native to Pleasanton. The canopies extended to the ground as is typical of the species. This form shades the root system and helps the trees survive the long dry summer. They were located at the west end of 4138 Vineyard Ave.
- Ginkgo #7 was a good young tree in Pleasanton Gardens (Photo 10), and moderate-sized #163 in the Vineyard Ave. was suppressed in form and in fair condition.
- Zelkova #51 was in fair condition because of multiple branch attachments and presence of a girdling root. Zelkova #132 was in good condition.

Photo 9. The canopy of Heritage coast live oaks #164 and 165 occupied the west end of the Vineyard Ave. property.

Twenty three species were represented by one tree each. Both Canary Island date palm #133 and the cork oak #56 were heritage trees (noted with an asterisk) in good condition. In Pleasanton Gardens, two small trees in excellent condition were Colorado spruce #28 with good form (Photo 11), and crape myrtle #29 with a full crown and multiple attachments at the base.

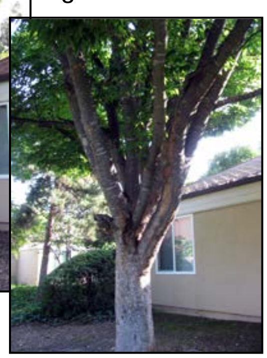

Photo 10 (left). Zelkova with multiple branch attachments (inset).

Photo 11 (right). Colorado spruce with good form and health.

Suitability for Preservation

Before evaluating the impacts that will occur during development, it is important to consider the quality of the tree resource itself, and the potential for individual trees to function well over an extended length of time. Trees that are preserved on development sites must be carefully selected to make sure that they may survive development impacts, adapt to a new environment and perform well in the landscape.

Our goal is to identify trees that have the potential for long-term health, structural stability and longevity. For trees growing in open fields, away from areas where people and property are present, structural defects and/or poor health presents a low risk of damage or injury if they fail. However, we must be concerned about safety in use areas. Therefore, where development encroaches into existing plantings, we must consider their structural stability as well as their potential to grow and thrive in a new environment. Where development will not occur, the normal life cycles of decline, structural failure and death should be allowed to continue.

Evaluation of suitability for preservation considers several factors:

- **Tree health**
  Healthy, vigorous trees are better able to tolerate impacts such as root injury, demolition of existing structures, changes in soil grade and moisture, and soil compaction than are non-vigorous trees.

- **Structural integrity**
  Trees with significant amounts of wood decay and other structural defects that cannot be corrected are likely to fail. Such trees should not be preserved in areas where damage to people or property is likely.

- **Species response**
  There is a wide variation in the response of individual species to construction impacts and changes in the environment. In general, coast redwoods are relatively tolerant of construction impacts and site changes while magnolia is intolerant of site disturbance.

- **Tree age and longevity**
  Old trees, while having significant emotional and aesthetic appeal, have limited physiological capacity to adjust to an altered environment. Young trees in good condition are better able to generate new tissue and respond to change.

- **Species invasiveness**
  Species that spread across a site and displace desired vegetation are not always appropriate for retention. This is particularly true when indigenous species are displaced. The California Invasive Plant Inventory Database (http://www.cal-ipc.org/paf/) maintains a list and invasive ratings of plant species in California. Pleasanton is part of the Central West Floristic Province. Blackwood acacia is listed with a *moderate* invasiveness rating, and red river gum, purple-leafed plum and pyracantha have a *limited* invasiveness, rating.

Each tree was rated for suitability for preservation based upon its age, health, structural condition and ability to safely coexist within a development environment (see *Tree Assessment* in Exhibits). We consider trees with good suitability for preservation to be the best candidates for preservation. We do not recommend retention of trees with poor suitability for preservation in areas where people or property will be present. Retention of trees with moderate suitability for preservation depends upon the intensity of proposed site changes.

Table 2: Trees Suitability for preservation

High	These are trees with good health and structural stability that have the potential for longevity at the site. Forty-five trees were in this category (Table 3).
Moderate	Trees in this category have fair health and/or structural defects that may be abated with treatment. These trees require more intense management and monitoring, and may have shorter life-spans than those in the “high” category. Fifty-eight trees were in this category.
Low	Trees in this category are in poor health or have significant defects in structure that cannot be abated with treatment. These trees can be expected to decline regardless of management. The species or individual tree may possess either characteristics that are undesirable in landscape settings or be unsuited for use areas. Seventy-four trees had low suitability for preservation.

Evaluation of Impacts and Recommendations for Preservation

Appropriate tree retention develops a practical match between the location and intensity of construction activities and the quality and health of trees. The *Tree Assessment (Exhibits)* was the reference point for tree condition and quality. Potential impacts from redevelopment of the site were evaluated using the Site Plan provided by Dahlin Group. This plan is conceptual in nature and identifies general layout of new homes, landscape, ad parking areas. No specific development information regarding site grading, utilities, or construction details were available at the time of this report. Trees have yet to be accurately located by engineer survey.

The plans indicated that the existing buildings, parking areas and landscapes will be demolished and new facilities will be constructed. Because of the intensity of the site changes, most trees on the site will be affected. The primarily opportunities for tree preservation are around the perimeter of the project. In most cases, grading or other excavation for construction is expected to be close to trees. It will be necessary to accurately locate the trunk of nearby trees to adequately assess potential tree impacts and design for tree preservation (Photo 12).

Photo 12. Canary Island pines #83-86 are located at the Kottenger Dr. entrance to Kottinger Place. They are good candidates for retention. They are in the “possibly preserve” category (Table 4). We recommend accurately locating the trunks and designing for their preservation.

Based on the information available to date, it appears that at least 132 trees will be removed, 49 of which are Heritage trees (Table 4). Pending having accurate trunk locations, we think that 21 trees can be preserved, and another 24 could likely be preserved with some design accommodation. Tree-by-tree disposition is provided in Table 4 and on the Tree Disposition Plan (Exhibits).

Table 3: Trees with High Suitability for Preservation
Kottinger Senior Housing Project, Pleasanton, CA

Tree #	Species	Diameter	Heritage?
1	Valley oak	20	Yes
2	Valley oak	20	Yes
7	Ginkgo	7	No
8	Valley oak	18	Yes
10	Coast redwood	25	Yes
12	Coast redwood	25	Yes
18	Southern magnolia	19	Yes
28	Colorado spruce	13	No
29	Crape myrtle	8,6,6,5,5	No
33	Southern magnolia	18	Yes
35	Coast redwood	39	Yes
36	Hackberry	11	No
39	Strawberry tree	7,5,5,5,5,5,4	No
40	Canary Island pine	18	Yes
42	Canary Island pine	17	No
48	Coast redwood	35	Yes
54	Canary Island pine	15	No
56	Cork oak	18	Yes
57	Canary Island pine	18	Yes
58	Canary Island pine	18	Yes
62	Coast redwood	16	No
63	Coast redwood	16	No
66	Coast redwood	34	Yes
67	Coast redwood	34	Yes
68	Coast redwood	43	Yes
72	Canary Island pine	18	Yes
74	Canary Island pine	20	Yes
83	Canary Island pine	19	Yes
84	Canary Island pine	21	Yes
86	Canary Island pine	24	Yes
102	Silver dollar gum	28	Yes
133	Canary Island date palm	49	Yes
138	London plane	25	Yes
141	Canary Island pine	18	Yes
142	Canary Island pine	22	Yes
143	Canary Island pine	17	No
144	Canary Island pine	18	Yes
145	Canary Island pine	13	No
162	Coast redwood	38	Yes
164	Coast live oak	35	Yes
165	Coast live oak	24	Yes
172	Raywood ash	16	No
172	Raywood ash	17	No
174	Raywood ash	17	No
175	Raywood ash	17	No

Table 4: Summary of Tree Disposition: Number of trees estimated to be removed and preserved based on current site development plans.

Heritage tree?	Preserve	Possibly Preserve	Remove
No	7	9	83
Yes	14	15	49
Total	21	24	132

Of the 26 off-site trees, 16 will be preserved; seven possibly preserved; and three removed. Three trees that will be removed are Raywood ash along the parking lot between Regalia House and the park. These trees are included in Tables 4 and 5.

Preservation of the trees is predicated on the construction impacts being within the tolerances of the trees and on the implementation of specific recommendations in the *Tree Preservation Guidelines.* Specific tree root and crown impacts near the limits of grading should be evaluated when construction plans and accurate trunk locations are available. Depending on the extent of impact, additional trees may be recommended for removal.

Table 5: Preliminary Assessment of Tree Preservation and Removal Kottinger Senior Housing Project, Pleasanton, CA

Tree #	**Species**	**Trunk Diameter** (in.)	**Heritage ?**	**Suitability for Preservation**	**Disposition**
1	Valley oak	20	Yes	High	Preserve
2	Valley oak	20	Yes	High	Preserve
3	Sweetgum	19	Yes	Moderate	Remove
4	Sweetgum	20	Yes	Moderate	Remove
5	Sweetgum	17	No	Moderate	Remove
6	Peach	6	No	Moderate	Remove
7	Ginkgo	7	No	High	Preserve
8	Valley oak	18	Yes	High	Preserve
9	Arizona cypress	9	No	Moderate	Possibly preserve
10	Coast redwood	25	Yes	High	Remove
11	Incense cedar	11	No	Moderate	Remove
12	Coast redwood	25	Yes	High	Remove
13	Callery pear	13	No	Moderate	Remove
14	Callery pear	11	No	Moderate	Remove
15	Sweetgum	14	No	Low	Remove
16	Sweetgum	14	No	Low	Remove
17	Cherry	10,7,5	No	Moderate	Remove
18	Southern magnolia	19	Yes	High	Remove
19	Callery pear	14	No	Moderate	Remove
20	Desert willow	10	No	Low	Remove
21	Callery pear	10	No	Low	Remove
22	Callery pear	15	No	Low	Remove
23	Callery pear	15	No	Moderate	Remove
24	Monterey pine	8,8	No	Low	Remove
25	Glossy privet	6,5,3	No	Low	Remove

Tree #	Species	Trunk Diameter (in.)	Heritage ?	Suitability for Preservation	Disposition
26	English walnut	14,11	Yes	Moderate	Preserve
27	Glossy privet	multi-stem	No	Low	Preserve
28	Colorado spruce	13	No	High	Remove
29	Crape myrtle	8,6,6,5,5	No	High	Remove
30	European white birch	6	No	Low	Remove
31	European white birch	7	No	Low	Remove
32	Purple-leafed plum	6,5,4,4,3	No	Low	Remove
33	Southern magnolia	18	Yes	High	Remove
34	Chinese tallow	12	No	Moderate	Remove
35	Coast redwood	39	Yes	High	Possibly preserve
36	Hackberry	11	No	High	Remove
37	Modesto ash	21	Yes	Moderate	Remove
38	Modesto ash	21	Yes	Moderate	Possibly preserve
39	Stawberry tree	7,5,5,5,5,5,4	No	High	Remove
40	Canary Island pine	18	Yes	High	Remove
41	Blackwood acacia	9,7,7,4	No	Low	Remove
42	Canary Island pine	17	No	High	Remove
43	Raywood ash	14	No	Low	Preserve
44	Modesto ash	14	No	Low	Preserve
45	Modesto ash	21	Yes	Low	Preserve
46	Idaho locust	11	No	Low	Possibly preserve
47	Modesto ash	20	Yes	Low	Remove
48	Coast redwood	35	Yes	High	Possibly preserve
49	Pyracantha	8,6,5	No	Low	Remove
50	Scots pine	10	No	Low	Remove
51	Zelkova	15	No	Moderate	Remove
52	Catalpa	15,10,8,6	Yes	Moderate	Remove
53	Catalpa	18	Yes	Moderate	Remove
54	Canary Island pine	15	No	High	Possibly preserve
55	Canary Island pine	18	Yes	Moderate	Possibly preserve
56	Cork oak	18	Yes	High	Remove
57	Canary Island pine	18	Yes	High	Remove
58	Canary Island pine	18	Yes	High	Remove
59	Idaho locust	11	No	Low	Preserve
60	Aleppo	8	No	Low	Remove
61	Aleppo	29	Yes	Low	Preserve
62	Coast redwood	16	No	High	Preserve
63	Coast redwood	16	No	High	Preserve
64	Siberian elm	18	Yes	Low	Remove
65	Siberian elm	10	No	Moderate	Remove
66	Coast redwood	34	Yes	High	Preserve
67	Coast redwood	34	Yes	High	Preserve
68	Coast redwood	43	Yes	High	Preserve
69	Siberian elm	22	Yes	Low	Remove
70	Coast redwood	35	Yes	Moderate	Preserve

Tree #	Species	Trunk Diameter (in.)	Heritage ?	Suitability for Preservation	Disposition
71	Coast redwood	39	Yes	Moderate	Preserve
72	Canary Island pine	18	Yes	High	Remove
73	Canary Island pine	21	Yes	Moderate	Remove
74	Canary Island pine	20	Yes	High	Remove
75	Coast redwood	22	Yes	Low	Preserve
76	Coast redwood	25	Yes	Moderate	Preserve
77	Catalpa	24	Yes	Low	Remove
78	Catalpa	18	Yes	Moderate	Remove
79	Catalpa	27	Yes	Moderate	Possibly preserve
80	Catalpa	21	Yes	Low	Remove
81	Catalpa	15	No	Low	Remove
82	Catalpa	27	Yes	Moderate	Possibly preserve
83	Canary Island pine	19	Yes	High	Possibly preserve
84	Canary Island pine	21	Yes	High	Possibly preserve
85	Canary Island pine	20	Yes	Moderate	Possibly preserve
86	Canary Island pine	24	Yes	High	Possibly preserve
87	Bronze loquat	6,5,4,3	No	Low	Remove
88	Evergreen pear	7	No	Moderate	Remove
89	Evergreen pear	6	No	Moderate	Remove
90	Aleppo	35	Yes	Low	Remove
91	Plum	7	No	Low	Remove
92	Glossy privet	6,6,3,3	No	Moderate	Remove
93	Evergreen pear	11	No	Moderate	Remove
94	River red gum	23	Yes	Moderate	Remove
95	River red gum	21	Yes	Low	Remove
96	River red gum	20,12	Yes	Low	Remove
97	Cabbage tree	6	No	Low	Remove
98	Evergreen pear	11	No	Moderate	Remove
99	Evergreen pear	13	No	Low	Remove
100	Evergreen pear	14	No	Low	Remove
101	Silver dollar gum	32	Yes	Moderate	Remove
102	Silver dollar gum	28	Yes	High	Remove
103	Silver dollar gum	30	Yes	Low	Remove
104	Silver dollar gum	14,12,12,12, 10,9,9,7,7	Yes	Low	Remove
105	California pepper	11	No	Moderate	Remove
106	California pepper	18	Yes	Low	Remove
107	California pepper	15	No	Moderate	Remove
108	River red gum	32	Yes	Low	Remove
109	Silver dollar gum	10	No	Low	Remove
110	Italian stone pine	15	No	Low	Remove
111	Silver dollar gum	18,15,12,8	Yes	Low	Remove
112	Canary Island pine	12	No	Moderate	Remove
113	Aleppo	23	Yes	Moderate	Remove
114	Valley oak	10,5	No	Low	Remove
115	Sweetgum	14	No	Low	Remove
116	Sweetgum	17	No	Moderate	Remove

Tree #	Species	Trunk Diameter (in.)	Heritage ?	Suitability for Preservation	Disposition
117	Sweetgum	12	No	Moderate	Remove
118	Sweetgum	13	No	Low	Remove
119	Sweetgum	15	No	Low	Remove
120	Sweetgum	16	No	Low	Remove
121	Southern magnolia	15	No	Low	Remove
122	English walnut	7,7	No	Low	Remove
123	River red gum	56	Yes	Moderate	Remove
124	Bailey acacia	9	No	Low	Remove
125	Italian stone pine	11	No	Low	Remove
126	River red gum	18	Yes	Moderate	Remove
127	Lombardy poplar	11,10,10,10	No	Moderate	Remove
128	Silver maple	8	No	Moderate	Remove
129	Evergreen pear	10	No	Moderate	Remove
130	Mayten	7	No	Low	Remove
131	Mayten	8	No	Low	Remove
132	Zelkova	16	No	Moderate	Remove
133	Canary Island palm	49	Yes	High	Remove
134	Siberian elm	6,5	No	Moderate	Remove
135	Mayten	10	No	Low	Remove
136	Mayten	8,3,3	No	Low	Remove
137	Mayten	9,7	No	Low	Remove
138	London plane	25	Yes	High	Remove
139	London plane	14	No	Low	Remove
140	Canary Island pine	19	Yes	Moderate	Remove
141	Canary Island pine	18	Yes	High	Remove
142	Canary Island pine	22	Yes	High	Remove
143	Canary Island pine	17	No	High	Remove
144	Canary Island pine	18	Yes	High	Remove
145	Canary Island pine	13	No	High	Remove
146	River red gum	32,26,26,24	Yes	Moderate	Remove
147	Plum	6,6,4,4	No	Low	Remove
148	River red gum	24	Yes	Low	Remove
149	Almond	8	No	Low	Remove
150	Almond	10	No	Low	Remove
151	Almond	7	No	Low	Remove
152	Valley oak	10,8	Yes	Moderate	Remove
153	River red gum	12,11,10,9	Yes	Moderate	Remove
154	Almond	12	No	Low	Remove
155	Modesto ash	17	No	Low	Remove
156	Modesto ash	30	Yes	Low	Remove
157	Hollywood juniper	15	No	Low	Remove
158	Hollywood juniper	11	No	Low	Remove
159	Modesto ash	31	Yes	Moderate	Remove
160	Modesto ash	32	Yes	Low	Remove
161	Raywood ash	16	No	Moderate	Remove
162	Coast redwood	38	Yes	High	Possibly preserve
163	Ginkgo	12	No	Moderate	Remove
164	Coast live oak	35	Yes	High	Possibly preserve

Tree #	Species	Trunk Diameter (in.)	Heritage ?	Suitability for Preservation	Disposition
165	Coast live oak	24	Yes	High	Possibly preserve
166	California black walnut	8,6,6,6	No	Low	Possibly preserve
167	California black walnut	14,12,12	Yes	Low	Possibly preserve
168	California black walnut	16	No	Low	Possibly preserve
169	California black walnut	24	Yes	Low	Possibly preserve
170	Avocado	12	No	Moderate	Possibly preserve
171	Siberian elm	14,14,13,12,12,12,12	Yes	Low	Preserve
172	Raywood ash	17	No	High	Remove
173	Raywood ash	16	No	High	Remove
174	Raywood ash	17	No	High	Remove
175	Raywood ash	17	No	High	Possibly preserve
176	Raywood ash	17	No	Moderate	Possibly preserve
177	Raywood ash	17	No	Moderate	Possibly preserve

Tree Preservation Guidelines

The goal of tree preservation is not merely tree survival during development but maintenance of tree health and beauty for many years. Trees retained on sites that are either subject to extensive injury during construction or are inadequately maintained become a liability rather than an asset. The response of individual trees depends on the amount of excavation and grading, care with which demolition is undertaken, and construction methods. Coordinating any construction activity inside the **TREE PROTECTION ZONE** can minimize these impacts.

The following recommendations will help reduce impacts to trees from development and maintain and improve their health and vitality through the clearing, grading and construction phases.

Design recommendations

1. Accurately locate trees currently designated as “preserve” and “possibly preserve”.

2. Modify site design to preserve as many trees in the “possibly preserve” category as possible.

3. Any changes to the plans affecting the trees should be reviewed by the consulting arborist with regard to tree impacts. These include, but are not limited to, site plans, improvement plans, utility and drainage plans, grading plans, landscape and irrigation plans, and demolition plans.

4. **TREE PROTECTION ZONE** shall be established around each tree. No grading, excavation, construction or storage of materials shall occur within that zone. No underground services including utilities, sub-drains, water or sewer shall be placed in the **TREE PROTECTION ZONE**. Spoil from trench, footing, utility or other excavation shall not be placed within the **TREE PROTECTION ZONE**, either temporarily nor permanently. The limits of the **TREE PROTECTION ZONE** will be adjusted following review of grading and

construction plans. For design purposes, the **TREE PROTECTION ZONE** trees shall be defined as the tree dripline.

5. **Tree Preservation Notes**, prepared by the Consulting Arborist, should be included on all plans.

6. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use.

7. Irrigation systems must be designed so that no trenching that severs roots larger than 1" diameter will occur within the **TREE PROTECTION ZONE.**

8. As trees withdraw water from the soil, expansive soils may shrink within the root area. Therefore, foundations, footings and pavements on expansive soils near trees should be designed to withstand differential displacement.

Pre-construction treatments and recommendations

1. The construction superintendent shall meet with the Consulting Arborist before beginning work to discuss work procedures and tree protection.

2. Fence all trees to be retained to completely enclose the **TREE PROTECTION ZONE** prior to demolition, grubbing or grading. Fences shall be 6 ft. chain link or equivalent as approved by the City. Fences are to remain until all grading and construction is completed. Where demolition must occur close to trees, such as removing curb and pavement, install trunk protection devices such as winding silt sock wattling around trunks or stacking hay bales around tree trunks.

3. Prune trees to be preserved to clean the crown of dead branches 2" and larger in diameter, raise canopies as needed for construction activities, and reduce weight on weak attachments. All pruning shall be done by a State of California Licensed Tree Contractor (C61/D49). All pruning shall be done by Certified Arborist or Certified Tree Worker in accordance with the Best Management Practices for Pruning (International Society of Arboriculture, 2002) and adhere to the most recent editions of the American National Standard for Tree Care Operations (Z133.1) and Pruning (A300). The Consulting Arborist will provide pruning specifications prior to site demolition.

4. Tree(s) to be removed that have branches extending into the canopy of tree(s) to remain shall be removed by a Certified Arborist or Certified Tree Worker and not by the demolition contractor. The Certified Arborist or Certified Tree Worker shall remove the trees in a manner that causes no damage to the tree(s) and understory to remain.

Recommendations for tree protection during construction

1. Any approved grading, construction, demolition or other work within the **TREE PROTECTION ZONE** should be monitored by the Consulting Arborist.

2. All contractors shall conduct operations in a manner that will prevent damage to trees to be preserved.

3. Tree protection devices are to remain until all site work has been completed within the work are. Fences or other protection devices may not be relocated or removed without permission of the Project Arborist.

4. Construction trailers, traffic and storage areas must remain outside **TREE PROTECTION ZONE** at all times.

5. Any root pruning required for construction purposes shall receive the prior approval of and be supervised by the Project Arborist. Roots should be cut with a saw to provide a flat and smooth cut. Removal of roots larger than 2" in diameter should be avoided.

6. If roots 2" and greater in diameter are encountered and during site work must be cut to complete the construction, the Project Arborist must be consulted to evaluate effects on the health and stability of the tree and recommend treatment.

7. All grading within the dripline of trees shall be done using the smallest equipment possible. The equipment shall operate perpendicular to the tree and operate from outside the **TREE PROTECTION ZONE**. Any modifications must be approved and monitored by the Consulting Arborist.

8. Redwoods require regular, frequent irrigation. If irrigation systems are not operable during construction, provisions must be made to provide adequate irrigation by other means. Supplemental irrigation shall be applied as determined by the Consulting Arborist.

9. If injury should occur to any tree during construction, it should be evaluated as soon as possible by the Consulting Arborist so that appropriate treatments can be applied.

10. No excess soil, chemicals, debris, equipment or other materials shall be dumped or stored within the **TREE PROTECTION ZONE**.

11. Any additional tree pruning needed for clearance during construction must be performed by a Certified Arborist and not by construction personnel.

Maintenance of impacted trees
Trees preserved at the Kottinger Senior Housing site will experience a different physical environment than previously. As a result, tree health and structural stability should be monitored. Occasional pruning, fertilization, mulch, pest management, replanting and irrigation may be required. In addition, monitoring tree health and structural stability following construction must be made a priority. As trees age, the likelihood of failure of branches or entire trees increases. Therefore, it is recommended that the property owner have the trees inspected annually for hazard potential.

HortScience, Inc.

Nelda Matheny

Nelda Matheny
Register Consulting Arborist #243
Board Certified Master Arborist #WE-0195B

Exhibits

Tree Assessment Map

Tree Disposition Maps

Tree Assessment

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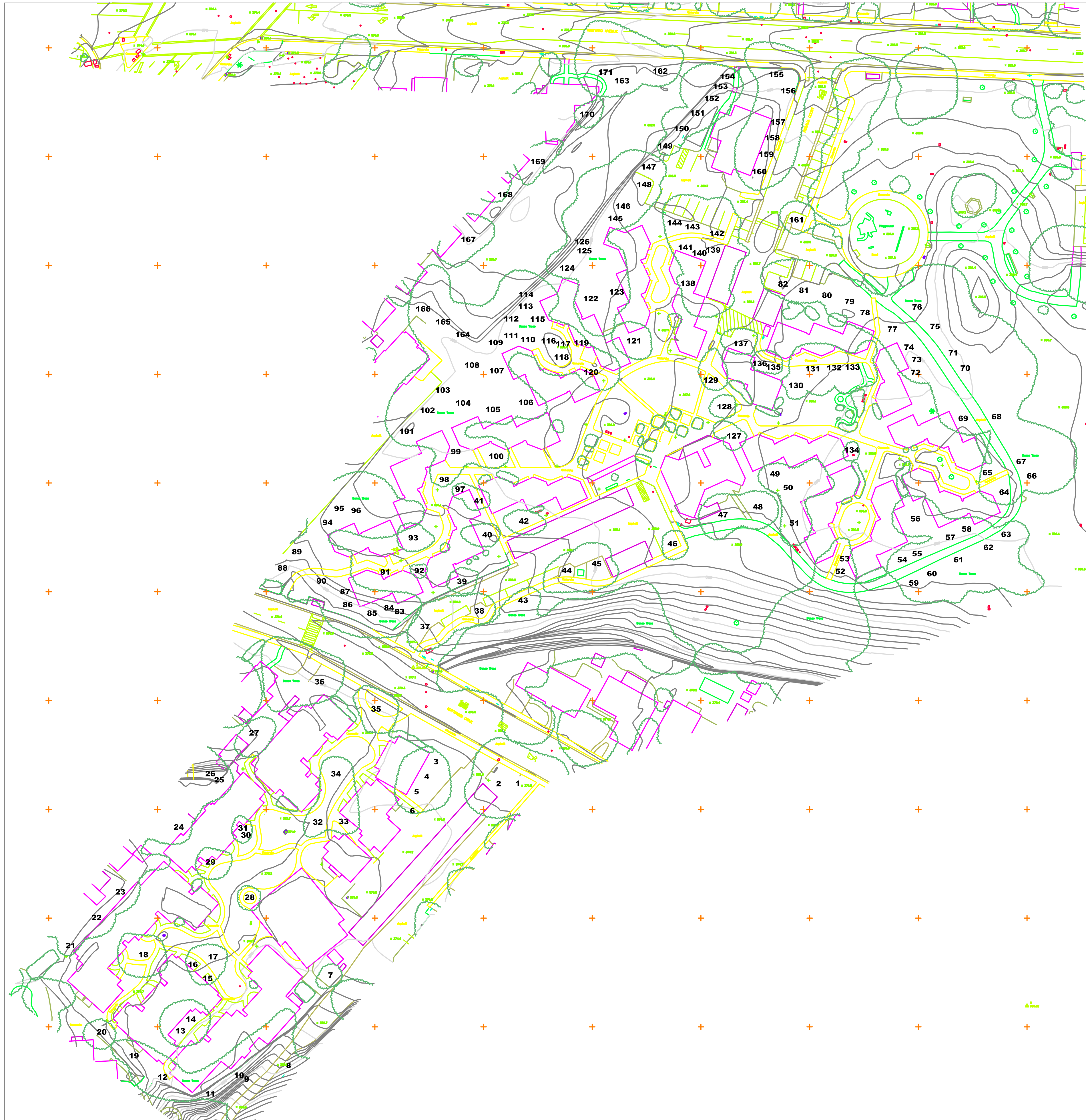

Tree Assessment Map

Kottinger Senior Housing Project
Pleasanton, CA

Prepared for:
MidPen Housing Corporation
Foster City, CA

June 2013

No Scale

Notes:
Site plan provided by:
The Dahlin Group

Numbered tree locations are approximate.

Refer to HortScience Tree Assessment for description of the trees

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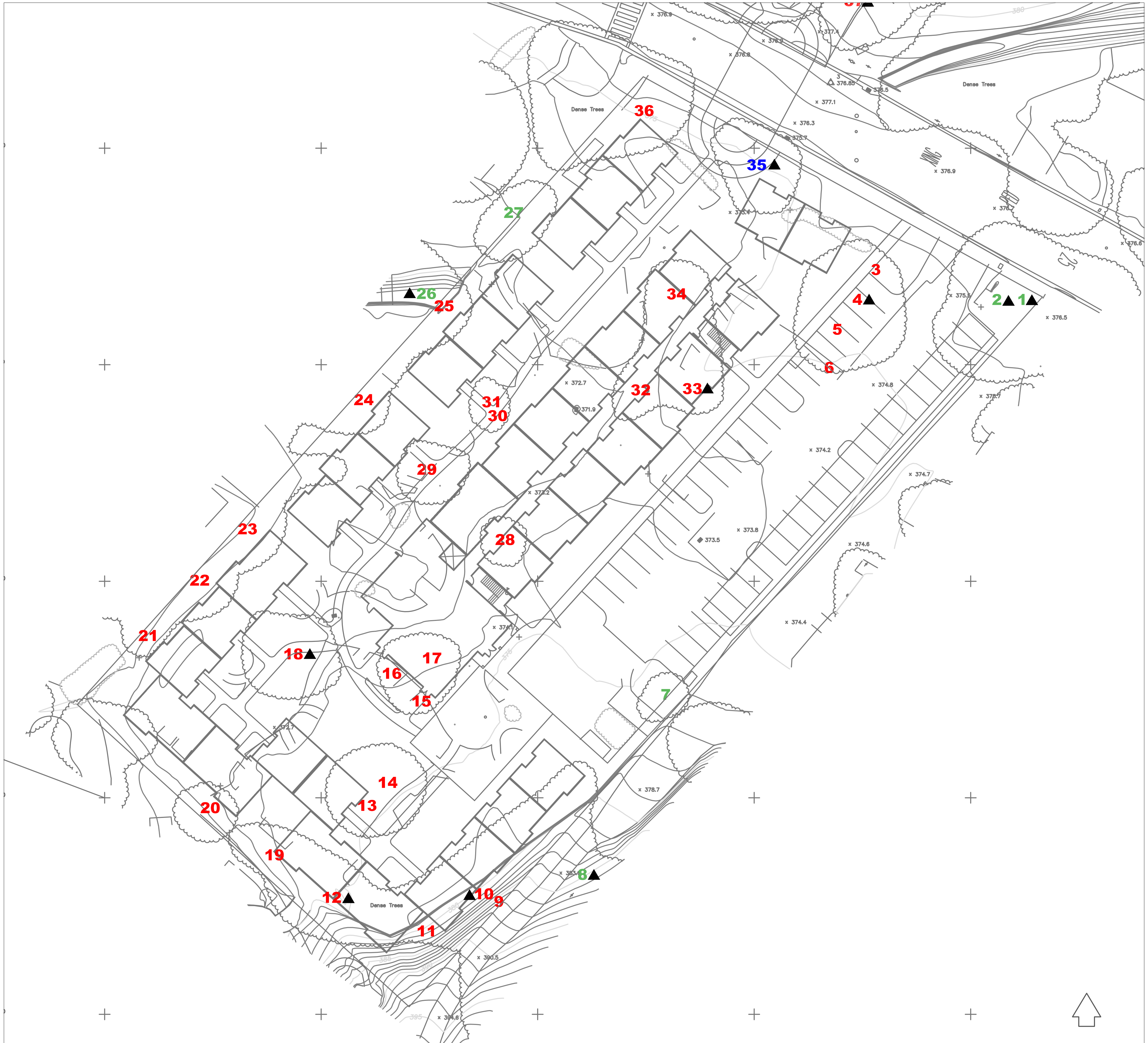

Tree Dispostion Plan

Kottinger Senior
Housing Project
Southern Section
Pleasanton, CA

Prepared for:
MidPen Housing Corporation
Foster City, CA

July 3, 2013

No Scale

Notes:

Site plan provided by:
The Dahlin Group

Numbered tree locations
are approximate.

Refer to HortScience Tree Assessment for
description of the trees.

55 = Trees to preserve
55 = Trees to possibly preserve
55 = Trees to be removed
▲ = Heritage trees

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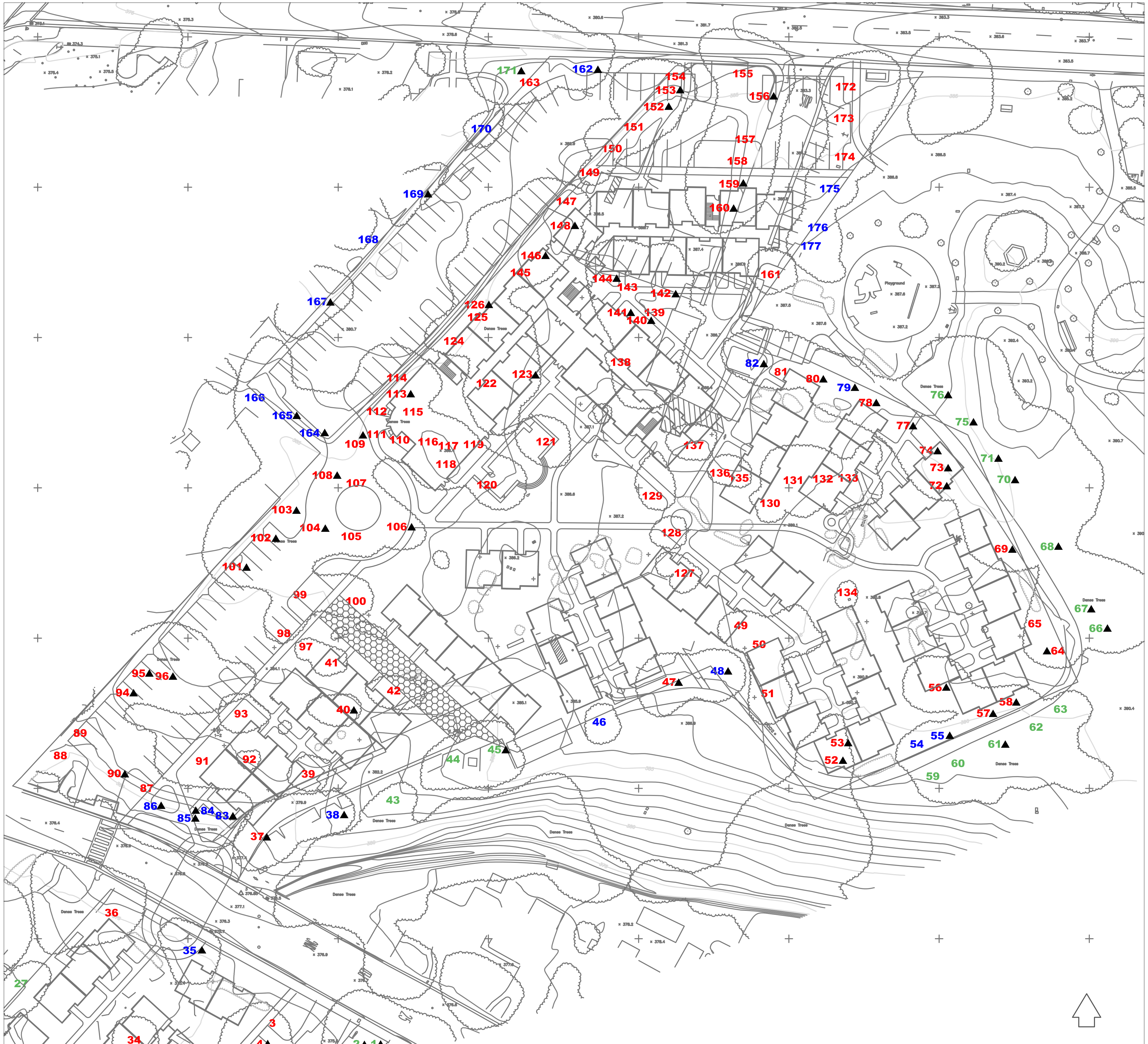

Tree Dispostion Plan

Kottinger Senior Housing Project Northern Section

Pleasanton, CA

Prepared for:
MidPen Housing Corporation
Foster City, CA

July 3, 2013

No Scale

Notes:

Site plan provided by:
The Dahlin Group

Numbered tree locations are approximate.

Refer to HortScience Tree Assessment for description of the trees.

55 = Trees to preserve
55 = Trees to possibly preserve
55 = Trees to be removed
▲ = Heritage trees

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Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

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TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
1	Valley oak	20	Yes	4	High	One-sided to N.; multiple attachments at 20'; fill and paving stones over root collar.
2	Valley oak	20	Yes	4	High	Multiple attachments at 10'; crown to S.; fill and paving stone over root collar; codominant form with #1.
3	Sweetgum	19	Yes	3	Moderate	Codominant at 8'; topped; very large surface roots.
4	Sweetgum	20	Yes	3	Moderate	Multiple attachments at 10'; topped; small cavity on W.
5	Sweetgum	17	No	3	Moderate	Topped; mounded at base; large surface roots.
6	Peach	6	No	4	Moderate	Multiple attachments at 5'.
7	Ginkgo	7	No	4	High	Good young tree.
8	Valley oak	18	Yes	4	High	Off-site; no tag; base engulfed in ivy; full crown.
9	Arizona cypress	9	No	3	Moderate	Very high narrow crown.
10	Coast redwood	25	Yes	4	High	Crown lifted to 25'.
11	Incense cedar	11	No	3	Moderate	Crown lifted to 12'; thin crown.
12	Coast redwood	25	Yes	4	High	Crown lifted to 12'; a bit thin; minor tip burn.
13	Callery pear	13	No	4	Moderate	Multiple attachments at 8' with narrow attachment; full crown.
14	Callery pear	11	No	4	Moderate	Multiple attachments at 8';
15	Sweetgum	14	No	3	Low	Codominant at 8' with very narrow attachment.
16	Sweetgum	14	No	3	Low	Codominant at 5' with very narrow attachment and included bark.
17	Cherry	10,7,5	No	3	Moderate	Multiple attachments at 3'; trunk decay.
18	Southern	19	Yes	4	High	Codominant at 6'; nice full crown.
19	Callery pear	14	No	4	Moderate	Multiple attachments at 10' with narrow attachment.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
20	Desert willow	10	No	3	Low	Extensive cracks in trunk and branches; good form.
21	Callery pear	10	No	2	Low	Extensive dieback.
22	Callery pear	15	No	3	Low	Leaning to E.; multiple attachments at 6'; bark checking at base.
23	Callery pear	15	No	3	Moderate	Multiple attachments at 6'; topped; full crown.
24	Monterey pine	8,8	No	1	Low	Little live foliage.
25	Glossy privet	6,5,3	No	2	Low	Multiple attachments at 1'; poor form.
26	English walnut	14,11	Yes	3	Moderate	Off-site; no tag; codominant at 5'; full crown.
27	Glossy privet	multi-stem	No	3	Low	Off-site; no tag; hedge of 30 stems 6" and smaller at fence line.
28	Colorado spruce	13	No	5	High	Nice tree; good form.
29	Crape myrtle	8,6,6,5,5	No	5	High	Multiple attachments at base; full crown; excellent health.
30	European white birch	6	No	1	Low	Topped; extensive dieback.
31	European white birch	7	No	2	Low	Topped; dieback.
32	Purple-leafed plum	6,5,4,4,3	No	2	Low	Multiple attachments at 4'; extensive trunk decay.
33	Southern	18	Yes	4	High	Full crown; small cavity on S.
34	Chinese tallow	12	No	4	Moderate	Codominant at 7'; interior deadwood; surface roots.
35	Coast redwood	39	Yes	5	High	Excellent health and structure.
36	Hackberry	11	No	4	High	Good form; minor dieback.
37	Modesto ash	21	Yes	3	Moderate	Codominant at 5'; stem to N. is starting to separate; thinning crown.
38	Modesto ash	21	Yes	3	Moderate	Multiple attachments at 5'; branch tore out on E.; thinning crown with dieback.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

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TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
39	Strawberry tree	7,5,5,5,5,5,4	No	4	High	Multiple attachments at base; full crown.
40	Canary Island pine	18	Yes	4	High	Tall narrow form.
41	Blackwood acacia	9,7,7,4	No	3	Low	At edge of building; multiple attachments at 2'; branches twist around each other.
42	Canary Island pine	17	No	4	High	Tall narrow form.
43	Raywood ash	14	No	3	Low	Poorly pruned; one upright stem remains.
44	Modesto ash	14	No	3	Low	Codominant at 6'; extensive dieback; trunk leans S.
45	Modesto ash	21	Yes	3	Low	Multiple attachments at 6'; extensive dieback.
46	Idaho locust	11	No	3	Low	Very thin; enlarged basal flare.
47	Modesto ash	20	Yes	2	Low	Trunk decay from base into upright stems; full crown.
48	Coast redwood	35	Yes	5	High	Excellent health and structure.
49	Pyracantha	8,6,5	No	3	Low	Poor form; dieback.
50	Scots pine	10	No	2	Low	Tall narrow form; leans N.
51	Zelkova	15	No	3	Moderate	Multiple attachments at 6'; nice full crown; girdling root.
52	Catalpa	15,10,8,6	Yes	3	Moderate	Multiple attachments at base; root pruned?
53	Catalpa	18	Yes	4	Moderate	Good upright form; decay in roots; root pruned?
54	Canary Island pine	15	No	4	High	Good upright form; a bit thin.
55	Canary Island pine	18	Yes	4	Moderate	Good upright form; a bit thin; one-sided to E.
56	Cork oak	18	Yes	4	High	Good form and structure.
57	Canary Island pine	18	Yes	4	High	Good upright form; a bit thin.
58	Canary Island pine	18	Yes	4	High	Good upright form; a bit thin.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
59	Idaho locust	11	No	3	Low	Off-site; edge of existing path; multiple attachments at 4' with decay in point of attachment.
60	Aleppo	8	No	2	Low	Off-site; edge of existing path; failing at base.
61	Aleppo	29	Yes	3	Low	Off-site; edge of existing path; codominant at 15'; heavy low lateral limb.
62	Coast redwood	16	No	5	High	Off-site; edge of existing path; excellent health and structure.
63	Coast redwood	16	No	5	High	Off-site; edge of existing path; excellent health and structure.
64	Siberian elm	18	Yes	3	Low	Codominant at 6'; twig dieback.
65	Siberian elm	10	No	3	Moderate	Codominant at 7'; base at edge of building.
66	Coast redwood	34	Yes	5	High	Off-site; edge of existing path; excellent health and structure.
67	Coast redwood	34	Yes	5	High	Off-site; edge of existing path; excellent health and structure.
68	Coast redwood	43	Yes	4	High	Off-site; edge of existing path; excellent health; codominant high in crown.
69	Siberian elm	22	Yes	3	Low	Multiple attachments at 12'; full heavy crown; extensive surface roots with decay.
70	Coast redwood	35	Yes	3	Moderate	Off-site; edge of existing path; extensive wound from codominant failure.
71	Coast redwood	39	Yes	4	Moderate	Off-site; edge of existing path; codominant at 18'; otherwise good.
72	Canary Island pine	18	Yes	4	High	Good form; thin crown.
73	Canary Island pine	21	Yes	3	Moderate	Codominant high in crown.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
74	Canary Island pine	20	Yes	4	High	Good upright form.
75	Coast redwood	22	Yes	3	Low	Off-site; edge of existing path; very thin.
76	Coast redwood	25	Yes	3	Moderate	Off-site; edge of existing path; corrected form; thin crown.
77	Catalpa	24	Yes	2	Low	Extensive trunk and branch wounds; full crown.
78	Catalpa	18	Yes	3	Moderate	Narrow crown; trunk wound.
79	Catalpa	27	Yes	3	Moderate	Heavy low lateral; dieback.
80	Catalpa	21	Yes	2	Low	Extensive trunk and branch decay.
81	Catalpa	15	No	2	Low	Extensive dieback.
82	Catalpa	27	Yes	3	Moderate	Multiple attachments at 12'; full crown; small trunk wound.
83	Canary Island pine	19	Yes	4	High	Good form and structure; a bit thin.
84	Canary Island pine	21	Yes	4	High	Heavy low lateral; otherwise good.
85	Canary Island pine	20	Yes	3	Moderate	Codominant high in crown.
86	Canary Island pine	24	Yes	4	High	Good form; a bit thin.
87	Bronze loquat	6,5,4,3	No	3	Low	Multiple attachments at base; decay in 3" stem.
88	Evergreen pear	7	No	3	Moderate	Suppressed; thin crown.
89	Evergreen pear	6	No	4	Moderate	Ok form.
90	Aleppo	35	Yes	3	Low	Codominant at 8' with very narrow attachment; cabled; stem to S. heavy weight over bus stop.
91	Plum	7	No	3	Low	Crown bows away from building.
92	Glossy privet	6,6,3,3	No	4	Moderate	Multiple attachments at 2'; good young tree.
93	Evergreen pear	11	No	4	Moderate	Codominant at 6'; full crown.
94	River red gum	23	Yes	4	Moderate	Good form; lerp psyllid.
95	River red gum	21	Yes	2	Low	Poor form and structure; topped; lerp psyllid.
96	River red gum	20,12	Yes	3	Low	History of branch failure; lerp psyllid.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
97	Cabbage tree	6	No	3	Low	Single stem.
98	Evergreen pear	11	No	3	Moderate	Corrected form.
99	Evergreen pear	13	No	3	Low	Codominant at 12'; history of branch failure; thin crown.
100	Evergreen pear	14	No	3	Low	Multiple attachments at 6'; history of branch failure.
101	Silver dollar gum	32	Yes	4	Moderate	Multiple attachments at 6'; one-sided to south
102	Silver dollar gum	28	Yes	4	High	Multiple attachments at 8'; good form and structure.
103	Silver dollar gum	30	Yes	3	Low	History of branch failure; multiple attachments at 7'; thin crown
104	Silver dollar gum	14,12,12,12,10 ,9,9,7,7	Yes	3	Low	Stump sprouts from base; full dense crown.
105	California pepper	11	No	4	Moderate	Crooked form; basal wound with decay.
106	California pepper	18	Yes	2	Low	Extensive trunk and branch decay; very thin.
107	California pepper	15	No	3	Moderate	Branch dieback.
108	River red gum	32	Yes	2	Low	Extensive wound in trunk extends up into upright stems.
109	Silver dollar gum	10	No	3	Low	Trunk and crown sweep up; codominant attachment removed at base.
110	Italian stone pine	15	No	3	Low	Girdling root; codominant high in crown.
111	Silver dollar gum	18,15,12,8	Yes	3	Low	Multiple attachments at 4'; trunk wound; thin crown.
112	Canary Island pine	12	No	3	Moderate	Tall narrow form; codominant high in crown.
113	Aleppo	23	Yes	3	Moderate	Codominant at 8'; crown beginning to separate.

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
114	Valley oak	10,5	No	3	Low	Suppressed by #113; poor form; on fence line.
115	Sweetgum	14	No	3	Low	Poor form; twig dieback.
116	Sweetgum	17	No	4	Moderate	Twig dieback; high crown with multiple attachment.
117	Sweetgum	12	No	3	Moderate	Multiple attachments at 12'; low lateral extends over building.
118	Sweetgum	13	No	3	Low	Thin crown; dieback.
119	Sweetgum	15	No	3	Low	Codominant at 6'; large surface roots.
120	Sweetgum	16	No	3	Low	Multiple attachments at 6'; girdling roots;
121	Southern	15	No	3	Low	Thin crown with dieback.
122	English walnut	7,7	No	3	Low	Codominant at 3'; exposed roots.
123	River red gum	56	Yes	3	Moderate	Multiple attachments at 6'; huge tree very close to building; starting to displace foundation; good form; thin crown.
124	Bailey acacia	9	No	2	Low	Poor form and structure; trunk turns 90 degrees at base.
125	Italian stone pine	11	No	2	Low	Failing at base.
126	River red gum	18	Yes	3	Moderate	Corrected form to W.
127	Lombardy poplar	11,10,10,10	No	4	Moderate	Multiple attachments at base; large surface roots.
128	Silver maple	8	No	4	Moderate	Codominant at 6'; full crown.
129	Evergreen pear	10	No	3	Moderate	Crown to S.
130	Mayten	7	No	2	Low	Extensive dieback; trunk decay.
131	Mayten	8	No	3	Low	Codominant at 6'; poor form.
132	Zelkova	16	No	4	Moderate	Multiple attachments at 7'; full wide crown; good form.
133	Canary Island date palm	49	Yes	4	High	6' clear trunk.
134	Siberian elm	6,5	No	3	Moderate	Codominant at base; full crown.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
135	Mayten	10	No	3	Low	Codominant at 5'; dieback.
136	Mayten	8,3,3	No	1	Low	Extensive decay.
137	Mayten	9,7	No	3	Low	Codominant at base; dieback.
138	London plane	25	Yes	4	High	Excellent form and structure; heavy low lat over carport; full dense crown.
139	London plane	14	No	2	Low	Extensive twig and branch dieback; epicormic growth.
140	Canary Island pine	19	Yes	3	Moderate	Codominant high in crown.
141	Canary Island pine	18	Yes	4	High	Narrow form.
142	Canary Island pine	22	Yes	5	High	Excellent form and structure.
143	Canary Island pine	17	No	4	High	Corrected form.
144	Canary Island pine	18	Yes	4	High	Good form; a bit thin.
145	Canary Island pine	13	No	4	High	Good form; a bit thin.
146	River red gum	32,26,26,24	Yes	3	Moderate	Multiple attachments at base; topped; thin crown;
147	Plum	6,6,4,4	No	3	Low	Multiple attachments at 2'; twig dieback.
148	River red gum	24	Yes	2	Low	Extensive wound with decay; twig dieback; declining.
149	Almond	8	No	3	Low	Partially failed at base; twig dieback.
150	Almond	10	No	3	Low	Poor form and structure.
151	Almond	7	No	2	Low	Very poor form; branch failure.
152	Valley oak	10,8	Yes	3	Moderate	Twig dieback; codominant at 1'; power lines go through crown.
153	River red gum	12,11,10,9	Yes	3	Moderate	Multiple attachments at base; stump sprouts; full crown.
154	Almond	12	No	3	Low	Poor form and structure; twig dieback.
155	Modesto ash	17	No	3	Low	Crown and trunk to N.
156	Modesto ash	30	Yes	2	Low	Codominant at 7' with crack between stems; cabled and bolted; girdling roots.

Tree Assessment

Kottinger Senior Housing Project
Pleasanton, CA
June 2013

HORT SCIENCE

TREE No.	SPECIES	TRUNK DIAMETER (inches)	HERITAGE TREE?	CONDITION 1=Poor 5=Excellent	SUITABILITY FOR PRESERVATIO	COMMENTS
157	Hollywood juniper	15	No	3	Low	Crown and trunk severely bow away from building.
158	Hollywood juniper	11	No	3	Low	Suppressed.
159	Modesto ash	31	Yes	3	Moderate	Multiple attachments at 6'; no basal flare; girdling root; thin upper crown.
160	Modesto ash	32	Yes	2	Low	Multiple attachments at 5' with decay below attachment; decay in upright stem; history of branch failure.
161	Raywood ash	16	No	4	Moderate	Good form.
162	Coast redwood	38	Yes	4	High	Multiple stems arise at 25'; full dense crown.
163	Ginkgo	12	No	3	Moderate	Suppressed by neighbor; thin crown;
164	Coast live oak	35	Yes	4	High	Codominant at 2'; trunks fused together; weight of crown to W.
165	Coast live oak	24	Yes	5	High	Excellent form and structure.
166	California black walnut	8,6,6,6	No	3	Low	Multiple attachments from base; stump sprout
167	California black walnut	14,12,12	Yes	2	Low	Off-site, no tag; multiple attachments from base; poor form; center stem and stem to N. are dead.
168	California black walnut	16	No	3	Low	Off-site, no tag; good form; codominant at 7'.
169	California black walnut	24	Yes	3	Low	Off-site, no tag; codominant at 4' with decay in point of attachment.
170	Avocado	12	No	3	Moderate	Off-site, no tag; base at fence; full crown.
171	Siberian elm	14,14,13,12,12 ,12,12	Yes	3	Low	Off-site, no tag; small grove of trees; stems from base; twig and branch dieback; thin crown.

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Kottinger Drive Senior Housing Project Traffic Impact Analysis

to the

City of Pleasanton

from

MidPen Housing Corporation

Updated Draft Report

February 13, 2014

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Executive Summary

The proposed Kottinger Drive Housing project would result in the development of 185 residential units for seniors on aa site located at 240 Kottinger Drive (Kottinger Place) and 251 Kottinger Drive (Pleasanton Gardens) in the City of Pleasanton. The proposed project would demolish the 90 existing senior housing units and build 54 new units on the Pleasanton Gardens site and 131 units on the Kottinger Place site, for a net increase of 95 senior units. It was determined that this project was not included in the recently approved *Pleasanton Housing Element EIR*.

The project is anticipated to generate an average of 295 net new trips on a daily basis, of which 20 trips would occur during the morning peak hour and 24 trips during the evening peak hour. It should be noted that the trip generation analysis presented in this report is based on a previous concept plan that included a total of 189 new residential units. However, based on the most recent site plan dated January 2014, the project would provide 185 new residential units. Therefore, the trip generation and traffic operation analysis presented in this report is conservative based on the slightly higher unit count.

Currently the study intersection of 1st Street/Bernal Avenue-Sunol Boulevard operates unacceptably at LOS E during the p.m. peak hour and it would continue to do so under all study scenarios without and with the addition of project-generated traffic. However, according to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*. All the remaining study intersections would operate at acceptable levels of service under all study scenarios without and with the addition of project-generated traffic.

Vehicular access to the Kottinger Place project site would be provided via two new full access driveways: one on Vineyard Avenue and one on Kottinger Drive. Vehicular access to the Pleasanton Gardens project site would be maintained through an existing driveway located on the south side of Kottinger Drive. To maintain clear sight lines, it is recommended that on-street parking be prohibited for 50 feet on either side of the proposed driveway on Vineyard Avenue. Additionally, periodic maintenance, including trimming of the vegetation on both sides of the project driveways on Kottinger Drive and Vineyard Avenue, should be undertaken.

The proposed project would provide 149 parking spaces which is expected to be adequate to satisfy the projected parking demand of 0.8 parking spaces per dwelling unit, which is the same as the current site.

Pedestrian and bicycle access to the site is expected to be adequate. Separate pedestrian entrances on Kottinger Drive would be provided to connect the Pleasanton Gardens and Kottinger Place sites and avoid pedestrian access through the parking lot. Existing transit route and bus stops adjacent to the project site on Vineyard Avenue and 1st Street together with the relocated bus stop on Kottinger Drive along the project frontage would adequately serve the project-generated transit trips.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with the development of 185 residential units for seniors located at 240 Kottinger Drive and 251 Kottinger Drive 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.

Project Profile

The project as proposed includes the development of 185 residential units for seniors on sites that are located at 240 Kottinger Drive (Kottinger Place) and 251 Kottinger Drive (Pleasanton Gardens) in the City of Pleasanton, as shown in Figure 1. Currently, the two project sites are occupied by 90 residential units (50 on the Kottinger Place site and 40 on the Pleasanton Gardens site) for seniors. The proposed project would demolish the existing units and build 54 new units on the Pleasanton Gardens site and 131 units on the Kottinger Place site, for a net increase of 95 senior residential units. As part of the proposed project, the Regalia House site located at 4133 Regalia Court and a vacant parcel located at 4138 Vineyard Avenue would be incorporated into the new plan for Kottinger Place. The Kottinger Place project site would be accessed via two new full access driveways: one on Vineyard Avenue and one on Kottinger Drive, while access to the Pleasanton Gardens project site would be maintained through an existing driveway on Kottinger Drive.

Kottinger Drive Senior Housing Project Traffic Impact Analysis

City of Pleasanton

Figure 1

Study Area and Lane Configurations

Operational Analysis

Study Area and Periods

The study area includes the immediate site vicinity and local roadways, as well as the following eight intersections:

1. 1st Street/Vineyard Avenue-Ray Street
2. 1st Street/Kottinger Drive-Spring Street
3. 1st Street/Neal Street
4. 1st Street/Bernal Avenue
5. Vineyard Avenue/Adams Way
6. Kottinger Drive/Adams Way-Mirador Drive
7. Stanley Boulevard/Bernal Avenue-Valley Avenue
8. Bernal Avenue/Vineyard Avenue-Tawny Drive

Operating conditions during typical weekday 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), were incorporated into this analysis. Existing traffic volume data were not available for the study intersections of Kottinger Drive/Adams Way and Vineyard Avenue/Adams Way; therefore, new a.m. (7:00-9:00) and p.m. (4:00-6:00) peak hour turning movement counts were conducted in April 2013.

Study Intersections

1st Street/Ray Street-Vineyard Avenue is a four-way, signalized intersection with protected left-turn phasing on the northbound and southbound 1st Street approaches and split, or exclusive, phasing on the eastbound Ray Street approach and westbound Vineyard Street approach. Marked crosswalks are provided across all legs of the intersection, along with pedestrian signals and push buttons.

1st Street/Kottinger Drive-Spring Street is a signalized four-legged intersection with permissive left-turn phasing on all approaches. Marked crosswalks and pedestrian signal heads with push buttons are provided across all legs of the intersection except the southern leg.

1st Street/Neal Street is a four-legged, signalized intersection with permissive left-turn phasing on all approaches. Marked crosswalks and pedestrian crossing signal equipment are provided across all legs of the intersection.

1st Street/Bernal Avenue is a four-legged signalized intersection with protected left-turn phasing on all approaches. Marked crosswalks and pedestrian crossing signal equipment are provided across all legs of the intersection.

Vineyard Avenue/Adams Way is an unsignalized tee-intersection with the eastbound and westbound Vineyard Street approaches being free and the northbound Adams Way approach being stop controlled. Marked crosswalks are provided across all legs of the intersection.

Kottinger Drive/Adams Way-Mirador Drive is a four-way, all-way stop-controlled intersection. Marked crosswalks are provided across all legs of the intersection except the western leg.

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

Bernal Avenue/Vineyard Avenue-Tawny Drive is a four-legged, signalized intersection with protected left-turn phasing on the northbound and southbound Bernal Avenue approaches and exclusive left–turn phasing on the eastbound and westbound Kottinger Drive-Tawny Drive approaches. Marked crosswalks with pedestrian signal heads and push buttons are provided across all legs of the intersection except the southern leg.

The locations of the study intersections as well as the existing lane configurations and traffic controls 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. Marked crosswalks and pedestrian signal phasing are provided at all signalized intersections. Additionally, a mid-block crosswalk exists on Kottinger Drive near the project vicinity providing pedestrian connectivity between the Pleasanton Gardens and Kottinger Place sites.

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.

Within the project vicinity, Class II bike lanes exist on Vineyard Avenue, First Street north of Vineyard Avenue, and Bernal Avenue south of Stanley Boulevard.

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. Following 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.

Wheels Bus Route 8 provides weekday and weekend (Saturday) service along Kottinger Drive and Vineyard Avenue between the East Dublin/Pleasanton BART Station and Downtown Pleasanton connecting Hopyard Road, Civic Center, Senior Center, Fairgrounds and Vintage Hills. During weekdays, service is provided between 6:00 a.m. and 7:00 p.m. with about 60-minute headways. On Saturdays, service is provided between 6:00 a.m. and 9:00 p.m. with approximately 60 to 120 minute headways. Bus stops are provided in both the eastbound and westbound directions along the Kottinger Place site frontage. The eastbound direction bus stop is on the south side of Vineyard Avenue just east of Regalia Court. The westbound direction bus stop is on the north side of Kottinger Drive approximately 190 feet east of 2nd Street.

Wheels Bus Route 10 provides weekday and weekend service along 1st Street between the East/Dublin Pleasanton Station to the west and Livermore Transit Center and beyond to the east. On weekday evenings and weekends, this route continues east to the Stoneridge Mall. Service is generally provided between 4:30 a.m. and 12:30 a.m. with approximately 30 to 40 minute headways. Bus stops are provided in both the northbound and southbound directions on 1st Street near the project vicinity. The northbound direction bus stop is located on the east side of 1st Street just north of Kottinger Drive. The southbound direction bus stop is located on the west side of 1st Street approximately 200 feet north of Kottinger Drive.

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 in 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 East 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 four 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 8 provides service between the project site and the East Dublin/Pleasanton BART Station.

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. The ACE station in Pleasanton is located at Pleasanton Avenue north of Bernal Avenue. Wheels Bus Route 8 does not provide direct service 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 study intersection of Vineyard Avenue/Adams Way, which has side-street stop controls, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall age delay for the intersection.

The study intersection of Kottinger Drive/Adams Way has stop signs on all approaches, and was analyzed using the "All-Way Stop-Controlled" Intersection" methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole, and is then related to a Level of Service.

All of the remaining study intersections are controlled by traffic signals and 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	All-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. Upon stopping, drivers are immediately able to proceed.	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 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop.	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 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection.	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 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches.	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 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection.	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 50 seconds. Drivers enter long queues on all approaches.	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). However, there are a few exceptions to the LOS D standard in the Downtown area and at the City of Pleasanton gateway intersections. These intersections may have a level of service below the LOS D standard if no reasonable mitigation exists or if the necessary mitigation is contrary to other goals and policies of the City. Traffic impacts at the study intersections would be considered significant if the Project would result in any of the following:

Signalized Intersections

- 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

Unsignalized Intersections

- Deterioration of a controlled movement at an unsignalized intersection from LOS E or better to LOS F, or at intersections where a controlled movement already operates at LOS F, one of the following:

- Project traffic results in satisfaction of the peak hour volume traffic signal warrant;
- Project traffic increases minor movement delay by more than 30 seconds; or
- Where the peak hour volume signal warrant is met without Project traffic and delay cannot be measured, Project increases traffic by 10 or more vehicles per lane on the controlled approach.

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 not included in the environmental analysis for the City's Housing Element update. Level of service was evaluated at the study intersections for the following scenarios:

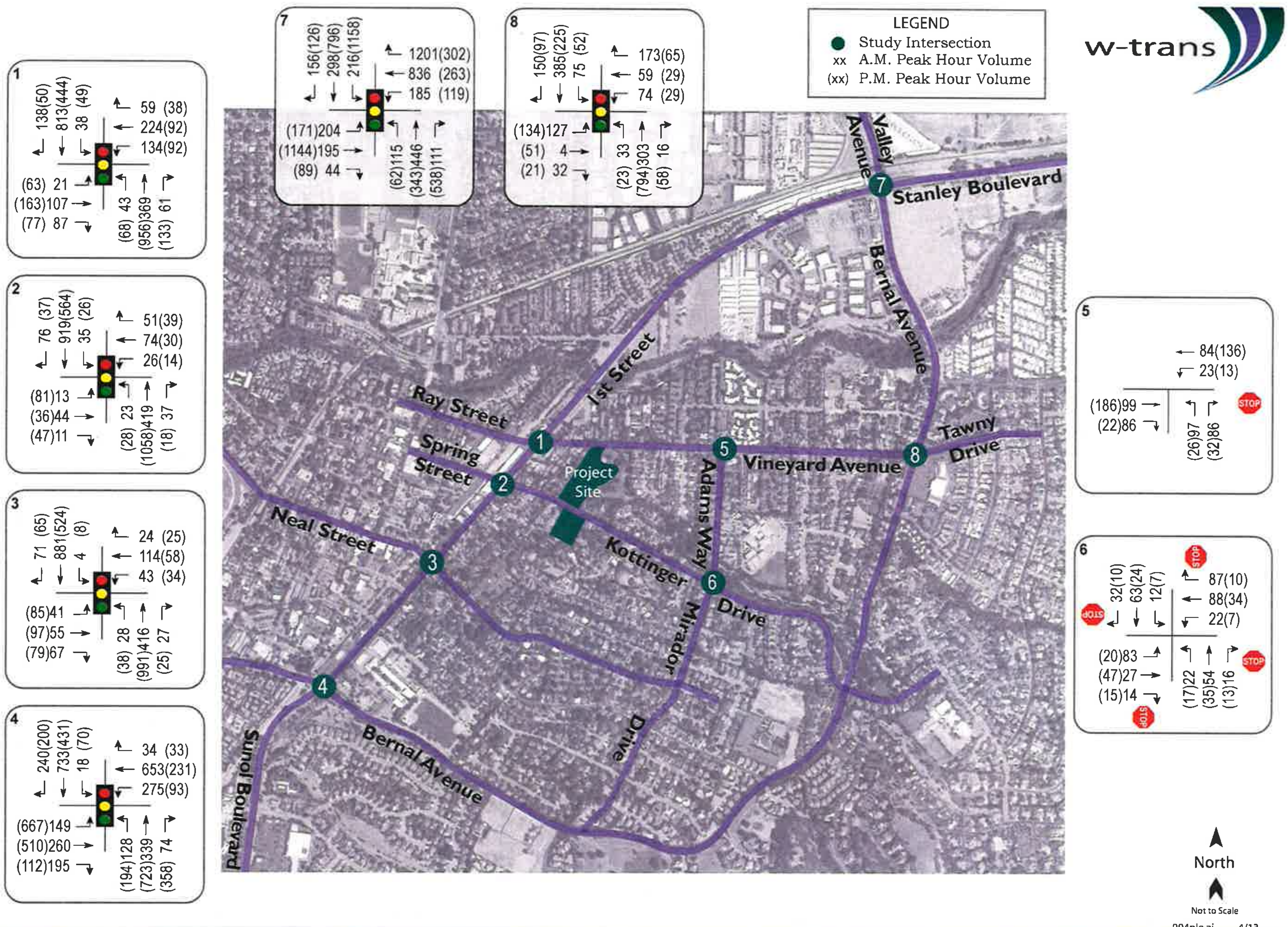
- *Existing conditions* – traffic volume data were obtained directly from the model for the existing conditions without project scenario.
- *Existing plus Project conditions* – project traffic volumes were added to the existing conditions traffic volumes to represent existing plus project conditions.
- *Existing plus Approved Projects conditions* – short-term future traffic volume data was directly obtained from the City's model.
- *Existing plus Approved Projects plus Project conditions* – project traffic volumes were added to the short-term conditions traffic volumes to represent existing plus approved project plus project conditions.
- *Cumulative conditions* – Cumulative conditions traffic volumes were obtained directly from City's model.
- *Cumulative plus Project conditions* – project traffic volumes were added to the cumulative conditions traffic volumes to represent cumulative plus project conditions.

Recent traffic volume data for the intersections of Kottinger Drive/Adams Way and Vineyard Avenue/ Adams Way were not available. Therefore, traffic volumes for these intersections under short-term and cumulative scenarios were developed based on balancing traffic volumes with adjacent intersections.

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 First Street/Bernal Avenue-Sunol Boulevard, which currently operates at LOS E during the p.m. peak hour. According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard. 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.



Kottinger Drive Senior Housing Project Traffic Impact Analysis

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. 1st St/Vineyard Ave-Ray St	20.5	C	28.5	C
2. 1st St/Kottinger Dr-Spring St	18.3	B	21.1	C
3. 1st St/Neal St	14.8	B	19.8	B
4. 1st St/Bernal Ave-Sunol Blvd*	33.8	C	**65.9**	**E**
5. Vineyard Ave/Adams Way	6.6	A	1.8	A
Northbound (Adams Ave) approach	*16.1*	*C*	*11.2*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	11.2	B	7.7	A
7. Stanley Blvd/Bernal Ave-Valley Ave	52.2	D	47.4	D
8. Bernal Ave/Vineyard Ave-Tawny Dr	17.4	B	10.7	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard.

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 following two intersections:

Stanley Boulevard/Bernal Avenue-Valley Avenue

The westbound Stanley Boulevard approach is to be converted to two left-turn lanes, two through lanes and a free right-turn lane. Additionally, the eastbound approach would be modified to provide two left-turn lanes, two through lanes and a shared through/right-turn lane. These improvements were included for the analysis of Existing plus Approved Projects and Cumulative Conditions scenarios.

1st Street/Bernal Avenue-Sunol Boulevard

The westbound Bernal Avenue approach is to be converted to two left-turn lanes, one through lane and a shared through/right-turn lane. Per the City's direction, this improvement was included for the analysis of only the Cumulative Conditions scenario.

Project Description

The project as proposed includes the development of 185 residential units for seniors located at 240 Kottinger Drive (Kottinger Place) and 251 Kottinger Drive (Pleasanton Gardens). Currently, the two project sites include 90 senior housing units (50 on the Kottinger Place site and 40 on the Pleasanton Gardens site) for seniors. The proposed project would demolish the existing units and build 54 new units on the Pleasanton Gardens site and 131 units on the Kottinger Place site, for a net increase of 95 senior units. As part of the proposed project, the Regalia House site located at 4133 Regalia Court and a vacant parcel located at 4138 Vineyard Avenue would be incorporated into the new plan for Kottinger Place. The Kottinger Place project site would be accessed via two new driveways: one on Vineyard Avenue and one on Kottinger Drive, while access to the Pleasanton Gardens project site would be maintained through the existing driveway on Kottinger Drive. The proposed site plan is shown in Figure 3A and 3B.

Trip Generation

The anticipated trip generation for the proposed project was estimated using the fitted curve equations for Senior Adult Housing-Attached (ITE Trip Generation Land Use #252) published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012. Because the site is currently occupied by 90 housing units for seniors, the trip generation of the existing use was also considered.

The expected trip generation potential for the proposed project is indicated in Table 3, with deductions taken for existing trips at the site. The proposed project is expected to result in a net increase of 295 daily trips, including 20 a.m. peak hour trips and 24 p.m. peak hour trips.

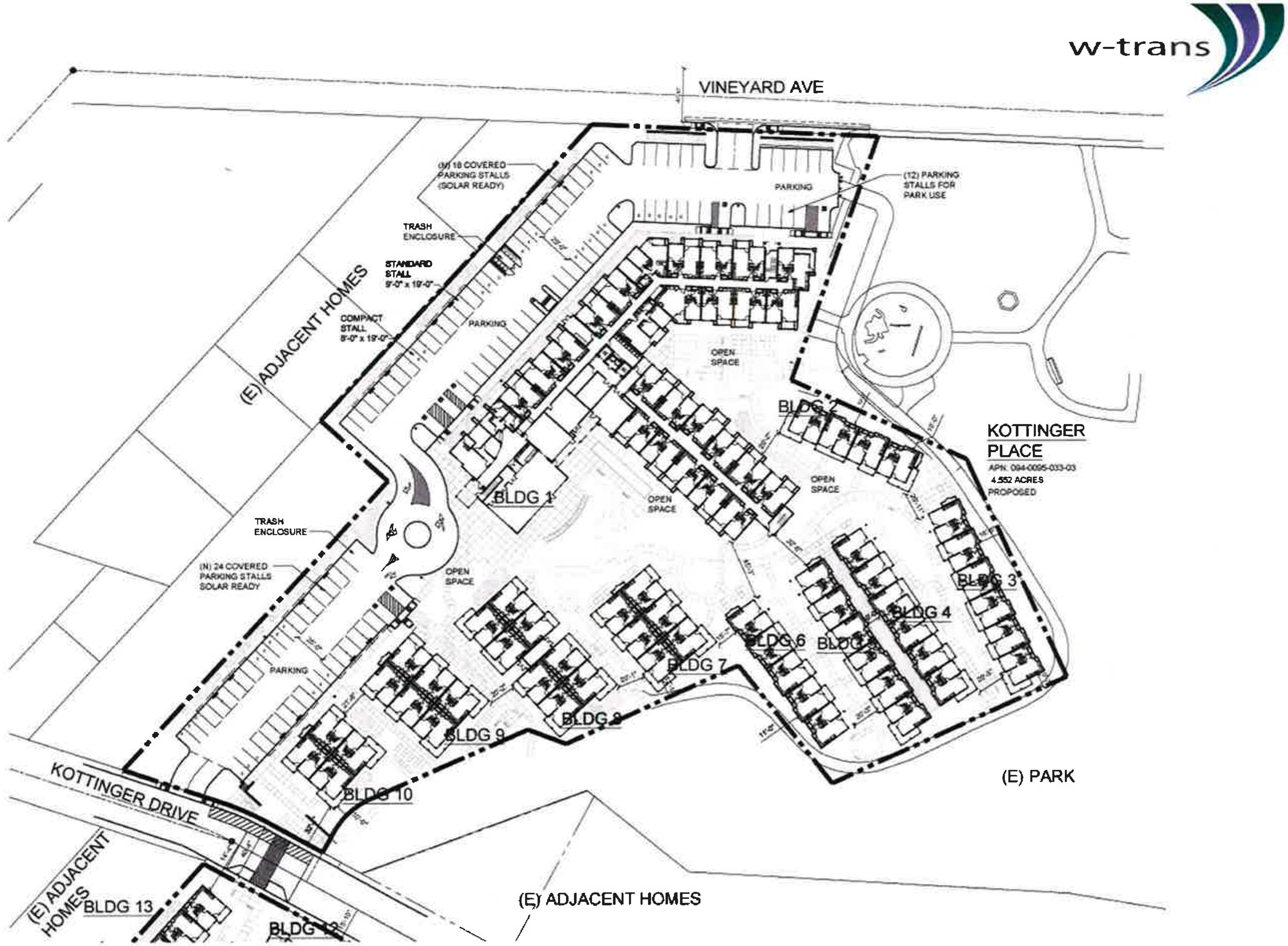
Table 3
Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Senior Housing-Attached	189* du	3.0	584	0.20	38	13	25	0.25	47	25	22
Existing											
Senior Housing-Attached	-90 du	-3.0	-289	-0.20	-18	-6	-12	-0.26	-23	-13	-10
Total Net-New Trips			**295**		**20**	**7**	**13**		**24**	**12**	**12**

Note: du = dwelling unit; * = the trip generation for the proposed project was based on a previous concept plan that included 189 new residential units. However, the new site plan has proposed 185 residential units. The trip generation analysis and traffic operations analysis in this report are conservative based on the slightly higher unit count

Trip Distribution

The trip distribution patterns used to allocate new project trips to the street network were determined by reviewing existing turning movements at the study intersections, location of the project site access points and traffic distribution patterns applied in a recently completed traffic study for 3150 Bernal Avenue. The applied distribution assumptions are shown in Table 4 and the resulting net new project traffic volumes are shown in Figure 4.



Source: Dahlin Group 1/10/14

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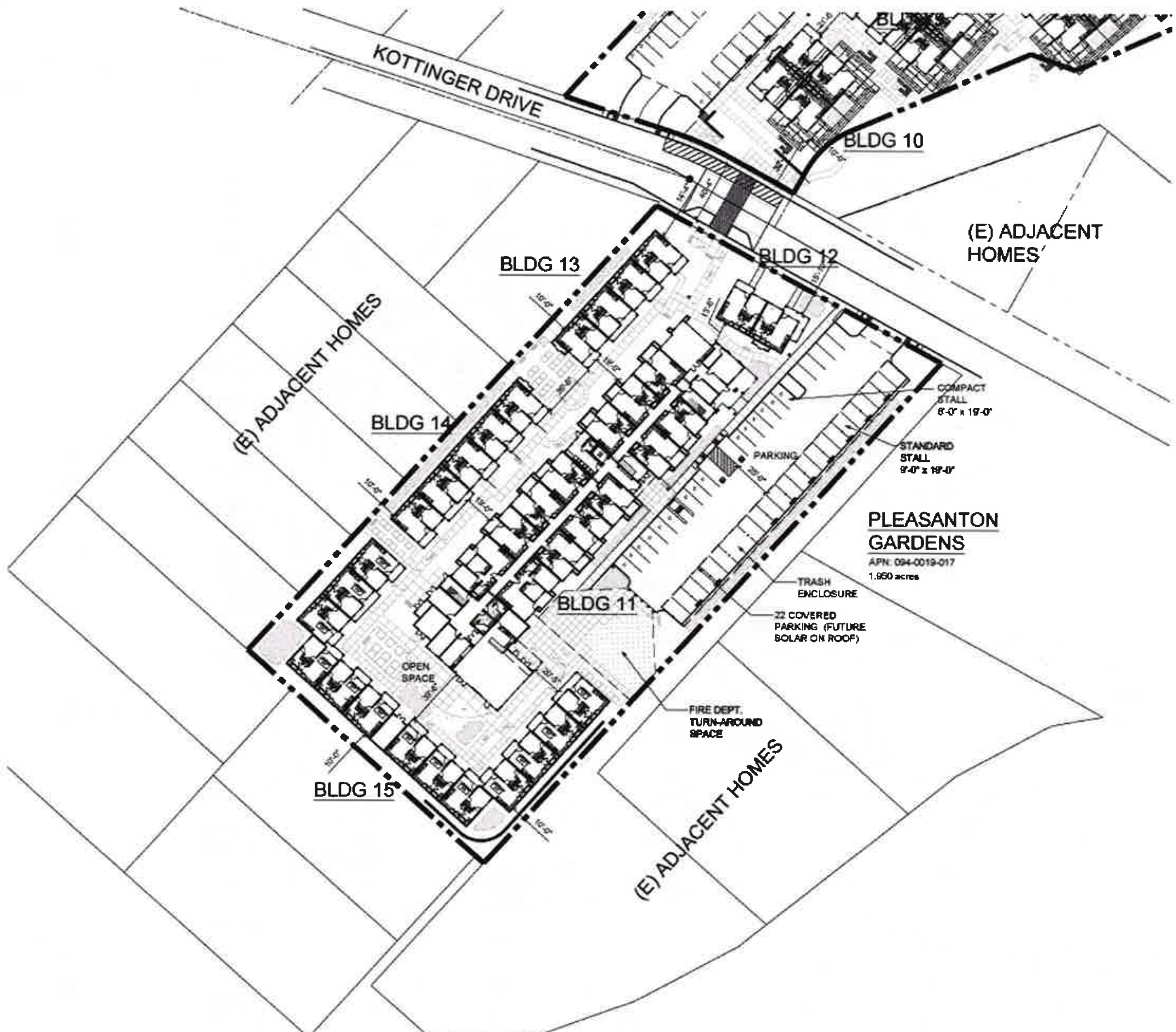
Kottinger Drive Senior Housing Project Traffic Impact Analysis

City of Pleasanton

Figure 3A

Site Plan - Kottinger Place



Source: Dahlin Group 1/10/14

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Kottinger Drive Senior Housing Project Traffic Impact Analysis

City of Pleasanton

Figure 3B

Site Plan - Pleasanton Gardens

Figure 4

Project Traffic Volumes

Kottinger Drive Senior Housing Project Traffic Impact Analysis

City of Pleasanton

Table 4
Trip Distribution Assumptions

Route	Percent
Santa Rita Rd north of Vineyard Ave	30%
Hopyard Rd west of 1st St	10%
Sunol Blvd south of Bernal Ave	25%
Bernal Ave west of 1st St	15%
Stanley Blvd east of Bernal Ave	20%
TOTAL	**100%**

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, all of the study intersections but one are expected to operate acceptably at LOS D or better during both the a.m. and p.m. peak hours. The intersection of 1st Street/Bernal Avenue-Sunol Boulevard would continue to operate at an unacceptable LOS E during the p.m. peak hour. A summary of the intersection level of service analysis is provided in Table 5 and copies of the Level of Service calculations are provided in Appendix A.

Table 5
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. 1st St/Vineyard Ave-Ray St	20.5	C	28.5	C	20.6	C	28.7	C
2. 1st St/Kottinger Dr-Spring St	18.3	B	21.1	C	18.9	B	21.7	C
3. 1st St/Neal St	14.8	B	19.8	B	14.8	B	19.9	B
4. 1st St/Bernal Ave-Sunol Blvd*	33.8	C	**65.9**	**E**	33.9	C	**66.6**	**E**
5. Vineyard Ave/Adams Way	6.6	A	1.8	A	6.7	A	1.9	A
Northbound Adams Ave	*16.1*	*C*	*11.2*	*B*	*16.2*	*C*	*11.2*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	11.2	B	7.7	A	11.2	B	7.7	A
7. Stanley Blvd/Bernal Ave-Valley Ave	52.2	D	47.4	D	52.3	D	47.4	D
8. Bernal Ave/Vineyard Ave-Tawny Dr	17.4	B	10.7	B	17.5	B	10.7	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard

The intersection of 1st Street/Bernal Avenue-Sunol Boulevard currently operates at an unacceptable LOS E during the p.m. peak hour. With the addition of the proposed project, the intersection would continue to operate at an unacceptable LOS E. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the

LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*.

Finding: The study intersections are expected to continue operating at an acceptable level of service with the addition of project-generated traffic except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard which would continue to operate at an unacceptable LOS E. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard.

Existing plus Approved Projects Conditions

Existing plus Approved Projects operating conditions were determined with traffic that would be generated by all approved and pending projects, added to existing traffic volumes, including the City's Housing Element, as contained in the City's Synchro traffic model. It should be noted that the planned TIF improvements at the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue were included in this analysis. Under these conditions, all of the study intersections are expected to operate at an acceptable LOS D or better, except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard, which would operate at an unacceptable LOS E during the p.m. peak hour. These results are summarized in Table 6, and Existing plus Approved Projects volumes are shown in Figure 5.

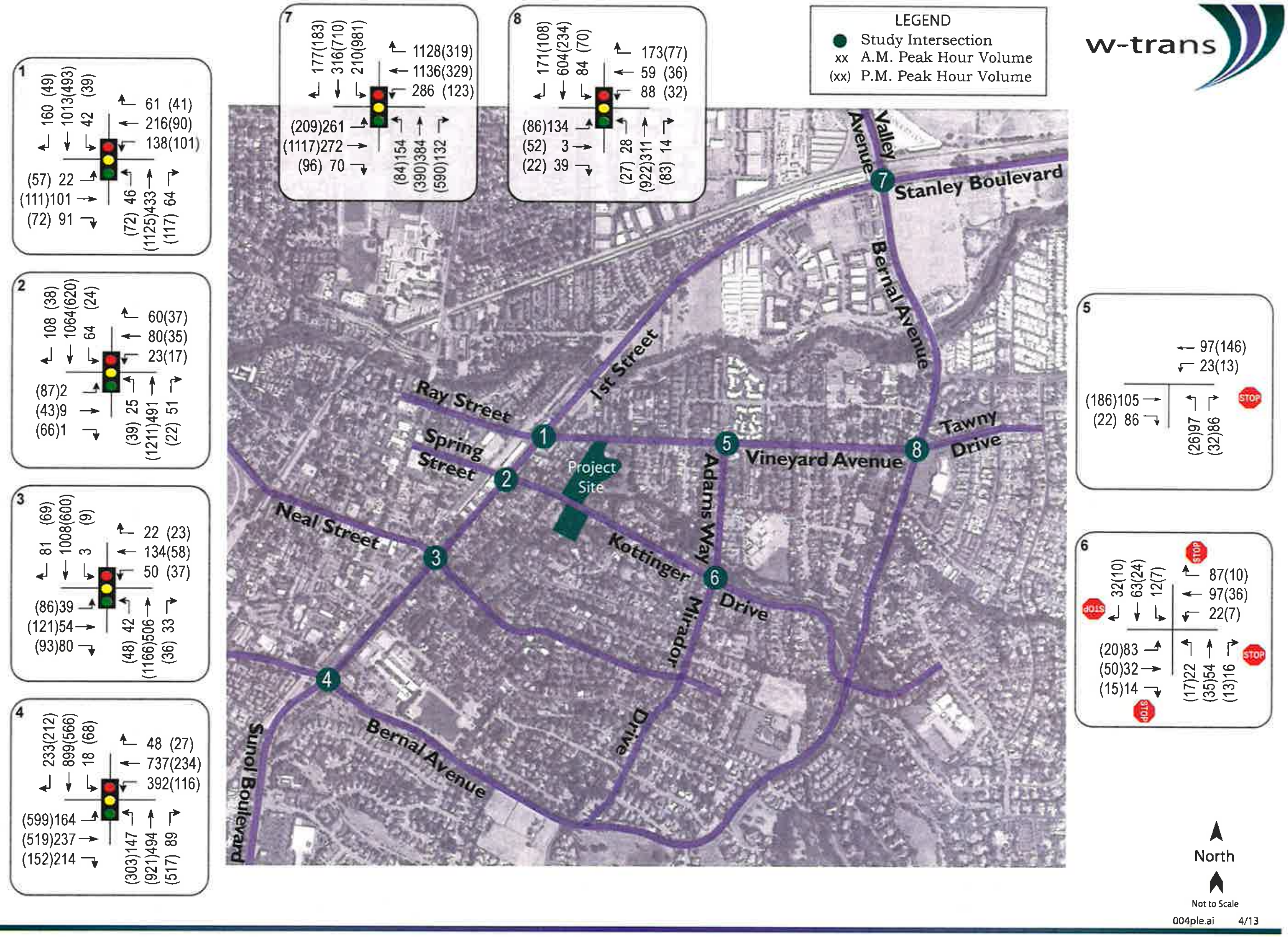
Table 6
Existing plus Approved Projects Peak Hour Intersection Levels of Service

Study Intersection *Approach*	**Existing Plus Approved Conditions**			
	AM Peak		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. 1st St/Vineyard Ave-Ray St	20.6	C	26.9	C
2. 1st St/Kottinger Dr-Spring St	34.0	C	34.1	C
3. 1st St/Neal St	17.5	B	34.2	C
4. 1st St/Bernal Ave-Sunol Blvd*	47.4	D	**79.6**	**E**
5. Vineyard Ave/Adams Way	6.6	A	1.8	A
Northbound Adams Ave	*16.7*	*C*	*11.2*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	11.5	B	7.8	A
7. Stanley Blvd/Bernal Ave-Valley Ave	27.0	C	29.4	C
8. Bernal Ave/Vineyard Ave-Tawny Dr	25.3	C	10.8	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard; Shaded cells = conditions with planned TIF improvements

Existing plus Approved Projects plus Project Conditions

Upon the addition of project-related traffic added to Existing plus Approved Projects volumes, and the planned TIF improvements, all of the study intersections are anticipated to operate at an acceptable LOS



Kottinger Drive Senior Housing Project Traffic Impact Analysis

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Figure 5

Existing plus Approved Projects Traffic Volumes

D or better, except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard, which would deteriorate from LOS E to LOS F during the p.m. peak hour. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*. A summary of the intersection level of service analysis is provided in Table 7 and copies of the level of service calculations are provided in Appendix A.

Table 7
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. 1st St/Vineyard Ave-Ray St	20.6	C	26.9	C	20.7	C	27.1	C
2. 1st St/Kottinger Dr-Spring St	34.0	C	34.1	C	35.2	D	36.0	D
3. 1st St/Neal St	17.5	B	34.2	C	17.5	B	34.8	C
4. 1st St/Bernal Ave-Sunol Blvd*	47.4	D	**79.6**	**E**	47.9	D	**80.4**	**F**
5. Vineyard Ave/Adams Way	6.6	A	1.8	A	6.7	A	1.8	A
Northbound Adams Ave	*16.7*	*C*	*11.2*	*B*	*16.8*	*C*	*11.2*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	11.5	B	7.8	A	11.5	B	7.8	A
7. Stanley Blvd/Bernal Ave-Valley Ave	27.0	C	29.4	C	27.0	C	29.4	C
8. Bernal Ave/Vineyard Ave-Tawny Dr	25.3	C	10.8	B	25.4	C	10.9	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard; Shaded cells = conditions with planned TIF improvements

Finding: With the addition of project-generated traffic, the study intersections are expected to continue operating at an acceptable level of service except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard which would deteriorate from LOS E to LOS F. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*.

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. It should be noted that the planned TIF improvements at the intersections of 1st Street/Bernal Avenue-Sunol Boulevard and Stanley Boulevard/Bernal Avenue-Valley Avenue were included in this analysis.

Under the anticipated Future volumes and considering the planned TIF improvements at the intersections of 1st Street/Bernal Avenue-Sunol Boulevard and Stanley Boulevard/Bernal Avenue-Valley Avenue, all of the study intersections but one are expected to operate at an acceptable LOS D or better. The intersection of 1st Street/Bernal Avenue-Sunol Boulevard is expected to operate at an unacceptable LOS E during the p.m. peak hour even after the implementation of the planned improvements. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*. Cumulative buildout volumes are shown in Figure 6 and operating conditions are summarized in Table 8.

Table 8
Cumulative Peak Hour Intersection Levels of Service

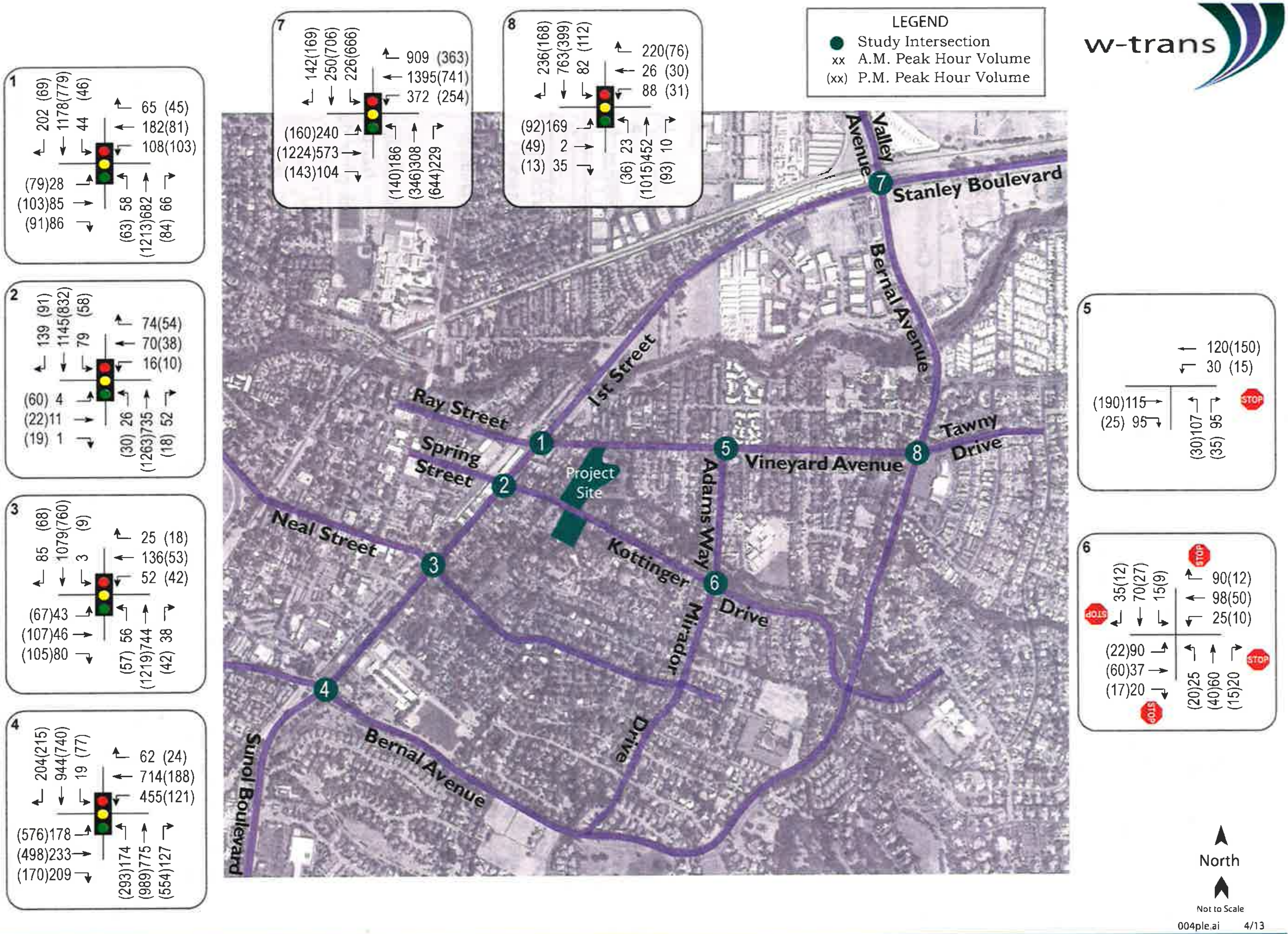
Study Intersection *Approach*	Cumulative Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. 1st St/Vineyard Ave-Ray St	19.5	B	25.2	C
2. 1st St/Kottinger Dr-Spring St	48.7	D	22.1	C
3. 1st St/Neal St	19.2	B	39.5	D
4. 1st St/Bernal Ave-Sunol Blvd*	36.1	D	**76.6**	**E**
5. Vineyard Ave/Adams Way	7.9	A	2.0	A
Northbound Adams Ave	*20.5*	*C*	*11.4*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	12.6	B	8.0	A
7. Stanley Blvd/Bernal Ave-Valley Ave	31.2	C	32.4	C
8. Bernal Ave/Vineyard Ave-Tawny Dr	35.8	D	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;* **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard; 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 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, the 1st Street Street/Bernal Avenue-Sunol Boulevard intersection is expected to continue operating at an unacceptable LOS E during the p.m. peak hour. As discussed previously, this intersection is exempt from the LOS D standard unless the City determines that improvements are necessary to maintain a LOS D standard. All of the remaining intersections would continue to operate at an acceptable LOS D or better with the addition of project generated traffic. A summary of the intersection level of service analysis is provided in Table 9 and copies of the level of service calculations are provided in Appendix A.



Kottinger Drive Senior Housing Project Traffic Impact Analysis

City of Pleasanton

Figure 6

Buildout Traffic Volumes

Table 9
Cumulative and Cumulative plus Project Peak Hour Intersection 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. 1st St/Vineyard Ave-Ray St	19.5	B	25.2	C	19.6	B	25.3	C
2. 1st St/Kottinger Dr-Spring St	48.7	D	22.1	C	49.8	D	23.5	C
3. 1st St/Neal St	19.2	B	39.5	D	19.5	B	40.1	D
4. 1st St/Bernal Ave-Sunol Blvd*	36.1	D	**76.6**	**E**	36.3	D	**77.4**	**E**
5. Vineyard Ave/Adams Way	7.9	A	2.0	A	7.9	A	2.0	A
Northbound Adams Ave	*20.5*	*C*	*11.4*	*B*	*20.6*	*C*	*11.5*	*B*
6. Kottinger Dr/Adams Way-Mirador Dr	12.6	B	8.0	A	12.6	B	8.0	A
7. Stanley Blvd/Bernal Ave-Valley Ave	31.2	C	32.4	C	31.2	C	32.4	C
8. Bernal Ave/Vineyard Ave-Tawny Dr	35.8	D	12.3	B	35.9	D	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;* **Bold** text = deficient operation; *According to the *City of Pleasanton General Plan*, Downtown intersections, including 1st Street/Bernal Avenue-Sunol Boulevard, are exempt from the LOS D standard; Shaded cells = conditions with TIF planned improvements

Finding: Upon the addition of project-generated traffic, the study intersections are expected to operate at an acceptable level of service except for 1st Street/Bernal Avenue-Sunol Boulevard which would continue to operate at an unacceptable LOS E. However, according to the *City of Pleasanton General Plan*, Downtown intersections (1st Street/Bernal Avenue-Sunol Boulevard) are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan.*

Queuing

Queuing analysis was performed of the study intersections of 1st Street/Vineyard Avenue-Ray Street and 1st Street/Kottinger Drive-Spring Street to determine if there would be adequate left-turn lane storage at these locations with the addition of project-generated traffic. Under the Existing plus Approved Projects Conditions and Cumulative Conditions, the queue lengths for left-turn pockets that would potentially receive project-generated traffic were determined using the SIMTRAFFIC application of Synchro, and averaging the 95th percentile queues for each of five runs.

The 95th percentile queue lengths are summarized in Table 10. Copies of the SIMTRAFFIC projections are provided in Appendix B.

Table 10
95th Percentile Left-Turn Queues

Intersection *movement*	**Available Storage**	**95th percentile Queues AM Peak Hour**				**95th percentile Queues PM Peak Hour**			
		E+A	**E+A+P**	**C**	**C+P**	**E+A**	**E+A+P**	**C**	**C+P**
1st St/Vineyard Ave-Ray St									
Southbound left-turn	125	*	*	*	*	50	91	119	93
Westbound left-turn	75	**120**	**128**	**118**	**122**	**101**	**101**	**95**	**111**
1st St/Kottinger Dr-Spring St									
Southbound left-turn	90	*	*	*	*	67	57	**120**	**100**

Notes: All distances are measured in feet; * = The project would not add traffic to these movements therefore, the queue length has not been 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

At the intersection of 1st Street/Vineyard Avenue-Ray Street, the 95th percentile queue for the westbound left-turn movement is expected to exceed the available storage length during both peak hours under the Existing plus Approved Project Conditions and Cumulative Conditions. With the addition of project-generated traffic, the queue length is expected to increase slightly but is not anticipated to result in an additional vehicle extending beyond the storage area assuming the typical size and spacing of vehicles in a turn lane to be in the range of 20 to 25 feet. During the p.m. peak hour, the southbound left-turn movement is expected to be accommodated within the available storage length under both scenarios. Further, with the addition of project-generated traffic, the queue length is expected to decrease slightly.

At the intersection of 1st Street/Kottinger Drive-Spring Street, the queue length for the southbound left-turn movement is expected to be accommodated within the available storage length under the Existing plus Approved Project Conditions without and with the addition of project generated trips during the p.m. peak hour. However, under Cumulative Conditions, the queue is anticipated to exceed the available storage length without and with the project.

It should be noted that with the addition of project-generated traffic, the queue lengths for the southbound left-turn movement at both of these study intersections would slightly decrease during the p.m. peak hour. The Southbound through queues would extend a significant distance in the through lane, blocking the left-turn pocket. Some of the project trips would not be able to enter the left-turn pocket due to the queuing in through lanes, which in turn would result in a decreased queue length in the left-turn pocket.

Findings: At the intersection of 1st Street/Vineyard Avenue-Ray Street, the westbound left-turn queue length is expected to exceed the available storage length under all scenarios without and with the addition of project-generated trips. During the p.m. peak hour, the southbound left-turn queue is expected to fit within the available storage length, without and with the project under both scenarios. The southbound left-turn queue at the 1st Street/Kottinger Drive-Spring Street intersection is expected to be accommodated within the available storage length under Existing plus Approved Projects Conditions, and exceed the storage length under Cumulative Conditions without and with the project. The increase in queue length due to the addition of the project-generated traffic would be less-than-significant.

Site Access and Parking

Site Access

Vehicular access to the Pleasanton Garden project site would be maintained through an existing driveway located on the south side Kottinger Drive. Vehicular access to the Kottinger Place project site would be provided via two new full access driveways: one on Kottinger Drive and one on Vineyard Avenue. Internally, pathways would connect the building units to the parking areas and streets.

Sight Distance

At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle waiting 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.

Sight distance along Vineyard Avenue and Kottinger Drive for the proposed Kottinger Place project site driveways was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distance for minor-street approaches that are either a private road or a driveway are based on stopping sight distance with the approach travel speeds as the basis for determining the recommended sight distance. Sight distance at the proposed project driveways on Vineyard Avenue and Kottinger Drive were field measured.

Vineyard Avenue

The posted speed limit on Vineyard Avenue is 25 miles per hour (mph). Based on a design speed of 25 mph, the minimum stopping sight distance needed is 150 feet. Vineyard Street is relatively flat and straight on either side of the project site; therefore, sight distance from the project driveway to the east and west would be adequate. However, it should be noted that on-street parking is permitted on the south side of Vineyard Street near the project vicinity. In order to have a clear line of sight for drivers exiting the proposed driveway it is recommended that on-street parking be prohibited for 50 feet on either side of the proposed driveway. Additionally, periodic maintenance, including trimming of the vegetation on both sides of the project driveway should be undertaken to maintain clear sight lines.

Kottinger Drive

The speed limit on Kottinger Drive is not posted. For sight distance evaluation, a speed limit of 25 mph was assumed. Based on a design speed of 25 mph, the minimum stopping sight distance needed is 150 feet. Kottinger Drive is relatively flat and straight on either side of the project site; therefore, sight distance from the project driveway to the east and west would be adequate. However, to maintain clear sight lines, periodic maintenance inducing trimming of vegetation should be undertaken.

Finding: Sight distance at the proposed project driveways on Vineyard Avenue and Kottinger Drive would be adequate in either direction.

Recommendation: On-street parking should be prohibited on the south side of Vineyard Avenue for 50 feet on either side of the proposed driveway. Periodic maintenance, including trimming of the vegetation on both sides of the project driveways on Kottinger Drive and Vineyard Avenue, should be undertaken.

Parking

To ensure that the proposed project would provide adequate on-site parking, the City of Pleasanton Municipal Code (§ 18.88.030) was reviewed. However, the code does not specify parking requirements for a residential land use that includes senior housing such as the proposed project. Based on the information provided by the project team, parking for the existing use is provided at a rate of 0.8 spaces per dwelling unit and is considered adequate for residents, visitors and other users. The proposed project would include 185 units, which would require 148 parking spaces based on the parking ratio demand for the existing use. The proposed project would provide 149 parking spaces including four visitor parking spaces and seven disabled parking spaces. The proposed parking would adequately satisfy the projected demand.

Finding: The proposed148 parking spaces including four visitor parking spaces and five disabled parking spaces at the project site are expected to be adequate.

Alternative Modes

Pedestrian Facilities

Sidewalks currently exit on the project frontage along Kottinger Drive and Vineyard Avenue connecting the project site to the surrounding area. The project would create a separate pedestrian entrance to Pleasanton Gardens from Kottinger Drive to avoid pedestrian access through the parking lot and provide better connectivity between the two sites. It is anticipated that the existing and proposed pedestrian facilities would adequately serve the project site.

Finding: Existing and proposed pedestrian facilities would adequately serve the project site.

Bicycle Facilities

Due to the nature of the proposed project, bike oriented trips would be minimal. Existing bicycle facilities are expected to adequately serve the project site.

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

Transit

The existing transit bus stops located on the project frontage at Vineyard Avenue and on 1st Street are within acceptable walking distance of both sites. The proposed project would relocate the existing transit stop located on the north side of Kottinger Drive slightly to the east due to the proposed frontage improvements. Existing and proposed pedestrian facilities that would connect the project site to the existing as well as the relocated bus stop are adequate. The existing and proposed transit and pedestrian facilities are anticipated to adequately accommodate the project-generated transit trips.

Finding: Existing and proposed transit route and bus stops adjacent to the project site are expected to be adequate.

Collision History

The collision histories for the study intersections were reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on collision data available from the California Highway Patrol as published in their *Statewide Integrated Traffic Records System* (SWITRS) reports. A five-year period between July 1, 2006, and June 30, 2011, was used in the analysis. The calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2009 Accident Data on California State Highways*, Caltrans.

The study intersections of 1st Street/Neal Street, 1st Street/Bernal Avenue-Sunol Boulevard and Vineyard Avenue/Adams Way were determined to have collision rates higher than the statewide averages for similar facilities. All of the remaining intersections experienced collision rates lower than the statewide averages for similar facilities. No fatalities were reported during the five-year period studied, although the injury rate for all the signalized intersections was higher than the statewide average for similar facilities. It should be noted that at the study intersection of 1st Street/Neal Street, six collisions out of the 19 reported involved a pedestrian or a bicyclist.

The calculated collision rates are presented in Table 11 and details are provided in Appendix C.

Table 11
Collision Rates at the Study Intersections

Study Intersection	Number of Collisions	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. 1st St/Vineyard Ave-Ray St	6	0.15	0.36
2. 1st St/Kottinger Dr-Spring St	9	0.25	0.36
3. 1st St/Neal St	19	**0.51**	0.36
4. 1st St/Bernal Ave-Sunol Blvd	31	**0.47**	0.36
5. Vineyard Ave/Adams Way	3	**0.39**	0.15
6. Kottinger Dr/Adams Way-Mirador Dr	1	0.23	0.25
7. Stanley Blvd/Bernal Ave-Valley Ave	15	0.16	0.36
8. Bernal Ave/Vineyard Ave-Tawny Dr	8	0.28	0.36

Note: c/mve = collisions per million vehicles entering; **Bold text** indicates calculated collision rates higher than the statewide average

The collision data for the intersections with higher-than-average collision rates were further examined to determine any apparent trends in collision types. At the study intersections of 1st Street/Neal Street and 1st Street/Bernal Avenue-Sunol Boulevard, the majority of the collisions reported were rear-end type collisions, which is a common collision type for a signalized intersection on an arterial, especially where conditions are occasionally congested. The primary collision factor associated with the rear-end collision was "unsafe speed."

At the study intersection of Vineyard Avenue/Adams Way, three collisions were reported over the five-year period, but no trend in collision types was noticed. The higher collision rate at this intersection can be attributed to the low traffic volumes.

Although the calculated collision rates at the three intersections were determined to be higher than the statewide averages for similar facilities, this does not indicate a safety concern because the intersections selected to determine the statewide collision rates does not necessarily correlate to the local conditions at the study intersections due to various factors including intersection spacing, signal timing, geometric design, traffic volumes, adjacent land uses, and travel mode.

Finding: All of the study intersections except three were determined to have a collision rates lower than the statewide averages for similar facilities. The higher collision rate at the three study intersections does not indicate any safety concern.

Conclusions and Recommendations

Conclusions

The following summarizes the findings of this analysis.

Existing Conditions

- Currently the intersection of 1st Street/Bernal Avenue-Sunol Boulevard operates at an unacceptable LOS E during the p.m. peak hour, but all other study intersections operate acceptably.
- The City's Traffic Impact Fee (TIF) program includes planned improvements to Stanley Boulevard/ Bernal Avenue-Valley Avenue and 1st Street/Bernal Avenue-Sunol Boulevard intersections.

Project Conditions

- The proposed project is anticipated to generate an average of 295 net new vehicle trips on a daily basis, of which 20 would occur during the a.m. peak hour and 24 would occur during the p.m. peak hour.

Existing plus Project Conditions

- The study intersections are expected to continue operating at acceptable levels of service with the addition of project-generated traffic except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard which would continue to operate at an unacceptable LOS E during the p.m. peak hour. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*.

Existing plus Approved Projects Condition

- Under Existing plus Approved Projects Conditions and considering the planned improvements at the intersection of Stanley Boulevard/Bernal Avenue-Valley Avenue, the study intersections are expected to continue operating at acceptable levels of service except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard, which would continue to operate at an unacceptable LOS E during the p.m. peak hour.
- With the addition of project-generated traffic, the intersection of 1st Street/Bernal Avenue-Sunol Boulevard would deteriorate from an unacceptable LOS E to LOS F during the p.m. peak hour. However, according to the *City of Pleasanton General Plan*, this intersection is exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan*. All of the remaining intersections would operate acceptably.
- The westbound left-turn queue at the 1st Street/Vineyard Avenue-Ray Street is expected to extend beyond the storage area without and with the addition of project-generated trips during both peak hours. The slight increase in the queue length due to the addition of project-generated traffic would result in a less-than-significant impact. During the p.m. peak hour, the southbound left-turn queue is expected to be accommodated within the available storage length without and with the project.

- The southbound left-turn queue at the 1st Street/Kottinger Drive-Spring Street intersection is expected to be accommodated within the available storage length without or with the project during the p.m. peak hour.

Cumulative Scenario

- Under Cumulative without Project Conditions and considering the planned improvements at the intersections of Stanley Boulevard/Bernal Avenue-Valley Avenue and 1st Street/Bernal Avenue-Sunol Boulevard, the study intersections are anticipated to operate acceptably except for the intersection of 1st Street/of Bernal Avenue-Sunol Boulevard, which would operate at an unacceptable LOS E during the p.m. peak hour even with planned improvements.

- With the addition of project-generated traffic, all study intersections are expected to operate acceptably except for the intersection of 1st Street/Bernal Avenue-Sunol Boulevard, which would continue to operate at an unacceptable LOS E during the p.m. peak hour. However, according to the *City of Pleasanton General Plan*, Downtown intersections such as 1st Street/Bernal Avenue-Sunol Boulevard are exempt from the LOS D standard unless the City determines that improvements necessary to maintain LOS D are consistent with the goals for the *Downtown Specific Plan.*

- The westbound left-turn queue length at the intersection of 1st Street/Vineyard Avenue-Ray Street is expected to exceed the available storage length without and with the addition of project-generated trips during both peak hours. The slight increase in the queue length due to the addition of project-generated traffic would result in a less-than-significant impact. During the p.m. peak hour, the southbound left-turn queue is expected to be accommodated within the available storage length without and with the project.

- The southbound left-turn queue at the 1st Street/Kottinger Drive-Spring Street intersection is expected to exceed the storage length under Cumulative Conditions without and with the project. The slight increase in the queue length due to the addition of project-generated traffic would result in a less-than-significant impact.

Project Access/Parking

- The project site would be accessed via one existing and one new full access driveway on Kottinger Drive and one new full access driveway on Vineyard Avenue.

- Parking would be provided at a rate of 0.8 spaces per one dwelling unit, resulting in 148 parking spaces. The proposed 149 parking spaces at the project site are expected to satisfy the projected parking demand.

Alternative Modes of Transportation

- Existing and proposed pedestrian facilities as well as existing bicycle facilities would adequately serve the project site.

- Existing transit route and bus stops adjacent to the project site on Vineyard Avenue and 1st Street together with the relocated bus stop on Kottinger Drive would adequately serve the project-generated transit trips.

Collision History

- For the five-year period of July 1, 2006, through June 30, 2011, the calculated collision rates for all study intersections except three were determined to be lower than the statewide average rates for similar facilities. The higher collision rate at the three study intersections does not indicate any safety concern.

Recommendations

- It is recommended that on-street parking be prohibited for 50 feet on either side of the proposed driveway on Vineyard Avenue to maintain clear sight lines.

- It is recommended that periodic maintenance, including trimming of the vegetation on both sides of the project driveways on Kottinger Drive and Vineyard Avenue, be undertaken to maintain clear sight lines.

Study Participants and References

Study Participants

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Editing/Formatting:	Angela McCoy
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PLE004

Appendix A

Intersection Level of Service Calculations

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/17/2013

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
30: Vineyard-Tawny & Bernal

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	4	32	74	59	173	33	303	16	75	385	150
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1412			1592	1391	1829	3629		1829	1829	
Flt Permitted	0.95	0.97			0.97	1.00	0.21	1.00		0.51	1.00	
Satd. Flow (perm)	1477	1412			1592	1391	398	3629		973	1829	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	146	5	38	87	69	204	39	356	19	88	453	176
RTOR Reduction (vph)	0	26	0	0	0	110	0	4	0	0	14	0
Lane Group Flow (vph)	96	67	0	0	156	94	39	371	0	88	615	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	9.9	9.9			13.0	13.0	29.6	29.6		29.6	29.6	
Effective Green, g (s)	11.9	11.9			15.0	15.0	31.6	31.6		31.6	31.6	
Actuated g/C Ratio	0.18	0.18			0.22	0.22	0.47	0.47		0.47	0.47	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	249			354	309	186	1699		456	856	
v/s Ratio Prot	c0.07	0.05			c0.10			0.10			c0.34	
v/s Ratio Perm						0.07	0.10			0.09		
v/c Ratio	0.37	0.27			0.44	0.31	0.21	0.22		0.19	0.72	
Uniform Delay, d1	24.5	24.0			22.6	21.9	10.6	10.6		10.5	14.4	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.6			0.9	0.6	0.6	0.1		0.2	2.9	
Delay (s)	25.4	24.6			23.5	22.5	11.1	10.7		10.7	17.3	
Level of Service	C	C			C	C	B	B		B	B	
Approach Delay (s)		25.0			22.9			10.7			16.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	107	87	134	224	59	43	369	61	38	813	138
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3550		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3550		1829	3657	1577
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)	23	119	97	149	249	66	48	410	68	42	903	153
RTOR Reduction (vph)	0	0	83	0	0	26	0	10	0	0	0	80
Lane Group Flow (vph)	23	119	14	149	249	40	48	468	0	42	903	73
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.3	13.3	13.3	18.9	18.9	18.9	5.2	45.7		5.1	45.6	45.6
Effective Green, g (s)	14.3	14.3	14.3	19.9	19.9	19.9	6.2	47.7		6.1	47.6	47.6
Actuated g/C Ratio	0.14	0.14	0.14	0.20	0.20	0.20	0.06	0.48		0.06	0.48	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	275	231	309	326	273	113	1693		112	1741	751
v/s Ratio Prot	0.01	c0.06		0.10	c0.15		c0.03	0.13		0.02	c0.25	
v/s Ratio Perm			0.01			0.03						0.05
v/c Ratio	0.09	0.43	0.06	0.48	0.76	0.15	0.42	0.28		0.38	0.52	0.10
Uniform Delay, d1	37.2	39.1	37.0	35.5	37.8	33.1	45.2	15.8		45.1	18.2	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.37	0.70		1.51	0.37	0.11
Incremental Delay, d2	0.1	1.1	0.1	1.2	10.2	0.3	2.4	0.4		1.9	1.0	0.2
Delay (s)	37.3	40.2	37.1	36.7	48.0	33.3	64.2	11.4		69.9	7.8	1.9
Level of Service	D	D	D	D	D	C	E	B		E	A	A
Approach Delay (s)		38.7			42.3			16.2			9.4	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	44	11	26	74	51	23	419	37	35	919	76
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		0.96	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1549			1592	1292	1554	1600		1487	1603	
Flt Permitted		0.94			0.93	1.00	0.18	1.00		0.45	1.00	
Satd. Flow (perm)		1471			1500	1292	290	1600		705	1603	
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)	14	48	12	29	81	56	25	460	41	38	1010	84
RTOR Reduction (vph)	0	9	0	0	0	48	0	2	0	0	2	0
Lane Group Flow (vph)	0	65	0	0	110	8	25	499	0	38	1092	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.3			13.3	13.3	78.7	78.7		78.7	78.7	
Effective Green, g (s)		14.3			14.3	14.3	79.7	79.7		79.7	79.7	
Actuated g/C Ratio		0.14			0.14	0.14	0.80	0.80		0.80	0.80	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		210			215	185	231	1275		562	1278	
v/s Ratio Prot								0.31			c0.68	
v/s Ratio Perm		0.04			c0.07	0.01	0.09			0.05		
v/c Ratio		0.31			0.51	0.04	0.11	0.39		0.07	0.85	
Uniform Delay, d1		38.4			39.6	37.0	2.3	3.0		2.2	6.5	
Progression Factor		1.00			1.00	1.00	1.62	1.81		0.62	2.06	
Incremental Delay, d2		0.9			2.1	0.1	0.9	0.9		0.2	6.7	
Delay (s)		39.3			41.7	37.0	4.6	6.3		1.6	20.0	
Level of Service		D			D	D	A	A		A	C	
Approach Delay (s)		39.3			40.1			6.2			19.4	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	55	67	43	114	24	28	416	27	4	881	71
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.92		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1537	1472		1536	1584		1554	1618		1543	1613	
Flt Permitted	0.47	1.00		0.51	1.00		0.21	1.00		0.47	1.00	
Satd. Flow (perm)	754	1472		829	1584		347	1618		761	1613	
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)	43	58	71	45	120	25	29	438	28	4	927	75
RTOR Reduction (vph)	0	55	0	0	9	0	0	1	0	0	2	0
Lane Group Flow (vph)	43	74	0	45	136	0	29	465	0	4	1000	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.9	13.9		13.9	13.9		78.1	78.1		78.1	78.1	
Effective Green, g (s)	14.9	14.9		14.9	14.9		79.1	79.1		79.1	79.1	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.79	0.79		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	112	219		124	236		274	1280		602	1276	
v/s Ratio Prot		0.05			c0.09			0.29			c0.62	
v/s Ratio Perm	0.06			0.05			0.08			0.01		
v/c Ratio	0.38	0.34		0.36	0.57		0.11	0.36		0.01	0.78	
Uniform Delay, d1	38.4	38.1		38.3	39.6		2.4	3.1		2.2	5.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.86	1.43	
Incremental Delay, d2	2.2	0.9		1.8	3.4		0.8	0.8		0.0	2.6	
Delay (s)	40.6	39.0		40.1	43.0		3.2	3.9		1.9	10.8	
Level of Service	D	D		D	D		A	A		A	B	
Approach Delay (s)		39.4			42.3			3.8			10.8	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	149	260	195	275	653	34	128	339	74	18	733	240
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	1829	3624		3547	1925	1345	1554	3223	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	1829	3624		3547	1925	1345	1554	3223	
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)	164	286	214	302	718	37	141	373	81	20	805	264
RTOR Reduction (vph)	0	0	177	0	4	0	0	0	45	0	27	0
Lane Group Flow (vph)	164	286	37	302	751	0	141	373	36	20	1042	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	9.9	15.3	15.3	20.8	26.2		8.9	42.6	42.6	3.3	37.0	
Effective Green, g (s)	10.9	17.3	17.3	21.8	28.2		9.9	44.6	44.6	4.3	39.0	
Actuated g/C Ratio	0.11	0.17	0.17	0.22	0.28		0.10	0.45	0.45	0.04	0.39	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	387	633	251	399	1022		351	859	600	67	1257	
v/s Ratio Prot	0.05	c0.08		0.17	c0.21		c0.04	0.19		0.01	c0.32	
v/s Ratio Perm			0.03						0.03			
v/c Ratio	0.42	0.45	0.15	0.76	0.73		0.40	0.43	0.06	0.30	0.83	
Uniform Delay, d1	41.6	37.1	35.1	36.6	32.5		42.3	19.0	15.8	46.4	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.89	0.76	0.83	1.00	1.00	
Incremental Delay, d2	0.8	0.5	0.3	8.0	2.8		0.8	1.6	0.2	2.5	6.4	
Delay (s)	42.4	37.6	35.4	44.6	35.3		38.4	16.1	13.3	48.9	33.9	
Level of Service	D	D	D	D	D		D	B	B	D	C	
Approach Delay (s)		38.1			37.9			21.0			34.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	99	86	23	84	97	86
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	155	134	36	131	152	134
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			309		465	262
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			309		465	262
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		71	82
cM capacity (veh/h)			1229		520	749

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	289	167	286
Volume Left	0	36	152
Volume Right	134	0	134
cSH	1700	1229	607
Volume to Capacity	0.17	0.03	0.47
Queue Length 95th (ft)	0	2	63
Control Delay (s)	0.0	1.9	16.1
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	16.1
Approach LOS			C

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	83	27	14	22	88	87	22	54	16	12	63	32
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	138	45	23	37	147	145	37	90	27	20	105	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	207	328	153	178
Volume Left (vph)	138	37	37	20
Volume Right (vph)	23	145	27	53
Hadj (s)	0.10	-0.18	-0.02	-0.12
Departure Headway (s)	5.4	5.0	5.6	5.5
Degree Utilization, x	0.31	0.46	0.24	0.27
Capacity (veh/h)	609	677	569	590
Control Delay (s)	10.9	12.1	10.4	10.5
Approach Delay (s)	10.9	12.1	10.4	10.5
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.2		
HCM Level of Service	B		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/17/2013

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
30: Vineyard-Tawny & Bernal

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	51	21	29	29	65	23	794	58	52	225	97
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1480			1596	1391	1822	3620		1829	1824	
Flt Permitted	0.95	0.99			0.98	1.00	0.48	1.00		0.23	1.00	
Satd. Flow (perm)	1477	1480			1596	1391	922	3620		434	1824	
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)	140	53	22	30	30	68	24	827	60	54	234	101
RTOR Reduction (vph)	0	17	0	0	0	58	0	8	0	0	23	0
Lane Group Flow (vph)	108	90	0	0	60	10	24	879	0	54	312	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.7	7.7			4.2	4.2	17.3	17.3		17.3	17.3	
Effective Green, g (s)	9.7	9.7			6.2	6.2	19.3	19.3		19.3	19.3	
Actuated g/C Ratio	0.22	0.22			0.14	0.14	0.44	0.44		0.44	0.44	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	324	325			224	195	403	1581		190	796	
v/s Ratio Prot	c0.07	0.06			c0.04			c0.24			0.17	
v/s Ratio Perm						0.01	0.03			0.12		
v/c Ratio	0.33	0.28			0.27	0.05	0.06	0.56		0.28	0.39	
Uniform Delay, d1	14.5	14.3			17.0	16.4	7.2	9.3		8.0	8.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.5			0.6	0.1	0.1	0.4		0.8	0.3	
Delay (s)	15.1	14.8			17.6	16.6	7.3	9.7		8.8	8.8	
Level of Service	B	B			B	B	A	A		A	A	
Approach Delay (s)		15.0			17.1			9.6			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	163	77	92	92	38	68	956	133	49	444	50
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3562		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3562		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	64	166	79	94	94	39	69	976	136	50	453	51
RTOR Reduction (vph)	0	0	40	0	0	34	0	6	0	0	0	22
Lane Group Flow (vph)	64	166	39	94	94	5	69	1106	0	50	453	29
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	15.8	15.8	15.8	13.7	13.7	13.7	7.2	66.7		6.8	66.3	66.3
Effective Green, g (s)	16.8	16.8	16.8	14.7	14.7	14.7	8.2	68.7		7.8	68.3	68.3
Actuated g/C Ratio	0.14	0.14	0.14	0.12	0.12	0.12	0.07	0.57		0.06	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	256	270	226	190	200	168	125	2039		119	2081	894
v/s Ratio Prot	0.03	c0.09		c0.06	0.06		0.04	c0.31		c0.03	0.12	
v/s Ratio Perm			0.02			0.00						0.02
v/c Ratio	0.25	0.61	0.17	0.49	0.47	0.03	0.55	0.54		0.42	0.22	0.03
Uniform Delay, d1	46.0	48.6	45.5	49.2	49.0	46.4	54.1	15.9		53.9	12.7	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	1.34		1.00	1.00	1.00
Incremental Delay, d2	0.5	4.1	0.4	2.0	1.7	0.1	2.8	0.5		2.4	0.2	0.1
Delay (s)	46.5	52.7	45.8	51.2	50.8	46.4	63.6	21.8		56.3	13.0	11.4
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		49.6			50.2			24.2			16.7	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	36	47	14	30	39	28	1058	18	26	564	37
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.97			0.99	1.00	0.96	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1442			1590	1276	1499	1628		1554	1607	
Flt Permitted		0.83			0.91	1.00	0.38	1.00		0.16	1.00	
Satd. Flow (perm)		1222			1471	1276	599	1628		254	1607	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	84	37	48	14	31	40	29	1091	19	27	581	38
RTOR Reduction (vph)	0	12	0	0	0	33	0	0	0	0	2	0
Lane Group Flow (vph)	0	157	0	0	45	7	29	1110	0	27	617	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		19.7			19.7	19.7	92.3	92.3		92.3	92.3	
Effective Green, g (s)		20.7			20.7	20.7	93.3	93.3		93.3	93.3	
Actuated g/C Ratio		0.17			0.17	0.17	0.78	0.78		0.78	0.78	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		211			254	220	466	1266		197	1249	
v/s Ratio Prot								c0.68			0.38	
v/s Ratio Perm		c0.13			0.03	0.01	0.05			0.11		
v/c Ratio		0.74			0.18	0.03	0.06	0.88		0.14	0.49	
Uniform Delay, d1		47.1			42.4	41.3	3.1	9.3		3.3	4.8	
Progression Factor		1.00			1.00	1.00	0.74	1.36		2.33	2.63	
Incremental Delay, d2		13.1			0.3	0.1	0.2	5.5		1.4	1.4	
Delay (s)		60.3			42.7	41.4	2.5	18.2		9.2	14.1	
Level of Service		E			D	D	A	B		A	B	
Approach Delay (s)		60.3			42.1			17.8			13.9	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	97	79	34	58	25	38	991	25	8	524	65
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		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)	1530	1500		1538	1545		1546	1629		1554	1602	
Flt Permitted	0.62	1.00		0.35	1.00		0.38	1.00		0.18	1.00	
Satd. Flow (perm)	1000	1500		563	1545		626	1629		300	1602	
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)	89	102	83	36	61	26	40	1043	26	8	552	68
RTOR Reduction (vph)	0	26	0	0	13	0	0	1	0	0	3	0
Lane Group Flow (vph)	89	159	0	36	74	0	40	1068	0	8	617	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.8	17.8		17.8	17.8		94.2	94.2		94.2	94.2	
Effective Green, g (s)	18.8	18.8		18.8	18.8		95.2	95.2		95.2	95.2	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.79	0.79		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	157	235		88	242		497	1292		238	1271	
v/s Ratio Prot		c0.11			0.05			c0.66			0.39	
v/s Ratio Perm	0.09			0.06			0.06			0.03		
v/c Ratio	0.57	0.68		0.41	0.30		0.08	0.83		0.03	0.49	
Uniform Delay, d1	46.8	47.7		45.6	44.8		2.7	7.5		2.6	4.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		2.10	2.42	
Incremental Delay, d2	4.6	7.5		3.1	0.7		0.3	6.2		0.2	1.2	
Delay (s)	51.5	55.2		48.7	45.5		3.1	13.6		5.8	11.3	
Level of Service	D	E		D	D		A	B		A	B	
Approach Delay (s)		54.0			46.4			13.2			11.2	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	667	510	112	93	231	33	194	723	358	70	431	200
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	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	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	1829	3572		3547	1925	1291	1554	3173	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	1829	3572		3547	1925	1291	1554	3173	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	855	654	144	119	296	42	249	927	459	90	553	256
RTOR Reduction (vph)	0	0	88	0	9	0	0	0	153	0	43	0
Lane Group Flow (vph)	855	654	56	119	329	0	249	927	306	90	766	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	22.2	25.7	25.7	12.7	16.2		19.0	53.5	53.5	10.1	44.6	
Effective Green, g (s)	23.2	27.7	27.7	13.7	18.2		20.0	55.5	55.5	11.1	46.6	
Actuated g/C Ratio	0.19	0.23	0.23	0.11	0.15		0.17	0.46	0.46	0.09	0.39	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	686	844	328	209	542		591	890	597	144	1232	
v/s Ratio Prot	c0.24	0.18		0.07	c0.09		0.07	c0.48		0.06	c0.24	
v/s Ratio Perm			0.04						0.24			
v/c Ratio	1.25	0.77	0.17	0.57	0.61		0.42	1.04	0.51	0.62	0.62	
Uniform Delay, d1	48.4	43.2	36.9	50.4	47.6		44.8	32.2	22.7	52.4	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.71	0.61	0.33	1.00	1.00	
Incremental Delay, d2	122.8	4.5	0.2	3.5	1.9		0.5	40.4	2.9	8.2	2.4	
Delay (s)	171.2	47.7	37.2	53.9	49.5		32.2	60.3	10.4	60.6	32.0	
Level of Service	F	D	D	D	D		C	E	B	E	C	
Approach Delay (s)		110.7			50.6			42.0			34.8	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	65.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	186	22	13	136	26	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	204	24	14	149	29	35
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			249		435	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		435	256
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	95
cM capacity (veh/h)			1293		552	754

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	229	164	64
Volume Left	0	14	29
Volume Right	24	0	35
cSH	1700	1293	648
Volume to Capacity	0.13	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.8	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	47	15	7	34	10	17	35	13	7	24	10
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	25	58	19	9	42	12	21	43	16	9	30	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	101	63	80	51
Volume Left (vph)	25	9	21	9
Volume Right (vph)	19	12	16	12
Hadj (s)	-0.01	-0.06	0.00	-0.08
Departure Headway (s)	4.3	4.3	4.3	4.3
Degree Utilization, x	0.12	0.07	0.10	0.06
Capacity (veh/h)	815	814	793	803
Control Delay (s)	7.8	7.6	7.8	7.6
Approach Delay (s)	7.8	7.6	7.8	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.7		
HCM Level of Service	A		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	204	196	44	186	837	1201	115	446	112	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	215	48	204	920	1320	126	490	123	237	327	171
RTOR Reduction (vph)	0	0	28	0	87	198	0	0	0	0	74	0
Lane Group Flow (vph)	224	215	20	204	1453	502	126	490	123	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	55.3	12.0	4.0	1.1	0.1	1.0	0.5	
Delay (s)	44.1	16.8	20.2	43.0	84.8	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			68.0			31.3			36.0	
Approach LOS		C			E			C			D	

Intersection Summary			
HCM Average Control Delay	52.3	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
30: Vineyard-Tawny & Bernal

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	4	32	74	59	173	33	303	16	75	385	151
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1412			1592	1391	1829	3629		1829	1828	
Flt Permitted	0.95	0.97			0.97	1.00	0.20	1.00		0.50	1.00	
Satd. Flow (perm)	1477	1412			1592	1391	393	3629		972	1828	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	147	5	38	87	69	204	39	356	19	88	453	178
RTOR Reduction (vph)	0	26	0	0	0	110	0	4	0	0	14	0
Lane Group Flow (vph)	97	67	0	0	156	94	39	371	0	88	617	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	10.0	10.0			13.1	13.1	29.7	29.7		29.7	29.7	
Effective Green, g (s)	12.0	12.0			15.1	15.1	31.7	31.7		31.7	31.7	
Actuated g/C Ratio	0.18	0.18			0.22	0.22	0.47	0.47		0.47	0.47	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	250			355	310	184	1697		454	855	
v/s Ratio Prot	c0.07	0.05			c0.10			0.10			c0.34	
v/s Ratio Perm						0.07	0.10			0.09		
v/c Ratio	0.37	0.27			0.44	0.30	0.21	0.22		0.19	0.72	
Uniform Delay, d1	24.6	24.1			22.7	22.0	10.7	10.7		10.6	14.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.6			0.9	0.6	0.6	0.1		0.2	3.0	
Delay (s)	25.5	24.7			23.6	22.5	11.2	10.8		10.8	17.5	
Level of Service	C	C			C	C	B	B		B	B	
Approach Delay (s)		25.1			23.0			10.8			16.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	108	87	137	226	60	43	370	63	38	813	138
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3548		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3548		1829	3657	1577
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)	23	120	97	152	251	67	48	411	70	42	903	153
RTOR Reduction (vph)	0	0	83	0	0	26	0	10	0	0	0	80
Lane Group Flow (vph)	23	120	14	152	251	41	48	471	0	42	903	73
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.3	13.3	13.3	19.0	19.0	19.0	5.2	45.6		5.1	45.5	45.5
Effective Green, g (s)	14.3	14.3	14.3	20.0	20.0	20.0	6.2	47.6		6.1	47.5	47.5
Actuated g/C Ratio	0.14	0.14	0.14	0.20	0.20	0.20	0.06	0.48		0.06	0.48	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	275	231	311	327	274	113	1689		112	1737	749
v/s Ratio Prot	0.01	c0.06		0.10	c0.15		c0.03	0.13		0.02	c0.25	
v/s Ratio Perm			0.01			0.03						0.05
v/c Ratio	0.09	0.44	0.06	0.49	0.77	0.15	0.42	0.28		0.38	0.52	0.10
Uniform Delay, d1	37.2	39.2	37.0	35.5	37.8	33.0	45.2	15.8		45.1	18.3	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.37	0.70		1.51	0.37	0.11
Incremental Delay, d2	0.1	1.1	0.1	1.2	10.3	0.3	2.4	0.4		1.9	1.0	0.2
Delay (s)	37.3	40.3	37.1	36.7	48.1	33.3	64.2	11.4		69.9	7.8	1.9
Level of Service	D	D	D	D	D	C	E	B		E	A	A
Approach Delay (s)		38.7			42.3			16.2			9.4	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	46	11	29	77	52	23	420	39	35	921	77
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		0.96	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1553			1591	1292	1554	1599		1488	1602	
Flt Permitted		0.94			0.93	1.00	0.17	1.00		0.45	1.00	
Satd. Flow (perm)		1477			1493	1292	283	1599		701	1602	
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)	14	51	12	32	85	57	25	462	43	38	1012	85
RTOR Reduction (vph)	0	8	0	0	0	49	0	2	0	0	2	0
Lane Group Flow (vph)	0	69	0	0	117	8	25	503	0	38	1095	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.7			13.7	13.7	78.3	78.3		78.3	78.3	
Effective Green, g (s)		14.7			14.7	14.7	79.3	79.3		79.3	79.3	
Actuated g/C Ratio		0.15			0.15	0.15	0.79	0.79		0.79	0.79	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		217			219	190	224	1268		556	1270	
v/s Ratio Prot								0.31			c0.68	
v/s Ratio Perm		0.05			c0.08	0.01	0.09			0.05		
v/c Ratio		0.32			0.53	0.04	0.11	0.40		0.07	0.86	
Uniform Delay, d1		38.2			39.5	36.6	2.4	3.1		2.3	6.8	
Progression Factor		1.00			1.00	1.00	1.62	1.80		0.63	2.01	
Incremental Delay, d2		0.9			2.5	0.1	1.0	0.9		0.2	7.1	
Delay (s)		39.0			42.0	36.7	4.8	6.5		1.6	20.7	
Level of Service		D			D	D	A	A		A	C	
Approach Delay (s)		39.0			40.3			6.4			20.1	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	55	67	43	114	24	28	419	27	4	886	71
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.92		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1537	1472		1536	1584		1554	1618		1543	1614	
Flt Permitted	0.47	1.00		0.51	1.00		0.21	1.00		0.47	1.00	
Satd. Flow (perm)	754	1472		829	1584		343	1618		758	1614	
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)	43	58	71	45	120	25	29	441	28	4	933	75
RTOR Reduction (vph)	0	55	0	0	9	0	0	1	0	0	2	0
Lane Group Flow (vph)	43	74	0	45	136	0	29	468	0	4	1006	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.9	13.9		13.9	13.9		78.1	78.1		78.1	78.1	
Effective Green, g (s)	14.9	14.9		14.9	14.9		79.1	79.1		79.1	79.1	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.79	0.79		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	112	219		124	236		271	1280		600	1277	
v/s Ratio Prot		0.05			c0.09			0.29			c0.62	
v/s Ratio Perm	0.06			0.05			0.08			0.01		
v/c Ratio	0.38	0.34		0.36	0.57		0.11	0.37		0.01	0.79	
Uniform Delay, d1	38.4	38.1		38.3	39.6		2.4	3.1		2.2	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.83	1.42	
Incremental Delay, d2	2.2	0.9		1.8	3.4		0.8	0.8		0.0	2.6	
Delay (s)	40.6	39.0		40.1	43.0		3.2	3.9		1.8	10.9	
Level of Service	D	D		D	D		A	A		A	B	
Approach Delay (s)		39.4			42.3			3.8			10.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	260	195	275	653	34	128	341	74	18	736	242
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	1829	3624		3547	1925	1345	1554	3223	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	1829	3624		3547	1925	1345	1554	3223	
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)	165	286	214	302	718	37	141	375	81	20	809	266
RTOR Reduction (vph)	0	0	177	0	4	0	0	0	45	0	27	0
Lane Group Flow (vph)	165	286	37	302	751	0	141	375	36	20	1048	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	10.0	15.3	15.3	20.9	26.2		8.9	42.5	42.5	3.3	36.9	
Effective Green, g (s)	11.0	17.3	17.3	21.9	28.2		9.9	44.5	44.5	4.3	38.9	
Actuated g/C Ratio	0.11	0.17	0.17	0.22	0.28		0.10	0.44	0.44	0.04	0.39	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	390	633	251	401	1022		351	857	599	67	1254	
v/s Ratio Prot	0.05	c0.08		0.17	c0.21		c0.04	0.19		0.01	c0.33	
v/s Ratio Perm			0.03						0.03			
v/c Ratio	0.42	0.45	0.15	0.75	0.73		0.40	0.44	0.06	0.30	0.84	
Uniform Delay, d1	41.5	37.1	35.1	36.5	32.5		42.3	19.1	15.8	46.4	27.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.89	0.76	0.83	1.00	1.00	
Incremental Delay, d2	0.7	0.5	0.3	7.8	2.8		0.8	1.6	0.2	2.5	6.7	
Delay (s)	42.3	37.6	35.4	44.3	35.3		38.5	16.2	13.3	48.9	34.3	
Level of Service	D	D	D	D	D		D	B	B	D	C	
Approach Delay (s)		38.0			37.9			21.1			34.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

4/19/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	100	86	23	84	97	87
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	156	134	36	131	152	136
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			311		467	263
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			311		467	263
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		71	82
cM capacity (veh/h)			1227		519	747

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	291	167	288
Volume Left	0	36	152
Volume Right	134	0	136
cSH	1700	1227	607
Volume to Capacity	0.17	0.03	0.47
Queue Length 95th (ft)	0	2	64
Control Delay (s)	0.0	1.9	16.2
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	16.2
Approach LOS			C

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	84	27	14	22	88	87	22	54	16	12	63	32
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	140	45	23	37	147	145	37	90	27	20	105	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	208	328	153	178
Volume Left (vph)	140	37	37	20
Volume Right (vph)	23	145	27	53
Hadj (s)	0.10	-0.18	-0.02	-0.12
Departure Headway (s)	5.4	5.0	5.6	5.5
Degree Utilization, x	0.32	0.46	0.24	0.27
Capacity (veh/h)	609	676	568	589
Control Delay (s)	10.9	12.1	10.4	10.5
Approach Delay (s)	10.9	12.1	10.4	10.5
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.2		
HCM Level of Service	B		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	1145	89	120	264	302	62	343	539	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	3286	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	3286	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	1218	95	128	281	321	66	365	573	1232	847	134
RTOR Reduction (vph)	0	0	61	0	41	123	0	0	0	0	9	0
Lane Group Flow (vph)	182	1218	34	128	375	63	66	365	573	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	0.42	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	14.0	0.2	0.9	0.2	0.1	2.3	3.6	0.6	61.9	1.4	
Delay (s)	51.8	51.5	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)		49.9			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	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	51	21	29	29	65	23	794	58	52	225	98
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1480			1596	1391	1822	3620		1829	1823	
Flt Permitted	0.95	0.99			0.98	1.00	0.48	1.00		0.23	1.00	
Satd. Flow (perm)	1477	1480			1596	1391	920	3620		434	1823	
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)	141	53	22	30	30	68	24	827	60	54	234	102
RTOR Reduction (vph)	0	17	0	0	0	58	0	8	0	0	23	0
Lane Group Flow (vph)	109	90	0	0	60	10	24	879	0	54	313	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.7	7.7			4.2	4.2	17.3	17.3		17.3	17.3	
Effective Green, g (s)	9.7	9.7			6.2	6.2	19.3	19.3		19.3	19.3	
Actuated g/C Ratio	0.22	0.22			0.14	0.14	0.44	0.44		0.44	0.44	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	324	325			224	195	402	1581		190	796	
v/s Ratio Prot	c0.07	0.06			c0.04			c0.24			0.17	
v/s Ratio Perm						0.01	0.03			0.12		
v/c Ratio	0.34	0.28			0.27	0.05	0.06	0.56		0.28	0.39	
Uniform Delay, d1	14.5	14.3			17.0	16.4	7.2	9.3		8.0	8.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.5			0.6	0.1	0.1	0.4		0.8	0.3	
Delay (s)	15.2	14.8			17.6	16.6	7.3	9.7		8.8	8.8	
Level of Service	B	B			B	B	A	A		A	A	
Approach Delay (s)		15.0			17.1			9.6			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	165	77	95	94	39	68	957	136	50	445	50
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3560		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3560		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	64	168	79	97	96	40	69	977	139	51	454	51
RTOR Reduction (vph)	0	0	40	0	0	35	0	7	0	0	0	22
Lane Group Flow (vph)	64	168	39	97	96	5	69	1109	0	51	454	29
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	15.9	15.9	15.9	13.8	13.8	13.8	7.2	66.5		6.8	66.1	66.1
Effective Green, g (s)	16.9	16.9	16.9	14.8	14.8	14.8	8.2	68.5		7.8	68.1	68.1
Actuated g/C Ratio	0.14	0.14	0.14	0.12	0.12	0.12	0.07	0.57		0.06	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	258	271	227	192	202	169	125	2032		119	2075	892
v/s Ratio Prot	0.03	c0.09		c0.06	0.06		0.04	c0.31		c0.03	0.12	
v/s Ratio Perm			0.02			0.00						0.02
v/c Ratio	0.25	0.62	0.17	0.51	0.48	0.03	0.55	0.55		0.43	0.22	0.03
Uniform Delay, d1	45.9	48.5	45.4	49.2	49.0	46.3	54.1	16.1		54.0	12.8	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.13	1.34		1.00	1.00	1.00
Incremental Delay, d2	0.5	4.2	0.4	2.1	1.8	0.1	2.7	0.5		2.5	0.2	0.1
Delay (s)	46.4	52.7	45.7	51.3	50.7	46.3	63.7	22.0		56.4	13.1	11.5
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		49.6			50.2			24.5			16.9	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	39	47	17	33	40	28	1060	21	27	566	38
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.97			0.99	1.00	0.97	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1446			1585	1276	1500	1627		1554	1607	
Flt Permitted		0.82			0.89	1.00	0.38	1.00		0.15	1.00	
Satd. Flow (perm)		1222			1429	1276	595	1627		247	1607	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	85	40	48	18	34	41	29	1093	22	28	584	39
RTOR Reduction (vph)	0	12	0	0	0	34	0	0	0	0	2	0
Lane Group Flow (vph)	0	161	0	0	52	7	29	1115	0	28	621	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		20.0			20.0	20.0	92.0	92.0		92.0	92.0	
Effective Green, g (s)		21.0			21.0	21.0	93.0	93.0		93.0	93.0	
Actuated g/C Ratio		0.18			0.18	0.18	0.78	0.78		0.78	0.78	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		214			250	223	461	1261		191	1245	
v/s Ratio Prot								c0.69			0.39	
v/s Ratio Perm		c0.13			0.04	0.01	0.05			0.11		
v/c Ratio		0.75			0.21	0.03	0.06	0.88		0.15	0.50	
Uniform Delay, d1		47.0			42.4	41.1	3.2	9.6		3.4	5.0	
Progression Factor		1.00			1.00	1.00	0.74	1.36		2.33	2.61	
Incremental Delay, d2		13.8			0.4	0.1	0.2	5.8		1.6	1.4	
Delay (s)		60.8			42.8	41.1	2.5	18.9		9.6	14.4	
Level of Service		E			D	D	A	B		A	B	
Approach Delay (s)		60.8			42.1			18.5			14.2	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	97	79	34	58	25	38	996	25	8	529	65
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		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)	1530	1500		1538	1545		1546	1629		1554	1603	
Flt Permitted	0.62	1.00		0.35	1.00		0.38	1.00		0.18	1.00	
Satd. Flow (perm)	1000	1500		563	1545		622	1629		297	1603	
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)	89	102	83	36	61	26	40	1048	26	8	557	68
RTOR Reduction (vph)	0	26	0	0	13	0	0	1	0	0	3	0
Lane Group Flow (vph)	89	159	0	36	74	0	40	1073	0	8	622	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.8	17.8		17.8	17.8		94.2	94.2		94.2	94.2	
Effective Green, g (s)	18.8	18.8		18.8	18.8		95.2	95.2		95.2	95.2	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.79	0.79		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	157	235		88	242		493	1292		236	1272	
v/s Ratio Prot		c0.11			0.05			c0.66			0.39	
v/s Ratio Perm	0.09			0.06			0.06			0.03		
v/c Ratio	0.57	0.68		0.41	0.30		0.08	0.83		0.03	0.49	
Uniform Delay, d1	46.8	47.7		45.6	44.8		2.7	7.5		2.6	4.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		2.09	2.42	
Incremental Delay, d2	4.6	7.5		3.1	0.7		0.3	6.3		0.2	1.2	
Delay (s)	51.5	55.2		48.7	45.5		3.1	13.8		5.7	11.3	
Level of Service	D	E		D	D		A	B		A	B	
Approach Delay (s)		54.0			46.4			13.4			11.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	669	510	112	93	231	33	194	726	358	70	434	202
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	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	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	1829	3572		3547	1925	1291	1554	3172	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	1829	3572		3547	1925	1291	1554	3172	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	858	654	144	119	296	42	249	931	459	90	556	259
RTOR Reduction (vph)	0	0	88	0	9	0	0	0	152	0	43	0
Lane Group Flow (vph)	858	654	56	119	329	0	249	931	307	90	772	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	22.2	25.7	25.7	12.7	16.2		19.0	53.5	53.5	10.1	44.6	
Effective Green, g (s)	23.2	27.7	27.7	13.7	18.2		20.0	55.5	55.5	11.1	46.6	
Actuated g/C Ratio	0.19	0.23	0.23	0.11	0.15		0.17	0.46	0.46	0.09	0.39	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	686	844	328	209	542		591	890	597	144	1232	
v/s Ratio Prot	c0.24	0.18		0.07	c0.09		0.07	c0.48		0.06	c0.24	
v/s Ratio Perm			0.04						0.24			
v/c Ratio	1.25	0.77	0.17	0.57	0.61		0.42	1.05	0.51	0.62	0.63	
Uniform Delay, d1	48.4	43.2	36.9	50.4	47.6		44.8	32.2	22.7	52.4	29.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.71	0.62	0.33	1.00	1.00	
Incremental Delay, d2	124.7	4.5	0.2	3.5	1.9		0.5	41.8	2.9	8.2	2.4	
Delay (s)	173.1	47.7	37.2	53.9	49.5		32.3	61.7	10.4	60.6	32.1	
Level of Service	F	D	D	D	D		C	E	B	E	C	
Approach Delay (s)		111.7			50.6			42.9			34.9	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	66.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

4/19/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	187	22	14	137	26	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	205	24	15	151	29	36
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			250		439	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			250		439	258
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	95
cM capacity (veh/h)			1292		548	753

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	230	166	65
Volume Left	0	15	29
Volume Right	24	0	36
cSH	1700	1292	647
Volume to Capacity	0.14	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.8	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	47	15	7	34	10	17	35	13	7	24	11
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	26	58	19	9	42	12	21	43	16	9	30	14

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	102	63	80	52
Volume Left (vph)	26	9	21	9
Volume Right (vph)	19	12	16	14
Hadj (s)	0.00	-0.06	0.00	-0.09
Departure Headway (s)	4.3	4.3	4.3	4.3
Degree Utilization, x	0.12	0.07	0.10	0.06
Capacity (veh/h)	814	813	792	805
Control Delay (s)	7.9	7.6	7.8	7.6
Approach Delay (s)	7.9	7.6	7.8	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.7		
HCM Level of Service	A		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

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	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	0.99		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	0.97		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	3657	1599	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	3657	1599	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	0	0	0	0	0	86	0
Lane Group Flow (vph)	287	336	0	314	1248	1240	169	422	145	231	456	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	8.0	36.0		12.4	40.4	100.0	10.0	20.9	100.0	9.7	20.6	
Effective Green, g (s)	9.0	40.0		13.4	44.4	100.0	11.0	23.9	100.0	10.7	23.6	
Actuated g/C Ratio	0.09	0.40		0.13	0.44	1.00	0.11	0.24	1.00	0.11	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	2026		475	1624	1599	201	874	1599	380	817	
v/s Ratio Prot	0.08	0.07		0.09	0.34		0.09	0.12		0.07	0.13	
v/s Ratio Perm						c0.78			0.09			
v/c Ratio	0.90	0.17		0.66	0.77	0.78	0.84	0.48	0.09	0.61	0.56	
Uniform Delay, d1	45.1	19.3		41.1	23.5	0.0	43.6	32.7	0.0	42.6	33.6	
Progression Factor	0.90	1.04		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.2	0.2		3.4	3.6	3.7	25.9	0.4	0.1	2.7	0.8	
Delay (s)	66.9	20.3		44.6	27.0	3.7	69.5	33.2	0.1	45.4	34.4	
Level of Service	E	C		D	C	A	E	C	A	D	C	
Approach Delay (s)		40.5			18.7			35.0			37.7	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

4/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	3	39	88	59	173	28	311	14	84	604	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	3.0		3.0	3.0	
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93			1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.98			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1401			1588	1391	1829	3634		1829	1848	
Flt Permitted	0.95	0.98			0.97	1.00	0.08	1.00		0.50	1.00	
Satd. Flow (perm)	1477	1401			1588	1391	159	3634		969	1848	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	154	4	46	104	69	204	33	366	16	99	711	201
RTOR Reduction (vph)	0	34	0	0	0	104	0	3	0	0	9	0
Lane Group Flow (vph)	105	65	0	0	173	100	33	379	0	99	903	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	13.1	13.1			14.1	14.1	46.5	46.5		46.5	46.5	
Effective Green, g (s)	15.1	15.1			16.1	16.1	48.5	48.5		48.5	48.5	
Actuated g/C Ratio	0.17	0.17			0.18	0.18	0.55	0.55		0.55	0.55	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	239			288	252	87	1987		530	1010	
v/s Ratio Prot	c0.07	0.05			c0.11			0.10			c0.49	
v/s Ratio Perm						0.07	0.21			0.10		
v/c Ratio	0.42	0.27			0.60	0.40	0.38	0.19		0.19	0.89	
Uniform Delay, d1	32.9	32.0			33.3	32.0	11.5	10.2		10.1	17.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6			3.5	1.0	2.8	0.0		0.2	10.2	
Delay (s)	34.0	32.6			36.9	33.0	14.2	10.2		10.3	28.0	
Level of Service	C	C			D	C	B	B		B	C	
Approach Delay (s)		33.3			34.8			10.5			26.3	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	101	91	138	216	61	46	433	64	42	1013	160
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3560		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3560		1829	3657	1577
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)	24	112	101	153	240	68	51	481	71	47	1126	178
RTOR Reduction (vph)	0	0	87	0	0	27	0	9	0	0	0	83
Lane Group Flow (vph)	24	112	14	153	240	41	51	543	0	47	1126	95
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.1	13.1	13.1	18.7	18.7	18.7	6.6	46.0		5.2	44.6	44.6
Effective Green, g (s)	14.1	14.1	14.1	19.7	19.7	19.7	7.6	48.0		6.2	46.6	46.6
Actuated g/C Ratio	0.14	0.14	0.14	0.20	0.20	0.20	0.08	0.48		0.06	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	258	271	228	306	322	270	139	1709		113	1704	735
v/s Ratio Prot	0.01	c0.06		0.10	c0.15		0.03	0.15		c0.03	c0.31	
v/s Ratio Perm			0.01			0.03						0.06
v/c Ratio	0.09	0.41	0.06	0.50	0.75	0.15	0.37	0.32		0.42	0.66	0.13
Uniform Delay, d1	37.4	39.2	37.2	35.8	37.8	33.2	43.9	16.0		45.2	20.6	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.39	0.65		1.48	0.46	0.45
Incremental Delay, d2	0.2	1.0	0.1	1.3	9.0	0.3	1.5	0.4		2.0	1.7	0.3
Delay (s)	37.5	40.2	37.3	37.0	46.8	33.5	62.7	10.8		68.9	11.2	7.1
Level of Service	D	D	D	D	D	C	E	B		E	B	A
Approach Delay (s)		38.7			41.6			15.2			12.6	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	9	1	23	80	60	25	491	51	64	1064	108
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		0.96	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1585			1595	1292	1554	1595		1500	1596	
Flt Permitted		0.97			0.94	1.00	0.09	1.00		0.40	1.00	
Satd. Flow (perm)		1547			1517	1292	149	1595		632	1596	
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)	2	10	1	25	88	66	27	540	56	70	1169	119
RTOR Reduction (vph)	0	1	0	0	0	57	0	2	0	0	2	0
Lane Group Flow (vph)	0	12	0	0	113	9	27	594	0	70	1286	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.3			13.3	13.3	78.7	78.7		78.7	78.7	
Effective Green, g (s)		14.3			14.3	14.3	79.7	79.7		79.7	79.7	
Actuated g/C Ratio		0.14			0.14	0.14	0.80	0.80		0.80	0.80	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		221			217	185	119	1271		504	1272	
v/s Ratio Prot								0.37			c0.81	
v/s Ratio Perm		0.01			c0.07	0.01	0.18			0.11		
v/c Ratio		0.05			0.52	0.05	0.23	0.47		0.14	1.01	
Uniform Delay, d1		37.0			39.7	37.0	2.5	3.3		2.3	10.1	
Progression Factor		1.00			1.00	1.00	1.63	1.82		0.50	2.22	
Incremental Delay, d2		0.1			2.2	0.1	4.1	1.1		0.5	25.4	
Delay (s)		37.1			41.9	37.1	8.2	7.1		1.6	47.9	
Level of Service		D			D	D	A	A		A	D	
Approach Delay (s)		37.1			40.1			7.2			45.5	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	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
95: Neal St & First

4/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	54	80	50	134	22	42	506	33	3	1008	81
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.91		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1538	1459		1537	1594		1554	1617		1546	1614	
Flt Permitted	0.43	1.00		0.50	1.00		0.14	1.00		0.41	1.00	
Satd. Flow (perm)	702	1459		802	1594		232	1617		666	1614	
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)	41	57	84	53	141	23	44	533	35	3	1061	85
RTOR Reduction (vph)	0	65	0	0	8	0	0	1	0	0	2	0
Lane Group Flow (vph)	41	76	0	53	156	0	44	567	0	3	1144	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.1	15.1		15.1	15.1		76.9	76.9		76.9	76.9	
Effective Green, g (s)	16.1	16.1		16.1	16.1		77.9	77.9		77.9	77.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	113	235		129	257		181	1260		519	1257	
v/s Ratio Prot		0.05			c0.10			0.35			c0.71	
v/s Ratio Perm	0.06			0.07			0.19			0.00		
v/c Ratio	0.36	0.32		0.41	0.61		0.24	0.45		0.01	0.91	
Uniform Delay, d1	37.4	37.1		37.7	39.0		3.0	3.8		2.5	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.90	1.55	
Incremental Delay, d2	2.0	0.8		2.1	4.0		3.2	1.2		0.0	3.2	
Delay (s)	39.4	37.9		39.8	43.1		6.2	4.9		2.2	16.2	
Level of Service	D	D		D	D		A	A		A	B	
Approach Delay (s)		38.2			42.3			5.0			16.1	
Approach LOS		D			D			A			B	

Intersection Summary				
HCM Average Control Delay	17.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	81.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/18/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	164	237	214	392	737	48	147	494	89	18	899	233
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	1829	3616		3547	1925	1345	1554	3250	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	1829	3616		3547	1925	1345	1554	3250	
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)	180	260	235	431	810	53	162	543	98	20	988	256
RTOR Reduction (vph)	0	0	184	0	5	0	0	0	57	0	21	0
Lane Group Flow (vph)	180	260	51	431	858	0	162	543	41	20	1223	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	10.4	14.9	14.9	23.6	28.1		9.2	40.2	40.2	3.3	34.3	
Effective Green, g (s)	11.4	16.9	16.9	24.6	30.1		10.2	42.2	42.2	4.3	36.3	
Actuated g/C Ratio	0.11	0.17	0.17	0.25	0.30		0.10	0.42	0.42	0.04	0.36	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	618	245	450	1088		362	812	568	67	1180	
v/s Ratio Prot	c0.05	0.07		c0.24	c0.24		c0.05	0.28		0.01	c0.38	
v/s Ratio Perm			0.03						0.03			
v/c Ratio	0.45	0.42	0.21	0.96	0.79		0.45	0.67	0.07	0.30	1.04	
Uniform Delay, d1	41.4	37.2	35.8	37.2	32.0		42.2	23.3	17.2	46.4	31.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.81	0.74	1.13	1.00	1.00	
Incremental Delay, d2	0.8	0.5	0.4	31.4	3.9		0.9	4.3	0.2	2.5	36.1	
Delay (s)	42.1	37.6	36.2	68.6	35.9		35.3	21.5	19.7	48.9	67.9	
Level of Service	D	D	D	E	D		D	C	B	D	E	
Approach Delay (s)		38.3			46.8			24.1			67.6	
Approach LOS		D			D			C			E	

Intersection Summary				
HCM Average Control Delay	47.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	88.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	105	86	23	97	97	86
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	164	134	36	152	152	134
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			318		495	271
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			318		495	271
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		70	82
cM capacity (veh/h)			1219		500	740

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	298	188	286
Volume Left	0	36	152
Volume Right	134	0	134
cSH	1700	1219	590
Volume to Capacity	0.18	0.03	0.48
Queue Length 95th (ft)	0	2	66
Control Delay (s)	0.0	1.8	16.7
Lane LOS		A	C
Approach Delay (s)	0.0	1.8	16.7
Approach LOS			C

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	83	32	14	22	97	87	22	54	16	12	63	32
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	138	53	23	37	162	145	37	90	27	20	105	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	215	343	153	178
Volume Left (vph)	138	37	37	20
Volume Right (vph)	23	145	27	53
Hadj (s)	0.10	-0.17	-0.02	-0.12
Departure Headway (s)	5.5	5.0	5.7	5.6
Degree Utilization, x	0.33	0.48	0.24	0.27
Capacity (veh/h)	605	673	557	579
Control Delay (s)	11.1	12.6	10.5	10.6
Approach Delay (s)	11.1	12.6	10.5	10.6
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.5		
HCM Level of Service	B		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

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	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	0.99		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	1599	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	1599	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	0	0	0	0	0	19	0
Lane Group Flow (vph)	222	1282	0	131	350	339	89	415	628	1044	931	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	10.7	31.0		7.0	27.3	120.0	9.9	14.8	120.0	46.2	51.1	
Effective Green, g (s)	11.7	35.0		8.0	31.3	120.0	10.9	17.8	120.0	47.2	54.1	
Actuated g/C Ratio	0.10	0.29		0.07	0.26	1.00	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	1599	166	542	1599	1395	1598	
v/s Ratio Prot	c0.06	c0.25		0.04	0.10		0.05	c0.11		c0.29	0.26	
v/s Ratio Perm						0.21			0.39			
v/c Ratio	0.64	0.85		0.56	0.37	0.21	0.54	0.77	0.39	0.75	0.58	
Uniform Delay, d1	52.1	40.0		54.3	36.3	0.0	52.1	49.1	0.0	31.3	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.60	
Incremental Delay, d2	4.0	6.1		2.8	0.2	0.3	3.3	6.4	0.7	2.7	0.4	
Delay (s)	56.2	46.1		57.1	36.5	0.3	55.4	55.5	0.7	24.1	15.1	
Level of Service	E	D		E	D	A	E	E	A	C	B	
Approach Delay (s)		47.6			24.8			25.1			19.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	29.4	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
30: Vineyard-Tawny & Bernal

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	52	22	32	36	77	27	922	83	70	234	108
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1479			1599	1391	1823	3612		1829	1819	
Flt Permitted	0.95	0.99			0.98	1.00	0.47	1.00		0.20	1.00	
Satd. Flow (perm)	1477	1479			1599	1391	896	3612		377	1819	
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)	90	54	23	33	38	80	28	960	86	73	244	112
RTOR Reduction (vph)	0	18	0	0	0	69	0	9	0	0	23	0
Lane Group Flow (vph)	81	68	0	0	71	11	28	1037	0	73	333	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.2	7.2			4.2	4.2	18.4	18.4		18.4	18.4	
Effective Green, g (s)	9.2	9.2			6.2	6.2	20.4	20.4		20.4	20.4	
Actuated g/C Ratio	0.21	0.21			0.14	0.14	0.46	0.46		0.46	0.46	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	304			221	193	408	1645		172	828	
v/s Ratio Prot	c0.05	0.05			c0.04			c0.29			0.18	
v/s Ratio Perm						0.01	0.03			0.19		
v/c Ratio	0.27	0.22			0.32	0.06	0.07	0.63		0.42	0.40	
Uniform Delay, d1	15.0	14.8			17.4	16.8	6.9	9.3		8.2	8.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4			0.8	0.1	0.1	0.8		1.7	0.3	
Delay (s)	15.4	15.2			18.2	16.9	6.9	10.1		9.9	8.5	
Level of Service	B	B			B	B	A	B		A	A	
Approach Delay (s)		15.3			17.5			10.0			8.7	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	111	72	101	90	41	72	1125	117	39	493	49
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3584		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3584		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	58	113	73	103	92	42	73	1148	119	40	503	50
RTOR Reduction (vph)	0	0	56	0	0	37	0	5	0	0	0	21
Lane Group Flow (vph)	58	113	17	103	92	5	73	1262	0	40	503	29
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.7	13.7	13.7	14.1	14.1	14.1	7.2	68.6		6.6	68.0	68.0
Effective Green, g (s)	14.7	14.7	14.7	15.1	15.1	15.1	8.2	70.6		7.6	70.0	70.0
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.07	0.59		0.06	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	224	236	198	196	206	173	125	2109		116	2133	916
v/s Ratio Prot	0.03	c0.06		c0.07	0.06		0.04	c0.35		c0.02	0.14	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.26	0.48	0.09	0.53	0.45	0.03	0.58	0.60		0.34	0.24	0.03
Uniform Delay, d1	47.7	49.1	46.7	49.1	48.6	46.0	54.2	15.7		53.8	12.1	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.36		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.5	0.2	2.5	1.5	0.1	1.9	0.3		1.8	0.3	0.1
Delay (s)	48.3	50.6	46.9	51.6	50.1	46.1	63.6	21.8		55.6	12.3	10.7
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		49.0			50.1			24.0			15.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	43	66	17	35	37	39	1211	22	24	620	38
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.97			0.99	1.00	0.97	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1433			1589	1276	1511	1628		1554	1609	
Flt Permitted		0.84			0.88	1.00	0.34	1.00		0.06	1.00	
Satd. Flow (perm)		1227			1420	1276	546	1628		106	1609	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	90	44	68	18	36	38	40	1248	23	25	639	39
RTOR Reduction (vph)	0	16	0	0	0	31	0	0	0	0	2	0
Lane Group Flow (vph)	0	186	0	0	54	7	40	1271	0	25	676	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		21.7			21.7	21.7	90.3	90.3		90.3	90.3	
Effective Green, g (s)		22.7			22.7	22.7	91.3	91.3		91.3	91.3	
Actuated g/C Ratio		0.19			0.19	0.19	0.76	0.76		0.76	0.76	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		232			269	241	415	1239		81	1224	
v/s Ratio Prot								c0.78			0.42	
v/s Ratio Perm		c0.15			0.04	0.01	0.07			0.24		
v/c Ratio		0.80			0.20	0.03	0.10	1.03		0.31	0.55	
Uniform Delay, d1		46.5			41.0	39.7	3.7	14.4		4.5	5.9	
Progression Factor		1.00			1.00	1.00	0.63	1.25		2.44	2.53	
Incremental Delay, d2		17.7			0.4	0.1	0.1	21.4		9.5	1.8	
Delay (s)		64.2			41.4	39.7	2.5	39.3		20.4	16.8	
Level of Service		E			D	D	A	D		C	B	
Approach Delay (s)		64.2			40.7			38.2			16.9	
Approach LOS		E			D			D			B	

Intersection Summary			
HCM Average Control Delay	34.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	121	93	37	58	23	48	1166	36	9	600	69
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		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)	1530	1504		1540	1550		1548	1627		1554	1604	
Flt Permitted	0.64	1.00		0.30	1.00		0.33	1.00		0.08	1.00	
Satd. Flow (perm)	1030	1504		480	1550		545	1627		129	1604	
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)	91	127	98	39	61	24	51	1227	38	9	632	73
RTOR Reduction (vph)	0	25	0	0	12	0	0	1	0	0	3	0
Lane Group Flow (vph)	91	200	0	39	73	0	51	1264	0	9	702	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3		91.7	91.7		91.7	91.7	
Effective Green, g (s)	21.3	21.3		21.3	21.3		92.7	92.7		92.7	92.7	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.77	0.77		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	183	267		85	275		421	1257		100	1239	
v/s Ratio Prot		c0.13			0.05			c0.78			0.44	
v/s Ratio Perm	0.09			0.08			0.09			0.07		
v/c Ratio	0.50	0.75		0.46	0.26		0.12	1.01		0.09	0.57	
Uniform Delay, d1	44.5	46.8		44.2	42.6		3.4	13.6		3.3	5.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		2.08	2.30	
Incremental Delay, d2	2.1	11.2		3.9	0.5		0.6	26.8		1.5	1.6	
Delay (s)	46.6	58.1		48.1	43.1		4.0	40.5		8.4	14.3	
Level of Service	D	E		D	D		A	D		A	B	
Approach Delay (s)		54.8			44.7			39.0			14.2	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	599	519	152	116	234	27	303	921	517	68	566	212
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	1.00	0.99	
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	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	1829	3585		3547	1925	1291	1554	3201	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	1829	3585		3547	1925	1291	1554	3201	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	768	665	195	149	300	35	388	1181	663	87	726	272
RTOR Reduction (vph)	0	0	118	0	8	0	0	0	175	0	31	0
Lane Group Flow (vph)	768	665	77	149	327	0	388	1181	488	87	967	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	23.0	25.3	25.3	13.9	16.2		19.0	52.8	52.8	10.0	43.8	
Effective Green, g (s)	24.0	27.3	27.3	14.9	18.2		20.0	54.8	54.8	11.0	45.8	
Actuated g/C Ratio	0.20	0.23	0.23	0.12	0.15		0.17	0.46	0.46	0.09	0.38	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	709	832	323	227	544		591	879	590	142	1222	
v/s Ratio Prot	c0.22	0.18		c0.08	c0.09		0.11	c0.61		0.06	c0.30	
v/s Ratio Perm			0.05						0.38			
v/c Ratio	1.08	0.80	0.24	0.66	0.60		0.66	1.34	0.83	0.61	0.79	
Uniform Delay, d1	48.0	43.8	37.9	50.1	47.5		46.8	32.6	28.5	52.4	32.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.71	0.63	0.38	1.00	1.00	
Incremental Delay, d2	58.6	5.4	0.4	6.7	1.9		2.1	160.8	10.4	7.6	5.3	
Delay (s)	106.6	49.2	38.2	56.8	49.4		35.5	181.4	21.1	60.1	38.2	
Level of Service	F	D	D	E	D		D	F	C	E	D	
Approach Delay (s)		74.9			51.7			108.4			39.9	
Approach LOS		E			D			F			D	

Intersection Summary			
HCM Average Control Delay	79.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	186	22	13	146	26	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	204	24	14	160	29	35
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			249		445	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		445	256
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	95
cM capacity (veh/h)			1293		544	754

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	229	175	64
Volume Left	0	14	29
Volume Right	24	0	35
cSH	1700	1293	643
Volume to Capacity	0.13	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.7	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.7	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	50	15	7	36	10	17	35	13	7	24	10
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	25	62	19	9	44	12	21	43	16	9	30	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	65	80	51
Volume Left (vph)	25	9	21	9
Volume Right (vph)	19	12	16	12
Hadj (s)	-0.02	-0.01	0.00	-0.08
Departure Headway (s)	4.2	4.3	4.3	4.3
Degree Utilization, x	0.12	0.08	0.10	0.06
Capacity (veh/h)	818	804	789	799
Control Delay (s)	7.8	7.7	7.8	7.6
Approach Delay (s)	7.8	7.7	7.8	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
HCM Level of Service	A		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	273	70	287	1137	1128	154	384	133	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	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	0.99		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	0.97		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	3657	1599	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	3657	1599	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	300	77	315	1249	1240	169	422	146	231	347	195
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	86	0
Lane Group Flow (vph)	287	337	0	315	1249	1240	169	422	146	231	456	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	8.0	36.0		12.4	40.4	100.0	10.0	20.9	100.0	9.7	20.6	
Effective Green, g (s)	9.0	40.0		13.4	44.4	100.0	11.0	23.9	100.0	10.7	23.6	
Actuated g/C Ratio	0.09	0.40		0.13	0.44	1.00	0.11	0.24	1.00	0.11	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	2026		475	1624	1599	201	874	1599	380	817	
v/s Ratio Prot	0.08	0.07		0.09	0.34		0.09	0.12		0.07	0.13	
v/s Ratio Perm						c0.78			0.09			
v/c Ratio	0.90	0.17		0.66	0.77	0.78	0.84	0.48	0.09	0.61	0.56	
Uniform Delay, d1	45.1	19.3		41.2	23.5	0.0	43.6	32.7	0.0	42.6	33.6	
Progression Factor	0.91	1.04		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.2	0.2		3.5	3.6	3.7	25.9	0.4	0.1	2.7	0.8	
Delay (s)	67.0	20.2		44.6	27.0	3.7	69.5	33.2	0.1	45.4	34.4	
Level of Service	E	C		D	C	A	E	C	A	D	C	
Approach Delay (s)		40.4			18.7			34.9			37.7	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	3	39	88	59	173	28	311	14	84	604	172
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93			1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.98			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1401			1588	1391	1829	3634		1829	1848	
Flt Permitted	0.95	0.98			0.97	1.00	0.08	1.00		0.50	1.00	
Satd. Flow (perm)	1477	1401			1588	1391	159	3634		969	1848	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	155	4	46	104	69	204	33	366	16	99	711	202
RTOR Reduction (vph)	0	33	0	0	0	104	0	3	0	0	9	0
Lane Group Flow (vph)	105	67	0	0	173	100	33	379	0	99	904	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	13.1	13.1			14.1	14.1	46.5	46.5		46.5	46.5	
Effective Green, g (s)	15.1	15.1			16.1	16.1	48.5	48.5		48.5	48.5	
Actuated g/C Ratio	0.17	0.17			0.18	0.18	0.55	0.55		0.55	0.55	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	239			288	252	87	1987		530	1010	
v/s Ratio Prot	c0.07	0.05			c0.11			0.10			c0.49	
v/s Ratio Perm						0.07	0.21			0.10		
v/c Ratio	0.42	0.28			0.60	0.40	0.38	0.19		0.19	0.89	
Uniform Delay, d1	32.9	32.1			33.3	32.0	11.5	10.2		10.1	17.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6			3.5	1.0	2.8	0.0		0.2	10.3	
Delay (s)	34.0	32.7			36.9	33.0	14.2	10.2		10.3	28.1	
Level of Service	C	C			D	C	B	B		B	C	
Approach Delay (s)		33.4			34.8			10.5			26.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	102	91	141	218	62	46	434	66	42	1013	160
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.98		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3558		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3558		1829	3657	1577
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)	24	113	101	157	242	69	51	482	73	47	1126	178
RTOR Reduction (vph)	0	0	87	0	0	28	0	9	0	0	0	83
Lane Group Flow (vph)	24	113	14	157	242	41	51	546	0	47	1126	95
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.1	13.1	13.1	18.7	18.7	18.7	6.6	46.0		5.2	44.6	44.6
Effective Green, g (s)	14.1	14.1	14.1	19.7	19.7	19.7	7.6	48.0		6.2	46.6	46.6
Actuated g/C Ratio	0.14	0.14	0.14	0.20	0.20	0.20	0.08	0.48		0.06	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	258	271	228	306	322	270	139	1708		113	1704	735
v/s Ratio Prot	0.01	c0.06		0.10	c0.15		0.03	0.15		c0.03	c0.31	
v/s Ratio Perm			0.01			0.03						0.06
v/c Ratio	0.09	0.42	0.06	0.51	0.75	0.15	0.37	0.32		0.42	0.66	0.13
Uniform Delay, d1	37.4	39.2	37.2	35.9	37.8	33.2	43.9	16.0		45.2	20.6	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.39	0.65		1.48	0.46	0.45
Incremental Delay, d2	0.2	1.0	0.1	1.5	9.5	0.3	1.5	0.5		2.0	1.7	0.3
Delay (s)	37.5	40.2	37.3	37.3	47.4	33.5	62.5	10.8		69.0	11.2	7.1
Level of Service	D	D	D	D	D	C	E	B		E	B	A
Approach Delay (s)		38.7			41.9			15.1			12.6	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	11	1	26	83	61	25	492	53	64	1066	109
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.98	1.00	1.00	1.00		0.97	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1592			1591	1292	1554	1594		1500	1596	
Flt Permitted		0.97			0.93	1.00	0.09	1.00		0.40	1.00	
Satd. Flow (perm)		1558			1502	1292	141	1594		628	1596	
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)	2	12	1	29	91	67	27	541	58	70	1171	120
RTOR Reduction (vph)	0	1	0	0	0	57	0	2	0	0	2	0
Lane Group Flow (vph)	0	14	0	0	120	10	27	597	0	70	1289	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.7			13.7	13.7	78.3	78.3		78.3	78.3	
Effective Green, g (s)		14.7			14.7	14.7	79.3	79.3		79.3	79.3	
Actuated g/C Ratio		0.15			0.15	0.15	0.79	0.79		0.79	0.79	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		229			221	190	112	1264		498	1266	
v/s Ratio Prot								0.37			c0.81	
v/s Ratio Perm		0.01			c0.08	0.01	0.19			0.11		
v/c Ratio		0.06			0.54	0.05	0.24	0.47		0.14	1.02	
Uniform Delay, d1		36.7			39.5	36.7	2.6	3.4		2.4	10.4	
Progression Factor		1.00			1.00	1.00	1.63	1.81		0.51	2.17	
Incremental Delay, d2		0.1			2.7	0.1	4.7	1.2		0.5	27.3	
Delay (s)		36.8			42.2	36.8	9.0	7.4		1.7	49.8	
Level of Service		D			D	D	A	A		A	D	
Approach Delay (s)		36.8			40.3			7.4			47.3	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	54	80	50	134	22	42	509	33	3	1013	81
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.91		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1538	1459		1537	1594		1554	1618		1546	1614	
Flt Permitted	0.43	1.00		0.50	1.00		0.14	1.00		0.41	1.00	
Satd. Flow (perm)	702	1459		802	1594		229	1618		663	1614	
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)	41	57	84	53	141	23	44	536	35	3	1066	85
RTOR Reduction (vph)	0	65	0	0	8	0	0	1	0	0	2	0
Lane Group Flow (vph)	41	76	0	53	156	0	44	570	0	3	1149	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.1	15.1		15.1	15.1		76.9	76.9		76.9	76.9	
Effective Green, g (s)	16.1	16.1		16.1	16.1		77.9	77.9		77.9	77.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	113	235		129	257		178	1260		516	1257	
v/s Ratio Prot		0.05			c0.10			0.35			c0.71	
v/s Ratio Perm	0.06			0.07			0.19			0.00		
v/c Ratio	0.36	0.32		0.41	0.61		0.25	0.45		0.01	0.91	
Uniform Delay, d1	37.4	37.1		37.7	39.0		3.0	3.8		2.5	8.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.86	1.53	
Incremental Delay, d2	2.0	0.8		2.1	4.0		3.3	1.2		0.0	3.2	
Delay (s)	39.4	37.9		39.8	43.1		6.3	4.9		2.1	16.2	
Level of Service	D	D		D	D		A	A		A	B	
Approach Delay (s)		38.2			42.3			5.0			16.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	237	214	392	737	48	147	496	89	18	902	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	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	1829	3616		3547	1925	1345	1554	3249	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	1829	3616		3547	1925	1345	1554	3249	
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)	181	260	235	431	810	53	162	545	98	20	991	258
RTOR Reduction (vph)	0	0	184	0	5	0	0	0	57	0	21	0
Lane Group Flow (vph)	181	260	51	431	858	0	162	545	41	20	1228	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	10.4	14.9	14.9	23.6	28.1		9.2	40.2	40.2	3.3	34.3	
Effective Green, g (s)	11.4	16.9	16.9	24.6	30.1		10.2	42.2	42.2	4.3	36.3	
Actuated g/C Ratio	0.11	0.17	0.17	0.25	0.30		0.10	0.42	0.42	0.04	0.36	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	618	245	450	1088		362	812	568	67	1179	
v/s Ratio Prot	c0.05	0.07		c0.24	c0.24		c0.05	0.28		0.01	c0.38	
v/s Ratio Perm			0.03						0.03			
v/c Ratio	0.45	0.42	0.21	0.96	0.79		0.45	0.67	0.07	0.30	1.04	
Uniform Delay, d1	41.4	37.2	35.8	37.2	32.0		42.2	23.3	17.2	46.4	31.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.82	0.74	1.13	1.00	1.00	
Incremental Delay, d2	0.8	0.5	0.4	31.4	3.9		0.9	4.3	0.2	2.5	37.7	
Delay (s)	42.2	37.6	36.2	68.6	35.9		35.3	21.6	19.7	48.9	69.5	
Level of Service	D	D	D	E	D		D	C	B	D	E	
Approach Delay (s)		38.3			46.8			24.1			69.2	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	86	23	97	97	87
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	166	134	36	152	152	136
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			320		496	273
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			320		496	273
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		70	82
cM capacity (veh/h)			1218		499	738

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	300	188	288
Volume Left	0	36	152
Volume Right	134	0	136
cSH	1700	1218	589
Volume to Capacity	0.18	0.03	0.49
Queue Length 95th (ft)	0	2	67
Control Delay (s)	0.0	1.8	16.8
Lane LOS		A	C
Approach Delay (s)	0.0	1.8	16.8
Approach LOS			C

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	84	32	14	22	97	87	22	54	16	12	63	32
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	140	53	23	37	162	145	37	90	27	20	105	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	217	343	153	178
Volume Left (vph)	140	37	37	20
Volume Right (vph)	23	145	27	53
Hadj (s)	0.10	-0.17	-0.02	-0.12
Departure Headway (s)	5.5	5.0	5.7	5.6
Degree Utilization, x	0.33	0.48	0.24	0.28
Capacity (veh/h)	605	672	556	579
Control Delay (s)	11.2	12.6	10.5	10.7
Approach Delay (s)	11.2	12.6	10.5	10.7
Approach LOS	B	B	B	B

Intersection Summary			
Delay	11.5		
HCM Level of Service	B		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1118	96	124	330	319	84	390	591	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	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	0.99		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	1599	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	1599	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	1189	102	132	351	339	89	415	629	1044	755	195
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	222	1283	0	132	351	339	89	415	629	1044	931	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	10.7	31.0		7.0	27.3	120.0	9.9	14.8	120.0	46.2	51.1	
Effective Green, g (s)	11.7	35.0		8.0	31.3	120.0	10.9	17.8	120.0	47.2	54.1	
Actuated g/C Ratio	0.10	0.29		0.07	0.26	1.00	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	1599	166	542	1599	1395	1598	
v/s Ratio Prot	c0.06	c0.25		0.04	0.10		0.05	c0.11		c0.29	0.26	
v/s Ratio Perm						0.21			0.39			
v/c Ratio	0.64	0.85		0.56	0.37	0.21	0.54	0.77	0.39	0.75	0.58	
Uniform Delay, d1	52.1	40.0		54.3	36.3	0.0	52.1	49.1	0.0	31.3	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.60	
Incremental Delay, d2	4.0	6.1		2.9	0.2	0.3	3.3	6.4	0.7	2.7	0.4	
Delay (s)	56.2	46.1		57.2	36.5	0.3	55.4	55.5	0.7	24.1	15.1	
Level of Service	E	D		E	D	A	E	E	A	C	B	
Approach Delay (s)		47.6			24.9			25.1			19.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	29.4	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
30: Vineyard-Tawny & Bernal

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	52	22	32	36	77	27	922	83	70	234	109
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1479			1599	1391	1823	3612		1829	1818	
Flt Permitted	0.95	0.99			0.98	1.00	0.46	1.00		0.20	1.00	
Satd. Flow (perm)	1477	1479			1599	1391	891	3612		377	1818	
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)	91	54	23	33	38	80	28	960	86	73	244	114
RTOR Reduction (vph)	0	18	0	0	0	69	0	9	0	0	23	0
Lane Group Flow (vph)	82	68	0	0	71	11	28	1037	0	73	335	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.3	7.3			4.2	4.2	18.4	18.4		18.4	18.4	
Effective Green, g (s)	9.3	9.3			6.2	6.2	20.4	20.4		20.4	20.4	
Actuated g/C Ratio	0.21	0.21			0.14	0.14	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	306			221	192	405	1641		171	826	
v/s Ratio Prot	c0.06	0.05			c0.04			c0.29			0.18	
v/s Ratio Perm						0.01	0.03			0.19		
v/c Ratio	0.27	0.22			0.32	0.06	0.07	0.63		0.43	0.41	
Uniform Delay, d1	14.9	14.8			17.5	16.8	6.9	9.4		8.3	8.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4			0.8	0.1	0.1	0.8		1.7	0.3	
Delay (s)	15.4	15.2			18.3	16.9	7.0	10.2		10.0	8.5	
Level of Service	B	B			B	B	A	B		B	A	
Approach Delay (s)		15.3			17.6			10.1			8.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	44.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	113	72	104	92	42	72	1126	120	40	494	49
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3582		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3582		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	58	115	73	106	94	43	73	1149	122	41	504	50
RTOR Reduction (vph)	0	0	55	0	0	38	0	5	0	0	0	21
Lane Group Flow (vph)	58	115	18	106	94	5	73	1266	0	41	504	29
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.8	13.8	13.8	14.1	14.1	14.1	7.2	68.5		6.6	67.9	67.9
Effective Green, g (s)	14.8	14.8	14.8	15.1	15.1	15.1	8.2	70.5		7.6	69.9	69.9
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.07	0.59		0.06	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	226	237	199	196	206	173	125	2104		116	2130	915
v/s Ratio Prot	0.03	c0.06		c0.07	0.06		0.04	c0.35		c0.02	0.14	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.26	0.49	0.09	0.54	0.46	0.03	0.58	0.60		0.35	0.24	0.03
Uniform Delay, d1	47.6	49.0	46.6	49.2	48.6	46.0	54.2	15.8		53.8	12.1	10.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.36		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.6	0.2	3.0	1.6	0.1	1.7	0.3		1.9	0.3	0.1
Delay (s)	48.2	50.6	46.8	52.2	50.2	46.1	63.6	21.9		55.7	12.4	10.7
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		48.9			50.4			24.1			15.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	46	66	20	38	38	39	1213	25	25	622	39
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.97			0.99	1.00	0.97	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1437			1587	1276	1511	1627		1554	1609	
Flt Permitted		0.84			0.86	1.00	0.34	1.00		0.06	1.00	
Satd. Flow (perm)		1228			1391	1276	542	1627		97	1609	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	91	47	68	21	39	39	40	1251	26	26	641	40
RTOR Reduction (vph)	0	15	0	0	0	32	0	0	0	0	2	0
Lane Group Flow (vph)	0	191	0	0	60	7	40	1277	0	26	679	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		22.0			22.0	22.0	90.0	90.0		90.0	90.0	
Effective Green, g (s)		23.0			23.0	23.0	91.0	91.0		91.0	91.0	
Actuated g/C Ratio		0.19			0.19	0.19	0.76	0.76		0.76	0.76	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		235			267	245	411	1234		74	1220	
v/s Ratio Prot								c0.78			0.42	
v/s Ratio Perm		c0.16			0.04	0.01	0.07			0.27		
v/c Ratio		0.81			0.22	0.03	0.10	1.03		0.35	0.56	
Uniform Delay, d1		46.4			41.0	39.4	3.8	14.5		4.8	6.1	
Progression Factor		1.00			1.00	1.00	0.64	1.25		2.38	2.51	
Incremental Delay, d2		18.8			0.4	0.1	0.1	24.3		12.4	1.8	
Delay (s)		65.2			41.4	39.5	2.6	42.4		23.8	17.0	
Level of Service		E			D	D	A	D		C	B	
Approach Delay (s)		65.2			40.6			41.2			17.3	
Approach LOS		E			D			D			B	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	121	93	37	58	23	48	1171	36	9	605	69
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		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)	1530	1504		1540	1550		1548	1627		1554	1605	
Flt Permitted	0.64	1.00		0.30	1.00		0.33	1.00		0.08	1.00	
Satd. Flow (perm)	1030	1504		480	1550		541	1627		124	1605	
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)	91	127	98	39	61	24	51	1233	38	9	637	73
RTOR Reduction (vph)	0	25	0	0	12	0	0	1	0	0	3	0
Lane Group Flow (vph)	91	200	0	39	73	0	51	1270	0	9	707	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3		91.7	91.7		91.7	91.7	
Effective Green, g (s)	21.3	21.3		21.3	21.3		92.7	92.7		92.7	92.7	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.77	0.77		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	183	267		85	275		418	1257		96	1240	
v/s Ratio Prot		c0.13			0.05			c0.78			0.44	
v/s Ratio Perm	0.09			0.08			0.09			0.07		
v/c Ratio	0.50	0.75		0.46	0.26		0.12	1.01		0.09	0.57	
Uniform Delay, d1	44.5	46.8		44.2	42.6		3.4	13.6		3.3	5.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		2.11	2.30	
Incremental Delay, d2	2.1	11.2		3.9	0.5		0.6	28.0		1.6	1.6	
Delay (s)	46.6	58.1		48.1	43.1		4.0	41.7		8.7	14.3	
Level of Service	D	E		D	D		A	D		A	B	
Approach Delay (s)		54.8			44.7			40.2			14.3	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	601	519	152	116	234	27	303	924	517	68	569	214
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	0.95	1.00	1.00	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	1.00	0.99	
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	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	1829	3585		3547	1925	1291	1554	3201	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	1829	3585		3547	1925	1291	1554	3201	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	771	665	195	149	300	35	388	1185	663	87	729	274
RTOR Reduction (vph)	0	0	118	0	8	0	0	0	174	0	31	0
Lane Group Flow (vph)	771	665	77	149	327	0	388	1185	489	87	972	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	23.0	25.3	25.3	13.9	16.2		19.0	52.8	52.8	10.0	43.8	
Effective Green, g (s)	24.0	27.3	27.3	14.9	18.2		20.0	54.8	54.8	11.0	45.8	
Actuated g/C Ratio	0.20	0.23	0.23	0.12	0.15		0.17	0.46	0.46	0.09	0.38	
Clearance Time (s)	4.0	5.0	5.0	4.0	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	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	709	832	323	227	544		591	879	590	142	1222	
v/s Ratio Prot	c0.22	0.18		c0.08	c0.09		0.11	c0.62		0.06	c0.30	
v/s Ratio Perm			0.05						0.38			
v/c Ratio	1.09	0.80	0.24	0.66	0.60		0.66	1.35	0.83	0.61	0.80	
Uniform Delay, d1	48.0	43.8	37.9	50.1	47.5		46.8	32.6	28.5	52.4	32.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.72	0.63	0.37	1.00	1.00	
Incremental Delay, d2	60.0	5.4	0.4	6.7	1.9		2.1	162.8	10.4	7.6	5.4	
Delay (s)	108.0	49.2	38.2	56.8	49.4		35.6	183.5	21.0	60.1	38.4	
Level of Service	F	D	D	E	D		D	F	C	E	D	
Approach Delay (s)		75.7			51.7			109.7			40.1	
Approach LOS		E			D			F			D	

Intersection Summary			
HCM Average Control Delay	80.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	187	22	14	147	26	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	205	24	15	162	29	36
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			250		450	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			250		450	258
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	95
cM capacity (veh/h)			1292		540	753

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	230	177	65
Volume Left	0	15	29
Volume Right	24	0	36
cSH	1700	1292	642
Volume to Capacity	0.14	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	0.8	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	50	15	7	36	10	17	35	13	7	24	11
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	26	62	19	9	44	12	21	43	16	9	30	14

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	106	65	80	52
Volume Left (vph)	26	9	21	9
Volume Right (vph)	19	12	16	14
Hadj (s)	-0.02	-0.01	0.00	-0.09
Departure Headway (s)	4.3	4.3	4.3	4.3
Degree Utilization, x	0.13	0.08	0.10	0.06
Capacity (veh/h)	817	803	788	791
Control Delay (s)	7.9	7.7	7.8	7.6
Approach Delay (s)	7.9	7.7	7.8	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
HCM Level of Service	A		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

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	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	0.95	
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	3657	1599	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	3657	1599	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	0	0	0	0	0	0	90	0
Lane Group Flow (vph)	264	722	0	409	1533	999	204	338	252	248	341	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	7.0	34.8		15.1	42.9	100.0	10.0	18.5	100.0	10.6	19.1	
Effective Green, g (s)	8.0	38.8		16.1	46.9	100.0	11.0	21.5	100.0	11.6	22.1	
Actuated g/C Ratio	0.08	0.39		0.16	0.47	1.00	0.11	0.22	1.00	0.12	0.22	
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	1984		571	1715	1599	201	786	1599	411	764	
v/s Ratio Prot	c0.07	0.14		c0.12	c0.42		c0.11	0.09		0.07	0.10	
v/s Ratio Perm						c0.62			0.16			
v/c Ratio	0.93	0.36		0.72	0.89	0.62	1.01	0.43	0.16	0.60	0.45	
Uniform Delay, d1	45.7	21.8		39.8	24.3	0.0	44.5	34.0	0.0	42.0	33.7	
Progression Factor	0.82	1.31		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.6	0.5		4.3	7.6	1.9	67.4	0.4	0.2	2.5	0.4	
Delay (s)	70.9	29.1		44.1	31.9	1.9	111.9	34.3	0.2	44.5	34.1	
Level of Service	E	C		D	C	A	F	C	A	D	C	
Approach Delay (s)		40.1			23.4			43.4			37.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	169	2	35	88	26	220	23	452	10	82	763	236
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1419			1575	1391	1829	3645		1829	1842	
Flt Permitted	0.95	0.97			0.96	1.00	0.06	1.00		0.42	1.00	
Satd. Flow (perm)	1477	1419			1575	1391	116	3645		810	1842	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	194	2	41	104	31	259	27	532	12	96	898	278
RTOR Reduction (vph)	0	19	0	0	0	150	0	1	0	0	9	0
Lane Group Flow (vph)	120	98	0	0	135	109	27	543	0	96	1167	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	14.4	14.4			10.6	10.6	64.2	64.2		64.2	64.2	
Effective Green, g (s)	16.4	16.4			12.6	12.6	66.2	66.2		66.2	66.2	
Actuated g/C Ratio	0.16	0.16			0.12	0.12	0.64	0.64		0.64	0.64	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	223			190	168	74	2316		515	1170	
v/s Ratio Prot	c0.08	0.07			c0.09			0.15			c0.63	
v/s Ratio Perm						0.08	0.23			0.12		
v/c Ratio	0.52	0.44			0.71	0.65	0.36	0.23		0.19	1.00	
Uniform Delay, d1	40.3	39.8			44.0	43.7	9.0	8.1		7.9	18.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	1.4			11.8	8.3	3.0	0.1		0.2	25.5	
Delay (s)	42.2	41.1			55.9	52.0	12.1	8.2		8.0	44.4	
Level of Service	D	D			E	D	B	A		A	D	
Approach Delay (s)		41.7			53.3			8.4			41.6	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	104.2	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			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	85	86	108	182	65	58	682	66	44	1178	202
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3591		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3591		1829	3657	1577
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)	31	94	96	120	202	72	64	758	73	49	1309	224
RTOR Reduction (vph)	0	0	83	0	0	35	0	6	0	0	0	87
Lane Group Flow (vph)	31	94	13	120	202	37	64	825	0	49	1309	137
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	12.6	12.6	12.6	17.1	17.1	17.1	6.9	46.7		6.6	46.4	46.4
Effective Green, g (s)	13.6	13.6	13.6	18.1	18.1	18.1	7.9	48.7		7.6	48.4	48.4
Actuated g/C Ratio	0.14	0.14	0.14	0.18	0.18	0.18	0.08	0.49		0.08	0.48	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	249	262	220	281	296	248	144	1749		139	1770	763
v/s Ratio Prot	0.02	c0.05		0.08	c0.12		c0.03	0.23		0.03	c0.36	
v/s Ratio Perm			0.01			0.03						0.09
v/c Ratio	0.12	0.36	0.06	0.43	0.68	0.15	0.44	0.47		0.35	0.74	0.18
Uniform Delay, d1	38.0	39.2	37.6	36.3	38.3	34.5	44.0	17.1		43.9	20.7	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.29	0.83		1.44	0.44	0.51
Incremental Delay, d2	0.2	0.8	0.1	1.0	6.4	0.3	1.7	0.7		1.1	2.0	0.4
Delay (s)	38.2	40.1	37.7	37.4	44.6	34.7	58.3	14.8		64.4	11.2	7.8
Level of Service	D	D	D	D	D	C	E	B		E	B	A
Approach Delay (s)		38.8			40.6			17.9			12.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	11	1	16	70	74	26	735	52	79	1145	139
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		0.98	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1577			1601	1292	1554	1607		1527	1589	
Flt Permitted		0.95			0.95	1.00	0.05	1.00		0.28	1.00	
Satd. Flow (perm)		1514			1538	1292	81	1607		446	1589	
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)	4	12	1	18	77	81	29	808	57	87	1258	153
RTOR Reduction (vph)	0	1	0	0	0	70	0	2	0	0	3	0
Lane Group Flow (vph)	0	16	0	0	95	11	29	863	0	87	1408	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		12.7			12.7	12.7	79.3	79.3		79.3	79.3	
Effective Green, g (s)		13.7			13.7	13.7	80.3	80.3		80.3	80.3	
Actuated g/C Ratio		0.14			0.14	0.14	0.80	0.80		0.80	0.80	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		207			211	177	65	1290		358	1276	
v/s Ratio Prot								0.54			c0.89	
v/s Ratio Perm		0.01			c0.06	0.01	0.36			0.20		
v/c Ratio		0.08			0.45	0.06	0.45	0.67		0.24	1.10	
Uniform Delay, d1		37.6			39.7	37.6	3.0	4.2		2.4	9.9	
Progression Factor		1.00			1.00	1.00	1.48	1.76		0.30	2.16	
Incremental Delay, d2		0.2			1.5	0.1	16.9	2.3		1.2	56.0	
Delay (s)		37.8			41.2	37.7	21.4	9.6		1.9	77.3	
Level of Service		D			D	D	C	A		A	E	
Approach Delay (s)		37.8			39.6			10.0			72.9	
Approach LOS		D			D			B			E	

Intersection Summary			
HCM Average Control Delay	48.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	46	80	52	136	25	56	744	38	3	1079	85
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1538	1447		1536	1590		1554	1621		1550	1614	
Flt Permitted	0.43	1.00		0.52	1.00		0.10	1.00		0.28	1.00	
Satd. Flow (perm)	690	1447		848	1590		169	1621		462	1614	
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)	45	48	84	55	143	26	59	783	40	3	1136	89
RTOR Reduction (vph)	0	70	0	0	8	0	0	1	0	0	2	0
Lane Group Flow (vph)	45	62	0	55	161	0	59	822	0	3	1223	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4		76.6	76.6		76.6	76.6	
Effective Green, g (s)	16.4	16.4		16.4	16.4		77.6	77.6		77.6	77.6	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	113	237		139	261		131	1258		359	1252	
v/s Ratio Prot		0.04			c0.10			0.51			c0.76	
v/s Ratio Perm	0.07			0.06			0.35			0.01		
v/c Ratio	0.40	0.26		0.40	0.62		0.45	0.65		0.01	0.98	
Uniform Delay, d1	37.4	36.5		37.4	38.9		3.9	5.1		2.5	10.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.89	1.56	
Incremental Delay, d2	2.3	0.6		1.9	4.3		10.8	2.7		0.0	4.0	
Delay (s)	39.7	37.1		39.2	43.1		14.6	7.7		2.3	20.2	
Level of Service	D	D		D	D		B	A		A	C	
Approach Delay (s)		37.8			42.2			8.2			20.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	178	233	209	455	714	62	174	775	127	19	944	204
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	0.95	1.00	0.97	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	3547	3604		3547	1925	1345	1554	3268	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	3547	3604		3547	1925	1345	1554	3268	
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)	196	256	230	500	785	68	191	852	140	21	1037	224
RTOR Reduction (vph)	0	0	130	0	7	0	0	0	60	0	18	0
Lane Group Flow (vph)	196	256	100	500	846	0	191	852	80	21	1243	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	7.0	14.9	14.9	17.6	25.5		7.0	46.7	46.7	2.8	42.5	
Effective Green, g (s)	8.0	16.9	16.9	18.6	27.5		8.0	48.7	48.7	3.8	44.5	
Actuated g/C Ratio	0.08	0.17	0.17	0.19	0.28		0.08	0.49	0.49	0.04	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	
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	618	245	660	991		284	937	655	59	1454	
v/s Ratio Prot	c0.06	0.07		0.14	c0.23		c0.05	c0.44		0.01	0.38	
v/s Ratio Perm			0.07						0.06			
v/c Ratio	0.69	0.41	0.41	0.76	0.85		0.67	0.91	0.12	0.36	0.85	
Uniform Delay, d1	44.8	37.1	37.1	38.6	34.3		44.7	23.6	14.0	46.9	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.13	0.64	0.37	1.00	1.00	
Incremental Delay, d2	7.0	0.5	1.1	5.0	7.3		5.8	13.7	0.4	3.7	6.6	
Delay (s)	51.8	37.6	38.2	43.5	41.6		56.4	28.8	5.5	50.6	31.5	
Level of Service	D	D	D	D	D		E	C	A	D	C	
Approach Delay (s)		41.9			42.3			30.5			31.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

4/29/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	115	95	30	120	107	95
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	180	148	47	188	167	148
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			348		575	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			348		575	294
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		62	79
cM capacity (veh/h)			1189		444	719

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	328	234	316
Volume Left	0	47	167
Volume Right	148	0	148
cSH	1700	1189	541
Volume to Capacity	0.19	0.04	0.58
Queue Length 95th (ft)	0	3	93
Control Delay (s)	0.0	1.9	20.5
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	20.5
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	90	37	20	25	98	90	25	60	20	15	70	35
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	150	62	33	42	163	150	42	100	33	25	117	58

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	245	355	175	200
Volume Left (vph)	150	42	42	25
Volume Right (vph)	33	150	33	58
Hadj (s)	0.07	-0.17	-0.03	-0.12
Departure Headway (s)	5.7	5.3	5.9	5.8
Degree Utilization, x	0.39	0.52	0.29	0.32
Capacity (veh/h)	581	639	533	552
Control Delay (s)	12.3	13.9	11.3	11.5
Approach Delay (s)	12.3	13.9	11.3	11.5
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.6		
HCM Level of Service	B		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

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	0.98	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	0.97	
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	1599	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	1599	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	0	0	0	0	0	17	0
Lane Group Flow (vph)	170	1442	0	270	788	386	149	368	685	709	914	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	8.8	35.3		11.7	38.2	120.0	12.9	16.3	120.0	35.7	39.1	
Effective Green, g (s)	9.8	39.3		12.7	42.2	120.0	13.9	19.3	120.0	36.7	42.1	
Actuated g/C Ratio	0.08	0.33		0.11	0.35	1.00	0.12	0.16	1.00	0.31	0.35	
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)	290	1689		375	1286	1599	212	588	1599	1085	1246	
v/s Ratio Prot	0.05	c0.28		c0.08	0.22		c0.08	c0.10		0.20	c0.26	
v/s Ratio Perm						0.24			c0.43			
v/c Ratio	0.59	0.85		0.72	0.61	0.24	0.70	0.63	0.43	0.65	0.73	
Uniform Delay, d1	53.1	37.7		51.9	32.1	0.0	51.1	47.0	0.0	36.1	34.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.78	
Incremental Delay, d2	3.0	5.7		6.5	0.9	0.4	10.1	2.1	0.8	2.8	2.1	
Delay (s)	56.2	43.4		58.4	33.0	0.4	61.1	49.1	0.8	31.6	28.6	
Level of Service	E	D		E	C	A	E	D	A	C	C	
Approach Delay (s)		44.7			29.0			23.1			29.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.4	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
30: Vineyard-Tawny & Bernal

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	92	49	13	31	30	76	36	1015	93	112	399	168
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1496			1596	1391	1825	3611		1829	1825	
Flt Permitted	0.95	0.99			0.98	1.00	0.26	1.00		0.18	1.00	
Satd. Flow (perm)	1477	1496			1596	1391	504	3611		342	1825	
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)	96	51	14	32	31	79	38	1057	97	117	416	175
RTOR Reduction (vph)	0	11	0	0	0	68	0	9	0	0	20	0
Lane Group Flow (vph)	80	70	0	0	63	11	38	1145	0	117	571	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.5	7.5			4.3	4.3	20.5	20.5		20.5	20.5	
Effective Green, g (s)	9.5	9.5			6.3	6.3	22.5	22.5		22.5	22.5	
Actuated g/C Ratio	0.20	0.20			0.13	0.13	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	300			213	185	240	1718		163	868	
v/s Ratio Prot	c0.05	0.05			c0.04			0.32			0.31	
v/s Ratio Perm						0.01	0.08			c0.34		
v/c Ratio	0.27	0.23			0.30	0.06	0.16	0.67		0.72	0.66	
Uniform Delay, d1	16.0	15.8			18.5	17.9	7.0	9.5		9.9	9.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4			0.8	0.1	0.3	1.0		14.0	1.8	
Delay (s)	16.5	16.2			19.3	18.0	7.3	10.5		23.9	11.3	
Level of Service	B	B			B	B	A	B		C	B	
Approach Delay (s)		16.4			18.6			10.4			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	103	91	103	81	45	63	1213	84	46	779	69
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3606		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3606		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	81	105	93	105	83	46	64	1238	86	47	795	70
RTOR Reduction (vph)	0	0	77	0	0	40	0	3	0	0	0	29
Lane Group Flow (vph)	81	105	16	105	83	6	64	1321	0	47	795	41
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.5	13.5	13.5	14.1	14.1	14.1	7.2	68.7		6.7	68.2	68.2
Effective Green, g (s)	14.5	14.5	14.5	15.1	15.1	15.1	8.2	70.7		7.7	70.2	70.2
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.07	0.59		0.06	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	221	233	195	196	206	173	125	2125		117	2139	919
v/s Ratio Prot	0.04	c0.05		c0.07	0.05		0.03	c0.37		c0.03	0.22	
v/s Ratio Perm			0.01			0.00						0.03
v/c Ratio	0.37	0.45	0.08	0.54	0.40	0.03	0.51	0.62		0.40	0.37	0.04
Uniform Delay, d1	48.5	49.0	46.8	49.2	48.3	46.0	54.0	16.0		53.9	13.2	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.26		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.4	0.2	2.8	1.3	0.1	1.3	0.5		2.3	0.5	0.1
Delay (s)	49.6	50.4	47.0	52.0	49.6	46.1	60.2	20.6		56.2	13.7	10.7
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		49.0			50.0			22.5			15.7	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	22	19	10	38	54	30	1263	18	58	832	91
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.96			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1459			1602	1276	1554	1629		1554	1590	
Flt Permitted		0.80			0.96	1.00	0.25	1.00		0.09	1.00	
Satd. Flow (perm)		1203			1546	1276	403	1629		152	1590	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	23	20	10	39	56	31	1302	19	60	858	94
RTOR Reduction (vph)	0	8	0	0	0	49	0	0	0	0	2	0
Lane Group Flow (vph)	0	97	0	0	49	7	31	1321	0	60	950	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		14.8			14.8	14.8	97.2	97.2		97.2	97.2	
Effective Green, g (s)		15.8			15.8	15.8	98.2	98.2		98.2	98.2	
Actuated g/C Ratio		0.13			0.13	0.13	0.82	0.82		0.82	0.82	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		158			204	168	330	1333		124	1301	
v/s Ratio Prot								c0.81			0.60	
v/s Ratio Perm		c0.08			0.03	0.01	0.08			0.39		
v/c Ratio		0.62			0.24	0.04	0.09	0.99		0.48	0.73	
Uniform Delay, d1		49.2			46.7	45.5	2.1	10.5		3.3	4.9	
Progression Factor		1.00			1.00	1.00	0.52	1.36		2.83	3.29	
Incremental Delay, d2		6.9			0.6	0.1	0.1	5.6		12.3	3.5	
Delay (s)		56.2			47.3	45.6	1.2	19.8		21.6	19.7	
Level of Service		E			D	D	A	B		C	B	
Approach Delay (s)		56.2			46.4			19.4			19.8	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	107	105	42	53	18	57	1219	42	9	760	68
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1529	1486		1540	1559		1554	1626		1554	1611	
Flt Permitted	0.66	1.00		0.29	1.00		0.26	1.00		0.05	1.00	
Satd. Flow (perm)	1069	1486		471	1559		423	1626		80	1611	
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)	71	113	111	44	56	19	60	1283	44	9	800	72
RTOR Reduction (vph)	0	31	0	0	11	0	0	1	0	0	2	0
Lane Group Flow (vph)	71	193	0	44	64	0	60	1326	0	9	870	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		92.1	92.1		92.1	92.1	
Effective Green, g (s)	20.9	20.9		20.9	20.9		93.1	93.1		93.1	93.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	186	259		82	272		328	1262		62	1250	
v/s Ratio Prot		c0.13			0.04			c0.82			0.54	
v/s Ratio Perm	0.07			0.09			0.14			0.11		
v/c Ratio	0.38	0.74		0.54	0.24		0.18	1.05		0.15	0.70	
Uniform Delay, d1	43.8	47.0		45.1	42.7		3.5	13.5		3.4	6.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.65	1.96	
Incremental Delay, d2	1.3	11.0		6.6	0.4		1.2	39.8		3.3	2.2	
Delay (s)	45.1	58.0		51.7	43.1		4.7	53.3		8.9	15.0	
Level of Service	D	E		D	D		A	D		A	B	
Approach Delay (s)		54.9			46.3			51.2			15.0	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	576	498	170	121	188	24	293	989	554	77	740	215
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	0.95	1.00	0.97	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	1.00	0.99	
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	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	3547	3579		3547	1925	1291	1554	3233	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	3547	3579		3547	1925	1291	1554	3233	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	738	638	218	155	241	31	376	1268	710	99	949	276
RTOR Reduction (vph)	0	0	140	0	9	0	0	0	114	0	22	0
Lane Group Flow (vph)	738	638	79	155	263	0	376	1268	596	99	1203	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	18.2	25.0	25.0	7.0	13.8		15.0	63.0	63.0	7.0	55.0	
Effective Green, g (s)	19.2	27.0	27.0	8.0	15.8		16.0	65.0	65.0	8.0	57.0	
Actuated g/C Ratio	0.16	0.22	0.22	0.07	0.13		0.13	0.54	0.54	0.07	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	
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)	568	823	319	236	471		473	1043	699	104	1536	
v/s Ratio Prot	c0.21	c0.17		c0.04	0.07		0.11	c0.66		c0.06	0.37	
v/s Ratio Perm			0.06						0.46			
v/c Ratio	1.30	0.78	0.25	0.66	0.56		0.79	1.22	0.85	0.95	0.78	
Uniform Delay, d1	50.4	43.7	38.1	54.7	48.8		50.4	27.5	23.4	55.8	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.73	0.54	0.26	1.00	1.00	
Incremental Delay, d2	147.3	4.6	0.4	6.4	1.4		7.0	104.0	9.9	72.5	4.1	
Delay (s)	197.7	48.3	38.6	61.1	50.3		43.9	118.8	15.9	128.3	30.4	
Level of Service	F	D	D	E	D		D	F	B	F	C	
Approach Delay (s)		116.1			54.2			75.8			37.7	
Approach LOS		F			D			E			D	

Intersection Summary			
HCM Average Control Delay	76.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	190	25	15	150	30	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	209	27	16	165	33	38
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			256		460	263
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			256		460	263
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	95
cM capacity (veh/h)			1285		532	748

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	236	181	71
Volume Left	0	16	33
Volume Right	27	0	38
cSH	1700	1285	630
Volume to Capacity	0.14	0.01	0.11
Queue Length 95th (ft)	0	1	10
Control Delay (s)	0.0	0.8	11.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.4
Approach LOS			B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	22	60	17	10	50	12	20	40	15	9	27	12
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	27	74	21	12	62	15	25	49	19	11	33	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	122	89	93	59
Volume Left (vph)	27	12	25	11
Volume Right (vph)	21	15	19	15
Hadj (s)	-0.02	0.01	0.01	-0.08
Departure Headway (s)	4.3	4.4	4.5	4.4
Degree Utilization, x	0.15	0.11	0.11	0.07
Capacity (veh/h)	798	775	764	763
Control Delay (s)	8.1	7.9	8.0	7.8
Approach Delay (s)	8.1	7.9	8.0	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
HCM Level of Service	A		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	574	104	373	1396	909	186	308	230	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	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	0.95	
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	3657	1599	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	3657	1599	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	631	114	410	1534	999	204	338	253	248	275	156
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	0	0	90	0
Lane Group Flow (vph)	264	723	0	410	1534	999	204	338	253	248	341	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	7.0	34.8		15.1	42.9	100.0	10.0	18.5	100.0	10.6	19.1	
Effective Green, g (s)	8.0	38.8		16.1	46.9	100.0	11.0	21.5	100.0	11.6	22.1	
Actuated g/C Ratio	0.08	0.39		0.16	0.47	1.00	0.11	0.22	1.00	0.12	0.22	
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	1984		571	1715	1599	201	786	1599	411	764	
v/s Ratio Prot	c0.07	0.14		c0.12	c0.42		c0.11	0.09		0.07	0.10	
v/s Ratio Perm						c0.62			0.16			
v/c Ratio	0.93	0.36		0.72	0.89	0.62	1.01	0.43	0.16	0.60	0.45	
Uniform Delay, d1	45.7	21.8		39.8	24.3	0.0	44.5	34.0	0.0	42.0	33.7	
Progression Factor	0.82	1.31		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.6	0.5		4.3	7.7	1.9	67.4	0.4	0.2	2.5	0.4	
Delay (s)	71.0	29.1		44.1	31.9	1.9	111.9	34.3	0.2	44.5	34.1	
Level of Service	E	C		D	C	A	F	C	A	D	C	
Approach Delay (s)		40.0			23.4			43.4			37.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	2	35	88	26	220	23	452	10	82	763	237
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	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1419			1575	1391	1829	3645		1829	1842	
Flt Permitted	0.95	0.97			0.96	1.00	0.06	1.00		0.42	1.00	
Satd. Flow (perm)	1477	1419			1575	1391	116	3645		810	1842	
Peak-hour factor, PHF	0.87	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	195	2	41	104	31	259	27	532	12	96	898	279
RTOR Reduction (vph)	0	19	0	0	0	150	0	1	0	0	9	0
Lane Group Flow (vph)	121	98	0	0	135	109	27	543	0	96	1168	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	14.4	14.4			10.6	10.6	64.2	64.2		64.2	64.2	
Effective Green, g (s)	16.4	16.4			12.6	12.6	66.2	66.2		66.2	66.2	
Actuated g/C Ratio	0.16	0.16			0.12	0.12	0.64	0.64		0.64	0.64	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	223			190	168	74	2316		515	1170	
v/s Ratio Prot	c0.08	0.07			c0.09			0.15			c0.63	
v/s Ratio Perm						0.08	0.23			0.12		
v/c Ratio	0.52	0.44			0.71	0.65	0.36	0.23		0.19	1.00	
Uniform Delay, d1	40.3	39.8			44.0	43.7	9.0	8.1		7.9	18.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	1.4			11.8	8.3	3.0	0.1		0.2	25.7	
Delay (s)	42.4	41.1			55.9	52.0	12.1	8.2		8.0	44.6	
Level of Service	D	D			E	D	B	A		A	D	
Approach Delay (s)		41.8			53.3			8.4			41.9	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	86	86	111	184	66	58	683	68	44	1178	202
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1614	1554	1636	1372	1829	3589		1829	3657	1577
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1614	1554	1636	1372	1829	3589		1829	3657	1577
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)	31	96	96	123	204	73	64	759	76	49	1309	224
RTOR Reduction (vph)	0	0	83	0	0	35	0	6	0	0	0	88
Lane Group Flow (vph)	31	96	13	123	204	38	64	829	0	49	1309	136
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	12.7	12.7	12.7	17.2	17.2	17.2	6.9	46.5		6.6	46.2	46.2
Effective Green, g (s)	13.7	13.7	13.7	18.2	18.2	18.2	7.9	48.5		7.6	48.2	48.2
Actuated g/C Ratio	0.14	0.14	0.14	0.18	0.18	0.18	0.08	0.48		0.08	0.48	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	251	264	221	283	298	250	144	1741		139	1763	760
v/s Ratio Prot	0.02	c0.05		0.08	c0.12		c0.03	0.23		0.03	c0.36	
v/s Ratio Perm			0.01			0.03						0.09
v/c Ratio	0.12	0.36	0.06	0.43	0.68	0.15	0.44	0.48		0.35	0.74	0.18
Uniform Delay, d1	37.9	39.2	37.5	36.3	38.2	34.4	44.0	17.2		43.9	20.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.29	0.83		1.45	0.44	0.51
Incremental Delay, d2	0.2	0.9	0.1	1.1	6.4	0.3	1.7	0.7		1.1	2.0	0.4
Delay (s)	38.1	40.0	37.7	37.4	44.6	34.7	58.3	15.0		64.5	11.3	7.9
Level of Service	D	D	D	D	D	C	E	B		E	B	A
Approach Delay (s)		38.7			40.6			18.1			12.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	13	1	19	73	75	26	736	54	79	1147	140
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.93	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		0.98	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1584			1597	1292	1554	1606		1528	1589	
Flt Permitted		0.95			0.94	1.00	0.05	1.00		0.27	1.00	
Satd. Flow (perm)		1525			1525	1292	82	1606		442	1589	
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)	4	14	1	21	80	82	29	809	59	87	1260	154
RTOR Reduction (vph)	0	1	0	0	0	71	0	2	0	0	3	0
Lane Group Flow (vph)	0	18	0	0	101	11	29	866	0	87	1411	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		12.9			12.9	12.9	79.1	79.1		79.1	79.1	
Effective Green, g (s)		13.9			13.9	13.9	80.1	80.1		80.1	80.1	
Actuated g/C Ratio		0.14			0.14	0.14	0.80	0.80		0.80	0.80	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		212			212	180	66	1286		354	1273	
v/s Ratio Prot								0.54			c0.89	
v/s Ratio Perm		0.01			c0.07	0.01	0.35			0.20		
v/c Ratio		0.09			0.48	0.06	0.44	0.67		0.25	1.11	
Uniform Delay, d1		37.5			39.7	37.4	3.1	4.3		2.5	10.0	
Progression Factor		1.00			1.00	1.00	1.48	1.75		0.31	2.14	
Incremental Delay, d2		0.2			1.7	0.1	16.2	2.3		1.2	57.9	
Delay (s)		37.7			41.4	37.5	20.7	9.8		2.0	79.3	
Level of Service		D			D	D	C	A		A	E	
Approach Delay (s)		37.7			39.7			10.2			74.8	
Approach LOS		D			D			B			E	

Intersection Summary			
HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	46	80	52	136	25	56	747	38	3	1084	85
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1538	1447		1536	1590		1554	1621		1550	1614	
Flt Permitted	0.43	1.00		0.52	1.00		0.10	1.00		0.28	1.00	
Satd. Flow (perm)	690	1447		848	1590		165	1621		460	1614	
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)	45	48	84	55	143	26	59	786	40	3	1141	89
RTOR Reduction (vph)	0	70	0	0	8	0	0	1	0	0	2	0
Lane Group Flow (vph)	45	62	0	55	161	0	59	825	0	3	1228	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4		76.6	76.6		76.6	76.6	
Effective Green, g (s)	16.4	16.4		16.4	16.4		77.6	77.6		77.6	77.6	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	113	237		139	261		128	1258		357	1252	
v/s Ratio Prot		0.04			c0.10			0.51			c0.76	
v/s Ratio Perm	0.07			0.06			0.36			0.01		
v/c Ratio	0.40	0.26		0.40	0.62		0.46	0.66		0.01	0.98	
Uniform Delay, d1	37.4	36.5		37.4	38.9		3.9	5.1		2.5	10.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.89	1.56	
Incremental Delay, d2	2.3	0.6		1.9	4.3		11.5	2.7		0.0	4.4	
Delay (s)	39.7	37.1		39.2	43.1		15.4	7.8		2.3	20.9	
Level of Service	D	D		D	D		B	A		A	C	
Approach Delay (s)		37.8			42.2			8.3			20.8	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	233	209	455	714	62	174	777	127	19	947	206
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	0.95	1.00	0.97	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	1.00	0.82	1.00	0.99	
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	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1452	3547	3604		3547	1925	1345	1554	3267	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1452	3547	3604		3547	1925	1345	1554	3267	
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)	197	256	230	500	785	68	191	854	140	21	1041	226
RTOR Reduction (vph)	0	0	129	0	7	0	0	0	60	0	18	0
Lane Group Flow (vph)	197	256	101	500	846	0	191	854	80	21	1249	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	7.0	14.9	14.9	17.6	25.5		7.0	46.7	46.7	2.8	42.5	
Effective Green, g (s)	8.0	16.9	16.9	18.6	27.5		8.0	48.7	48.7	3.8	44.5	
Actuated g/C Ratio	0.08	0.17	0.17	0.19	0.28		0.08	0.49	0.49	0.04	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	
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	618	245	660	991		284	937	655	59	1454	
v/s Ratio Prot	c0.06	0.07		0.14	c0.23		c0.05	c0.44		0.01	0.38	
v/s Ratio Perm			0.07						0.06			
v/c Ratio	0.69	0.41	0.41	0.76	0.85		0.67	0.91	0.12	0.36	0.86	
Uniform Delay, d1	44.8	37.1	37.1	38.6	34.3		44.7	23.7	14.0	46.9	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.13	0.64	0.37	1.00	1.00	
Incremental Delay, d2	7.1	0.5	1.1	5.0	7.3		5.8	13.9	0.4	3.7	6.8	
Delay (s)	52.0	37.6	38.3	43.5	41.6		56.4	29.1	5.5	50.6	31.7	
Level of Service	D	D	D	D	D		E	C	A	D	C	
Approach Delay (s)		42.0			42.3			30.7			32.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	36.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
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 Unsignalized Intersection Capacity Analysis
595: Vineyard & Adams

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	116	95	30	120	107	96
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64
Hourly flow rate (vph)	181	148	47	188	167	150
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			350		577	295
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			350		577	295
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		62	79
cM capacity (veh/h)			1187		443	717

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	330	234	317
Volume Left	0	47	167
Volume Right	148	0	150
cSH	1700	1187	541
Volume to Capacity	0.19	0.04	0.59
Queue Length 95th (ft)	0	3	94
Control Delay (s)	0.0	1.9	20.6
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	20.6
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
597: Kottinger & Adams

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	91	37	20	25	98	90	25	60	20	15	70	35
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	152	62	33	42	163	150	42	100	33	25	117	58

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	247	355	175	200
Volume Left (vph)	152	42	42	25
Volume Right (vph)	33	150	33	58
Hadj (s)	0.08	-0.17	-0.03	-0.12
Departure Headway (s)	5.7	5.3	5.9	5.8
Degree Utilization, x	0.39	0.52	0.29	0.32
Capacity (veh/h)	581	638	532	551
Control Delay (s)	12.3	14.0	11.3	11.6
Approach Delay (s)	12.3	14.0	11.3	11.6
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.6		
HCM Level of Service	B		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
28: Stanley Blvd & Valley

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	1225	143	255	742	363	140	346	645	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	0.98	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	0.97	
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	1599	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	1599	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	1303	152	271	789	386	149	368	686	709	751	180
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	170	1443	0	271	789	386	149	368	686	709	914	0
Confl. Peds. (#/hr)			12			36			36			
Turn Type	Prot			Prot		Free	Prot		Free	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						Free			Free			
Actuated Green, G (s)	8.8	35.3		11.7	38.2	120.0	12.9	16.3	120.0	35.7	39.1	
Effective Green, g (s)	9.8	39.3		12.7	42.2	120.0	13.9	19.3	120.0	36.7	42.1	
Actuated g/C Ratio	0.08	0.33		0.11	0.35	1.00	0.12	0.16	1.00	0.31	0.35	
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)	290	1689		375	1286	1599	212	588	1599	1085	1246	
v/s Ratio Prot	0.05	c0.28		c0.08	0.22		c0.08	c0.10		0.20	c0.26	
v/s Ratio Perm						0.24			c0.43			
v/c Ratio	0.59	0.85		0.72	0.61	0.24	0.70	0.63	0.43	0.65	0.73	
Uniform Delay, d1	53.1	37.7		51.9	32.2	0.0	51.1	47.0	0.0	36.1	34.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.78	
Incremental Delay, d2	3.0	5.7		6.7	0.9	0.4	10.1	2.1	0.8	2.8	2.1	
Delay (s)	56.2	43.4		58.7	33.0	0.4	61.1	49.1	0.8	31.6	28.6	
Level of Service	E	D		E	C	A	E	D	A	C	C	
Approach Delay (s)		44.8			29.1			23.1			29.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.4	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	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Vineyard-Tawny & Bernal

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	49	13	31	30	76	36	1015	93	112	399	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	3.0		3.0	3.0	
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1477	1496			1596	1391	1825	3611		1829	1825	
Flt Permitted	0.95	0.99			0.98	1.00	0.26	1.00		0.18	1.00	
Satd. Flow (perm)	1477	1496			1596	1391	503	3611		342	1825	
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)	97	51	14	32	31	79	38	1057	97	117	416	176
RTOR Reduction (vph)	0	11	0	0	0	68	0	9	0	0	20	0
Lane Group Flow (vph)	81	70	0	0	63	11	38	1145	0	117	572	0
Confl. Peds. (#/hr)			3	3			4					4
Parking (#/hr)	10	10	10	10	10	10						
Turn Type	Split			Split		Perm	Perm			Perm		
Protected Phases	4	4		3	3			2			6	
Permitted Phases						3	2			6		
Actuated Green, G (s)	7.5	7.5			4.3	4.3	20.5	20.5		20.5	20.5	
Effective Green, g (s)	9.5	9.5			6.3	6.3	22.5	22.5		22.5	22.5	
Actuated g/C Ratio	0.20	0.20			0.13	0.13	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	300			213	185	239	1718		163	868	
v/s Ratio Prot	c0.05	0.05			c0.04			0.32			0.31	
v/s Ratio Perm						0.01	0.08			c0.34		
v/c Ratio	0.27	0.23			0.30	0.06	0.16	0.67		0.72	0.66	
Uniform Delay, d1	16.0	15.8			18.5	17.9	7.0	9.5		9.9	9.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4			0.8	0.1	0.3	1.0		14.0	1.8	
Delay (s)	16.5	16.2			19.3	18.0	7.3	10.5		23.9	11.3	
Level of Service	B	B			B	B	A	B		C	B	
Approach Delay (s)		16.4			18.6			10.4			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
93: Vineyard-Ray St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	105	91	106	83	46	63	1214	87	47	780	69
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.96
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	0.99		1.00	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	1.00
Satd. Flow (prot)	1829	1925	1613	1554	1636	1371	1829	3605		1829	3657	1571
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1829	1925	1613	1554	1636	1371	1829	3605		1829	3657	1571
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	81	107	93	108	85	47	64	1239	89	48	796	70
RTOR Reduction (vph)	0	0	76	0	0	41	0	3	0	0	0	29
Lane Group Flow (vph)	81	107	17	108	85	6	64	1325	0	48	796	41
Confl. Peds. (#/hr)			1			1			9			4
Parking (#/hr)				10	10	10						
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	13.5	13.5	13.5	14.2	14.2	14.2	7.2	68.6		6.7	68.1	68.1
Effective Green, g (s)	14.5	14.5	14.5	15.2	15.2	15.2	8.2	70.6		7.7	70.1	70.1
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.07	0.59		0.06	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	221	233	195	197	207	174	125	2121		117	2136	918
v/s Ratio Prot	0.04	c0.06		c0.07	0.05		0.03	c0.37		c0.03	0.22	
v/s Ratio Perm			0.01			0.00						0.03
v/c Ratio	0.37	0.46	0.08	0.55	0.41	0.03	0.51	0.62		0.41	0.37	0.04
Uniform Delay, d1	48.5	49.1	46.9	49.2	48.3	46.0	54.0	16.1		54.0	13.3	10.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.26		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.4	0.2	3.1	1.3	0.1	1.2	0.5		2.3	0.5	0.1
Delay (s)	49.6	50.5	47.0	52.3	49.6	46.0	60.6	20.7		56.3	13.8	10.7
Level of Service	D	D	D	D	D	D	E	C		E	B	B
Approach Delay (s)		49.1			50.1			22.6			15.8	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
94: Kottinger-Spring & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	25	19	13	41	55	30	1265	21	59	834	92
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	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00	0.92	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.96			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1465			1597	1276	1554	1628		1554	1590	
Flt Permitted		0.80			0.94	1.00	0.24	1.00		0.09	1.00	
Satd. Flow (perm)		1207			1523	1276	399	1628		144	1590	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	63	26	20	13	42	57	31	1304	22	61	860	95
RTOR Reduction (vph)	0	8	0	0	0	49	0	0	0	0	2	0
Lane Group Flow (vph)	0	101	0	0	55	8	31	1326	0	61	953	0
Confl. Peds. (#/hr)	36		24	24		36	36		36	36		36
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.1			15.1	15.1	96.9	96.9		96.9	96.9	
Effective Green, g (s)		16.1			16.1	16.1	97.9	97.9		97.9	97.9	
Actuated g/C Ratio		0.13			0.13	0.13	0.82	0.82		0.82	0.82	
Clearance Time (s)		4.0			4.0	4.0	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	
Lane Grp Cap (vph)		162			204	171	326	1328		117	1297	
v/s Ratio Prot								c0.81			0.60	
v/s Ratio Perm		c0.08			0.04	0.01	0.08			0.42		
v/c Ratio		0.62			0.27	0.04	0.10	1.00		0.52	0.73	
Uniform Delay, d1		49.1			46.7	45.3	2.2	11.0		3.5	5.1	
Progression Factor		1.00			1.00	1.00	0.52	1.36		2.80	3.23	
Incremental Delay, d2		7.3			0.7	0.1	0.1	7.0		15.0	3.6	
Delay (s)		56.4			47.4	45.4	1.2	21.9		24.9	20.0	
Level of Service		E			D	D	A	C		C	B	
Approach Delay (s)		56.4			46.4			21.5			20.3	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
95: Neal St & First

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	107	105	42	53	18	57	1224	42	9	765	68
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1529	1486		1540	1559		1554	1626		1554	1611	
Flt Permitted	0.66	1.00		0.29	1.00		0.26	1.00		0.05	1.00	
Satd. Flow (perm)	1069	1486		471	1559		419	1626		75	1611	
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)	71	113	111	44	56	19	60	1288	44	9	805	72
RTOR Reduction (vph)	0	31	0	0	11	0	0	1	0	0	2	0
Lane Group Flow (vph)	71	193	0	44	64	0	60	1331	0	9	875	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Parking (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		92.1	92.1		92.1	92.1	
Effective Green, g (s)	20.9	20.9		20.9	20.9		93.1	93.1		93.1	93.1	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.78	0.78		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0		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	
Lane Grp Cap (vph)	186	259		82	272		325	1262		58	1250	
v/s Ratio Prot		c0.13			0.04			c0.82			0.54	
v/s Ratio Perm	0.07			0.09			0.14			0.12		
v/c Ratio	0.38	0.74		0.54	0.24		0.18	1.05		0.16	0.70	
Uniform Delay, d1	43.8	47.0		45.1	42.7		3.5	13.5		3.4	6.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.64	1.95	
Incremental Delay, d2	1.3	11.0		6.6	0.4		1.2	41.1		3.8	2.2	
Delay (s)	45.1	58.0		51.7	43.1		4.8	54.6		9.5	15.1	
Level of Service	D	E		D	D		A	D		A	B	
Approach Delay (s)		54.9			46.3			52.4			15.1	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
96: Bernal & First St

4/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	578	498	170	121	188	24	293	992	554	77	743	217
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	0.95	1.00	0.97	0.95		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00		1.00	1.00	0.79	1.00	0.99	
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	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3547	3657	1419	3547	3579		3547	1925	1291	1554	3232	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3547	3657	1419	3547	3579		3547	1925	1291	1554	3232	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	741	638	218	155	241	31	376	1272	710	99	953	278
RTOR Reduction (vph)	0	0	140	0	9	0	0	0	114	0	22	0
Lane Group Flow (vph)	741	638	79	155	263	0	376	1272	596	99	1209	0
Confl. Peds. (#/hr)			72			12			96			24
Parking (#/hr)										10	10	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases		4	4						2			
Actuated Green, G (s)	18.2	25.0	25.0	7.0	13.8		15.0	63.0	63.0	7.0	55.0	
Effective Green, g (s)	19.2	27.0	27.0	8.0	15.8		16.0	65.0	65.0	8.0	57.0	
Actuated g/C Ratio	0.16	0.22	0.22	0.07	0.13		0.13	0.54	0.54	0.07	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	
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)	568	823	319	236	471		473	1043	699	104	1535	
v/s Ratio Prot	c0.21	c0.17		c0.04	0.07		0.11	c0.66		c0.06	0.37	
v/s Ratio Perm			0.06						0.46			
v/c Ratio	1.30	0.78	0.25	0.66	0.56		0.79	1.22	0.85	0.95	0.79	
Uniform Delay, d1	50.4	43.7	38.1	54.7	48.8		50.4	27.5	23.4	55.8	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.73	0.54	0.25	1.00	1.00	
Incremental Delay, d2	149.5	4.6	0.4	6.4	1.4		7.0	105.7	9.9	72.5	4.2	
Delay (s)	199.9	48.3	38.6	61.1	50.3		43.9	120.5	15.9	128.3	30.6	
Level of Service	F	D	D	E	D		D	F	B	F	C	
Approach Delay (s)		117.3			54.2			76.8			37.9	
Approach LOS		F			D			E			D	

Intersection Summary			
HCM Average Control Delay	77.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	191	25	16	151	30	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	210	27	18	166	33	40
Pedestrians	20			20	20	
Lane Width (ft)	13.0			13.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			257		465	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			257		465	264
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	95
cM capacity (veh/h)			1284		529	747

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	237	184	73
Volume Left	0	18	33
Volume Right	27	0	40
cSH	1700	1284	629
Volume to Capacity	0.14	0.01	0.12
Queue Length 95th (ft)	0	1	10
Control Delay (s)	0.0	0.9	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.9	11.5
Approach LOS			B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	23	60	17	10	50	12	20	40	15	9	27	13
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	28	74	21	12	62	15	25	49	19	11	33	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	89	93	60
Volume Left (vph)	28	12	25	11
Volume Right (vph)	21	15	19	16
Hadj (s)	-0.02	0.01	0.01	-0.09
Departure Headway (s)	4.3	4.4	4.5	4.4
Degree Utilization, x	0.15	0.11	0.11	0.07
Capacity (veh/h)	797	774	763	764
Control Delay (s)	8.1	7.9	8.0	7.8
Approach Delay (s)	8.1	7.9	8.0	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.0		
HCM Level of Service	A		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix B

Queuing Calculations

Queuing and Blocking Report
AM Peak Hour Existing plus Approved Project Conditions-No Project

5/13/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	T
Maximum Queue (ft)	25	143	65	99	294	63	41	63	72	93	1317	1154
Average Queue (ft)	9	85	51	61	184	32	18	25	30	22	959	783
95th Queue (ft)	27	165	84	120	364	73	50	66	76	100	1453	1229
Link Distance (ft)		142			1758			116	116		1303	1303
Upstream Blk Time (%)		2							0		12	1
Queuing Penalty (veh)		0							0		0	0
Storage Bay Dist (ft)	225		40	75		40	100			125		
Storage Blk Time (%)		31	11	10	45	2		0			52	7
Queuing Penalty (veh)		35	13	28	89	5		0			22	11

Intersection: 93: Vineyard-Ray St & First

Movement	SB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	36
95th Queue (ft)	163
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	220
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	15	122	57	50	213	47	230	62
Average Queue (ft)	3	67	34	26	107	19	143	20
95th Queue (ft)	21	140	71	63	236	55	288	109
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)							2	0
Queuing Penalty (veh)							19	2
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		16	0	6	9		9	
Queuing Penalty (veh)		10	0	31	2		6	

Network Summary

Network wide Queuing Penalty: 275

Queuing and Blocking Report
PM Peak Hour Existing plus Approved Projects Conditions-No Project

5/14/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	B371	WB	WB	WB	NB	NB	NB	B788	B788
Directions Served	L	T	R	T	L	T	R	L	T	TR	T	T
Maximum Queue (ft)	63	135	63	15	91	111	50	82	194	187	139	154
Average Queue (ft)	22	62	43	3	51	60	28	34	181	185	80	95
95th Queue (ft)	73	150	76	27	101	135	65	96	216	193	170	172
Link Distance (ft)		142		1018		1758			116	116	224	224
Upstream Blk Time (%)	0	2						0	19	26		
Queuing Penalty (veh)	0	0						0	128	172		
Storage Bay Dist (ft)	225		40		75		40	100				
Storage Blk Time (%)	0	27	5		6	13	2	0	21			
Queuing Penalty (veh)	0	34	8		8	19	4	1	15			

Intersection: 93: Vineyard-Ray St & First

Movement	SB	SB
Directions Served	L	T
Maximum Queue (ft)	36	298
Average Queue (ft)	13	189
95th Queue (ft)	50	315
Link Distance (ft)		1303
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	
Storage Blk Time (%)		11
Queuing Penalty (veh)		4

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	226	62	62	46	1079	62	301	111
Average Queue (ft)	175	38	33	15	753	18	232	35
95th Queue (ft)	287	71	72	53	1292	67	363	125
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)					7		9	1
Queuing Penalty (veh)					0		60	4
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		5	3	0	24		16	
Queuing Penalty (veh)		2	1	4	9		4	

Network Summary

Network wide Queuing Penalty: 479

Queuing and Blocking Report

AM Peak Hour Existing plus Approved Project plus Proejct Conditions

5/13/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	T
Maximum Queue (ft)	46	147	65	99	301	57	25	65	95	68	1236	1060
Average Queue (ft)	14	83	50	81	215	33	7	26	39	14	900	722
95th Queue (ft)	58	165	77	128	416	76	26	66	104	80	1497	1294
Link Distance (ft)		142			1758			116	116		1303	1303
Upstream Blk Time (%)	0	2							1		11	0
Queuing Penalty (veh)	0	0							3		0	0
Storage Bay Dist (ft)	225		40	75		40	100			125		
Storage Blk Time (%)	0	27	16	9	44	1		0			49	2
Queuing Penalty (veh)	0	31	20	25	90	5		0			21	4

Intersection: 93: Vineyard-Ray St & First

Movement	SB
Directions Served	R
Maximum Queue (ft)	102
Average Queue (ft)	32
95th Queue (ft)	162
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	220
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	30	118	75	52	176	69	215	26
Average Queue (ft)	16	61	39	21	88	28	143	10
95th Queue (ft)	42	130	81	54	191	83	250	64
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							6	1
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		14	0	0	8	0	12	
Queuing Penalty (veh)		8	0	1	2	1	13	

Network Summary

Network wide Queuing Penalty: 230

Queuing and Blocking Report

PM Peak Hour Existing plus Approved Projects plus Project Conditions

5/14/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	B788	B788	SB
Directions Served	L	T	R	L	T	R	L	T	TR	T	T	L
Maximum Queue (ft)	76	139	63	89	97	53	66	204	197	153	171	55
Average Queue (ft)	22	81	45	47	47	26	26	187	186	93	116	25
95th Queue (ft)	77	173	78	101	106	64	72	208	205	189	206	91
Link Distance (ft)		142			1758			116	116	224	224	
Upstream Blk Time (%)	0	3					0	22	26		0	
Queuing Penalty (veh)	0	0					0	148	173		0	
Storage Bay Dist (ft)	225		40	75		40	100					125
Storage Blk Time (%)	0	32	8	3	15	1	1	24				
Queuing Penalty (veh)	0	42	14	4	22	3	8	17				

Intersection: 93: Vineyard-Ray St & First

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	261	99	51
Average Queue (ft)	162	20	10
95th Queue (ft)	285	131	89
Link Distance (ft)	1303	1303	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			220
Storage Blk Time (%)	9	0	
Queuing Penalty (veh)	4	0	

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	273	58	33	49	1083	45	295	156
Average Queue (ft)	204	37	21	19	938	15	229	41
95th Queue (ft)	346	68	42	55	1357	57	368	154
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)					14		10	2
Queuing Penalty (veh)					0		69	7
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		2	0	0	25	0	14	
Queuing Penalty (veh)		1	0	0	10	0	4	

Network Summary

Network wide Queuing Penalty: 526

Queuing and Blocking Report
AM Peak Hour Buildout Conditions-No Project

5/13/2013

Intersection: 93: First & Vineyard-Ray St/Vineyard

Movement	EB	EB	EB	B371	WB	WB	WB	NB	NB	NB	B788	SB
Directions Served	L	T	R	T	L	T	R	L	T	TR	T	L
Maximum Queue (ft)	29	140	66	3	99	255	65	72	145	147	6	125
Average Queue (ft)	7	58	47	0	58	133	34	22	71	78	1	27
95th Queue (ft)	25	133	79	6	118	256	77	67	140	152	9	113
Link Distance (ft)		142		1018		1758			116	116	224	
Upstream Blk Time (%)		1						0	2	3		
Queuing Penalty (veh)		0						0	9	12		
Storage Bay Dist (ft)	225		40		75		40	100				125
Storage Blk Time (%)		21	11		3	37	2	0	4			
Queuing Penalty (veh)		24	13		7	64	6	0	2			

Intersection: 93: First & Vineyard-Ray St/Vineyard

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	1337	1347	222
Average Queue (ft)	1222	1207	53
95th Queue (ft)	1532	1549	209
Link Distance (ft)	1303	1303	
Upstream Blk Time (%)	59	57	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			220
Storage Blk Time (%)	54	6	0
Queuing Penalty (veh)	24	13	0

Intersection: 94: First & Kottinger-Spring/Kottinger

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	39	85	74	51	389	108	242	10
Average Queue (ft)	11	47	40	18	151	29	124	1
95th Queue (ft)	34	90	78	52	360	86	225	12
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)							1	
Queuing Penalty (veh)							12	
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		8	1	2	13	0	12	
Queuing Penalty (veh)		6	1	13	3	0	10	

Network Summary

Network wide Queuing Penalty: 219

Queuing and Blocking Report
PM Peak Hour Buildout Conditions-No Project

5/13/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	B371	WB	WB	WB	NB	NB	NB	B788	B788
Directions Served	L	T	R	T	L	T	R	L	T	TR	T	T
Maximum Queue (ft)	90	145	64	19	83	104	58	85	191	201	182	192
Average Queue (ft)	43	83	46	4	43	54	30	43	184	188	108	130
95th Queue (ft)	108	192	82	34	95	117	63	102	199	205	212	213
Link Distance (ft)		142		1018		1758			116	116	224	224
Upstream Blk Time (%)	0	6						0	20	27		0
Queuing Penalty (veh)	0	0						0	137	189		1
Storage Bay Dist (ft)	225		40		75		40	100				
Storage Blk Time (%)	0	34	14		3	18	2	0	22			
Queuing Penalty (veh)	0	57	25		4	26	4	1	14			

Intersection: 93: Vineyard-Ray St & First

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	130	492	451	51
Average Queue (ft)	32	390	235	10
95th Queue (ft)	119	585	555	89
Link Distance (ft)		1303	1303	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	125			220
Storage Blk Time (%)		35	1	
Queuing Penalty (veh)		16	0	

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	109	85	64	54	928	106	295	253
Average Queue (ft)	78	45	40	22	693	57	273	134
95th Queue (ft)	122	100	80	65	1212	120	373	312
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)					5		12	7
Queuing Penalty (veh)					0		116	36
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		6	4	0	20	3	15	
Queuing Penalty (veh)		3	2	0	6	25	9	

Network Summary

Network wide Queuing Penalty: 673

Queuing and Blocking Report
AM Peak Hour Buildout plus Project Conditions

5/13/2013

Intersection: 93: First & Vineyard-Ray St/Vineyard

Movement	EB	EB	EB	B371	WB	WB	WB	NB	NB	NB	B788	B788
Directions Served	L	T	R	T	L	T	R	L	T	TR	T	T
Maximum Queue (ft)	49	141	66	17	99	294	65	82	138	152	7	6
Average Queue (ft)	10	56	46	2	59	148	42	30	72	80	1	1
95th Queue (ft)	46	130	79	22	122	294	85	77	140	150	10	8
Link Distance (ft)		142		1018		1758			116	116	224	224
Upstream Blk Time (%)	0	1						0	3	3		
Queuing Penalty (veh)	0	0						0	11	13		
Storage Bay Dist (ft)	225		40		75		40	100				
Storage Blk Time (%)	0	23	13		6	36	2	0	4			
Queuing Penalty (veh)	0	26	14		14	63	7	1	2			

Intersection: 93: First & Vineyard-Ray St/Vineyard

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	148	1336	1335	226
Average Queue (ft)	36	1208	1187	63
95th Queue (ft)	131	1535	1546	221
Link Distance (ft)		1303	1303	
Upstream Blk Time (%)		57	54	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	125			220
Storage Blk Time (%)		54	4	0
Queuing Penalty (veh)		24	8	0

Intersection: 94: First & Kottinger-Spring/Kottinger

Movement	EB	WB	WB	NB	NB	SB	SB	B788	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T	
Maximum Queue (ft)	56	129	80	62	244	88	225	40	12
Average Queue (ft)	16	58	40	22	132	29	128	4	1
95th Queue (ft)	49	125	83	59	248	78	239	45	15
Link Distance (ft)	548	473			1064		224	116	116
Upstream Blk Time (%)							1	0	
Queuing Penalty (veh)							13	1	
Storage Bay Dist (ft)			60	60		90			
Storage Blk Time (%)		12	1	4	14	0	14		
Queuing Penalty (veh)		9	1	33	4	1	11		

Network Summary

Network wide Queuing Penalty: 256

Queuing and Blocking Report
PM Peak Hour Buildout plus Project Conditions

5/13/2013

Intersection: 93: Vineyard-Ray St & First

Movement	EB	EB	EB	B371	WB	WB	WB	NB	NB	NB	B788	B788
Directions Served	L	T	R	T	L	T	R	L	T	TR	T	T
Maximum Queue (ft)	73	171	62	51	94	122	53	98	192	187	200	200
Average Queue (ft)	35	85	46	19	53	63	27	49	183	184	96	122
95th Queue (ft)	100	200	76	120	111	147	62	114	206	192	224	224
Link Distance (ft)		142		1018		1758			116	116	224	224
Upstream Blk Time (%)	0	6						0	20	28	1	0
Queuing Penalty (veh)	0	0						0	140	191	4	0
Storage Bay Dist (ft)	225		40		75		40	100				
Storage Blk Time (%)	0	36	8		8	15	4	2	22			
Queuing Penalty (veh)	1	61	14		11	23	8	10	14			

Intersection: 93: Vineyard-Ray St & First

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	79	549	471	96
Average Queue (ft)	26	421	266	19
95th Queue (ft)	93	623	620	127
Link Distance (ft)		1303	1303	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	125			220
Storage Blk Time (%)		40	0	0
Queuing Penalty (veh)		19	0	0

Intersection: 94: Kottinger-Spring & First

Movement	EB	WB	WB	NB	NB	SB	SB	B788
Directions Served	LTR	LT	R	L	TR	L	TR	T
Maximum Queue (ft)	118	103	71	43	994	67	295	245
Average Queue (ft)	73	47	43	16	653	42	256	131
95th Queue (ft)	129	125	90	49	1237	100	365	314
Link Distance (ft)	548	473			1064		224	116
Upstream Blk Time (%)					7		12	8
Queuing Penalty (veh)					0		118	40
Storage Bay Dist (ft)			60	60		90		
Storage Blk Time (%)		9	4		19	7	15	
Queuing Penalty (veh)		5	2		6	69	9	

Network Summary

Network wide Queuing Penalty: 744

Appendix C

Collision Rate Calculations

INTERSECTION COLLISION RATE CALCULATIONS

Kottinger Drive Senior Housing Redevelopment

Intersection # 1: 1st St & Vineyard Ave-Ray St
Date of Count:

Number of Collisions: 6
Number of Injuries: 5
Number of Fatalities: 0
ADT: 22300
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{6 \times 1{,}000{,}000}{22{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.15 c/mve	0.0%	83.3%
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: 1st St & Kottinger Dr-Spring St
Date of Count:

Number of Collisions: 9
Number of Injuries: 5
Number of Fatalities: 0
ADT: 19800
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{9 \times 1{,}000{,}000}{19{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.25 c/mve	0.0%	55.6%
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

Kottinger Drive Senior Housing Redevelopment

Intersection # 3: 1st St & Neal St
Date of Count:

Number of Collisions: 19
Number of Injuries: 9
Number of Fatalities: 0
ADT: 20300
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{19 \quad x \quad 1{,}000{,}000}{20{,}300 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.51 c/mve	0.0%	47.4%
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: 1st St & Bernal Ave-Sunol Blvd
Date of Count:

Number of Collisions: 31
Number of Injuries: 10
Number of Fatalities: 0
ADT: 36000
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{31 \quad x \quad 1{,}000{,}000}{36{,}000 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.47 c/mve	0.0%	32.3%
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

Kottinger Drive Senior Housing Redevelopment

Intersection # 5: Vineyard Ave & Adams Way
Date of Count:

Number of Collisions: 3
Number of Injuries: 0
Number of Fatalities: 0
ADT: 4200
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{3 \times 1{,}000{,}000}{4{,}200 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.39 c/mve	0.0%	0.0%
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 # 6: Kottinger Dr & Adams Way-Mirador Dr
Date of Count:

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 2400
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

Intersection Type: Four-Legged
Control Type: 4 Way Stop
Area: Urban

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

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{2{,}400 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.23 c/mve	0.0%	0.0%
Statewide Average*	0.25 c/mve	0.7%	28.4%

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

Kottinger Drive Senior Housing Redevelopment

Intersection # 7: Stanley Blvd & Bernal Ave-Valley Ave

Date of Count:

Number of Collisions: 15
Number of Injuries: 6
Number of Fatalities: 0
ADT: 51100
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{15 \quad x \quad 1,000,000}{51,100 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.16 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 # 8: Bernal Ave & Vineayrd Ave-Tawny Dr

Date of Count: Saturday, January 00, 1900

Number of Collisions: 8
Number of Injuries: 4
Number of Fatalities: 0
ADT: 15800
Start Date: July 1, 2006
End Date: June 30, 2011
Number of Years: 5

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

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

$$\text{collision rate} = \frac{8 \quad x \quad 1,000,000}{15,800 \quad x \quad 365 \quad x \quad 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.28 c/mve	0.0%	50.0%
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

EXIBIT G

GATES
+ASSOCIATES

LANDSCAPE ARCHITECTURE · LAND PLANNING · URBAN DESIGN

February 14, 2014

City of Pleasanton
Eric Luchini – Planning Division
200 Old Bernal Avenue
Pleasanton, CA 94566

RE: Kottinger Gardens General Plan Amendment (P14-0011) and Planned Unit Development (PUD- 101) at Kottinger Drive
APN: 094-0019-017
Landscape Response : Modal Water Efficient Landscape / Sustainable Landscape Practices Compliance

Dear Eric Luchini,

This letter in response to application comment 4, issued on January 31th, 2014.

With regards to item 4 - Modal Water Efficient Landscaping Ordinance (MWELO), Our plans will meet compliance with the following practices – These items are also Bay Friendly:

- Hydrozone plans shall be provided based upon landscape planting plans and WUCOLS.
- No lawn on slopes greater than 4:1 unless the toe of slope is permeable.
- Soil test shall be provided by General Contractor and report shall outline recommended soil amendments which shall be amended to soils on site per specifications.
- A dedicated water meter shall be provided for irrigation systems for the project.
- Overspray in minimized and spray irrigation shall not be used for areas less than 8' wide in any direction.
- Drip irrigation and sub-surface irrigation shall be used for the majority of the site.
- All irrigation controllers shall be self adjusting type that use evapotranspiration or soil moisture data. Rain sensors shall be required to shut off water during rain events.

- Irrigation spray heads on slopes greater that 25% (4:1) do not exceed .75" per hour precipitation rate.
- An irrigation design includes a water efficient landscape worksheet inclusive of water budget calculations and irrigation schedules. Irrigation system design does not exceed maximum applied water allowance.
- Special Landscape Areas shall be calculated with a plant factor of one (1). This includes landscape dedicated solely to edible plants.
- Irrigation systems shall be designed by a certified irrigation designer.
- Certificate of completion shall include: an irrigation inspection by a landscape irrigation specialist, Landscape and irrigation maintenance schedules, certification of installation and soils test results.

This is not a certified Bay Friendly Project. However the project shall follow Bay Friendly Basics – Landscape Sustainable Practices which help to make it a sustainable landscape:

- Plant Selection is appropriate to Pleasanton area.
- Within project, plant selection is appropriate to landscape micro area, i.e. Bioswale shall be planted with plants that can handle wet conditions, yet also exhibit drought tolerance.
- 3" mulch shall be specified for all shrub, groundcover, and unplanted area.
- Plants shall be grouped into similar hydrozone requirements
- No invasive species were included within the plant list for the project.
- Plants shall be spaced according to their maximum growth, reducing shearing and cutting of plants.

If you should have any questions, please feel free to call me.

Jennie Suen
Associate Landscape Architect
Gates + Associates

THE CITY OF PLEASANTON.

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Housing Commission Minutes - EXCERPT

[SUBJECT TO APPROVAL]

City Council Chambers, 200 Old Bernal Ave., Pleasanton, CA

February 20, 2014
7:00 p.m.

PUBLIC HEARINGS AND OTHER MATTERS

10. Approval of Kottinger Gardens Overall Plan (PUD-101) and Submittal of a HUD Section 18 Demolition and Disposition Application

Mr. Bocian introduced the agenda item and provided information about the Kottinger Gardens Overall Plan (PUD-101) and the work that has been done by the Task Force and MidPen. He noted that in September 2012, the Housing Commission recommended approval of the Kottinger Place and Pleasanton Gardens Predevelopment Analysis Report establishing the parameters for a new affordable senior housing development on the Kottinger Place and Pleasanton Gardens sites.

Commissioners were provided a PowerPoint presentation by MidPen representative Abby Goldware. Items reviewed included:

- Information pertaining to Task Force meetings and the desired objectives of the group
- Incorporation of feedback from appropriate stakeholders and City of Pleasanton
- Review of various design options
- Required next steps
- Necessary disposition process (Public Housing) and change of ownership
- Project financing
- Relocation process (and the use of phasing to minimize impact on residents)
- Project phasing and developing a construction phasing plan
- Affordability issues
- Provision of onsite resident services

Ms. Goldware provided information about the site plan that was approved by the Task Force at its October 23, 2013, meeting. The site plan includes the current Pleasanton Gardens, Kottinger Place, Regalia House, and 4138 Vineyard Avenue parcels, for a total of approximately 6.5 acres.

The proposed project includes a total of 185 units to be built in a configuration of single story cottage units and multi-story (two- and three-story) buildings, open space, community rooms on both the Kottinger Place and Pleasanton Gardens sites, additional parking spaces, an improved pedestrian crossing over Kottinger Drive, and garden places for residents.

The Commission was advised by Ms. Goldware that over the next several months, City staff and MidPen will be focusing on completing the requirements related to HUD's Section 18 Demolition and Disposition process. Staff and MidPen also met recently with Congressman Swalwell to keep him advised of the process for and status of this project. HUD staff have encouraged the Housing Authority and MidPen to submit the application for a technical assistance review prior to a formal submittal. HUD requires the Housing Authority's Board to formally approve the submittal of an application to HUD. As soon as HUD completes its technical assistance review, staff anticipates bringing the action to the City Council.

Chairperson Welsh questioned Ms. Goldware about the minor site design changes that were made after the overall plan was approved by the Task Force in order to address the water line easement. Ms. Goldware showed Commissioners how minor site plan changes had been made on both the Kottinger Place and Pleasanton Gardens sides to allow for improved access to the easement as required by the Fire Department. The changes allowed them to maintain the same number of units in the new project.

Chairperson Welsh opened the meeting for public comment.

Becky Dennis, Chair of the Task Force, noted that it had been a long process, but it is inspiring to finally reach this stage of the project. Ms. Dennis noted that the City of Pleasanton has committed $10 million to this very worthwhile project and she hopes that more projects of this kind will be forthcoming, especially projects that will benefit Pleasanton's workforce by creating housing units at the lowest affordability levels.

Chairperson Welsh closed the meeting for public comment.

A motion was made by Commissioner Mermelstein, seconded by Commissioner Welsh, to approve the Kottinger Gardens Overall Plan (PUD-101) and authorize submittal of the HUD Section 18 Demolition and Disposition Application required to facilitate the proposed new development.

ROLL CALL VOTE:

AYES:	Commissioners Lopez, Mermelstein, and Chairperson Welsh.
NOES:	None
ABSENT:	Commissioner Casey
ABSTAIN:	None

EXHIBIT I

Eric Luchini

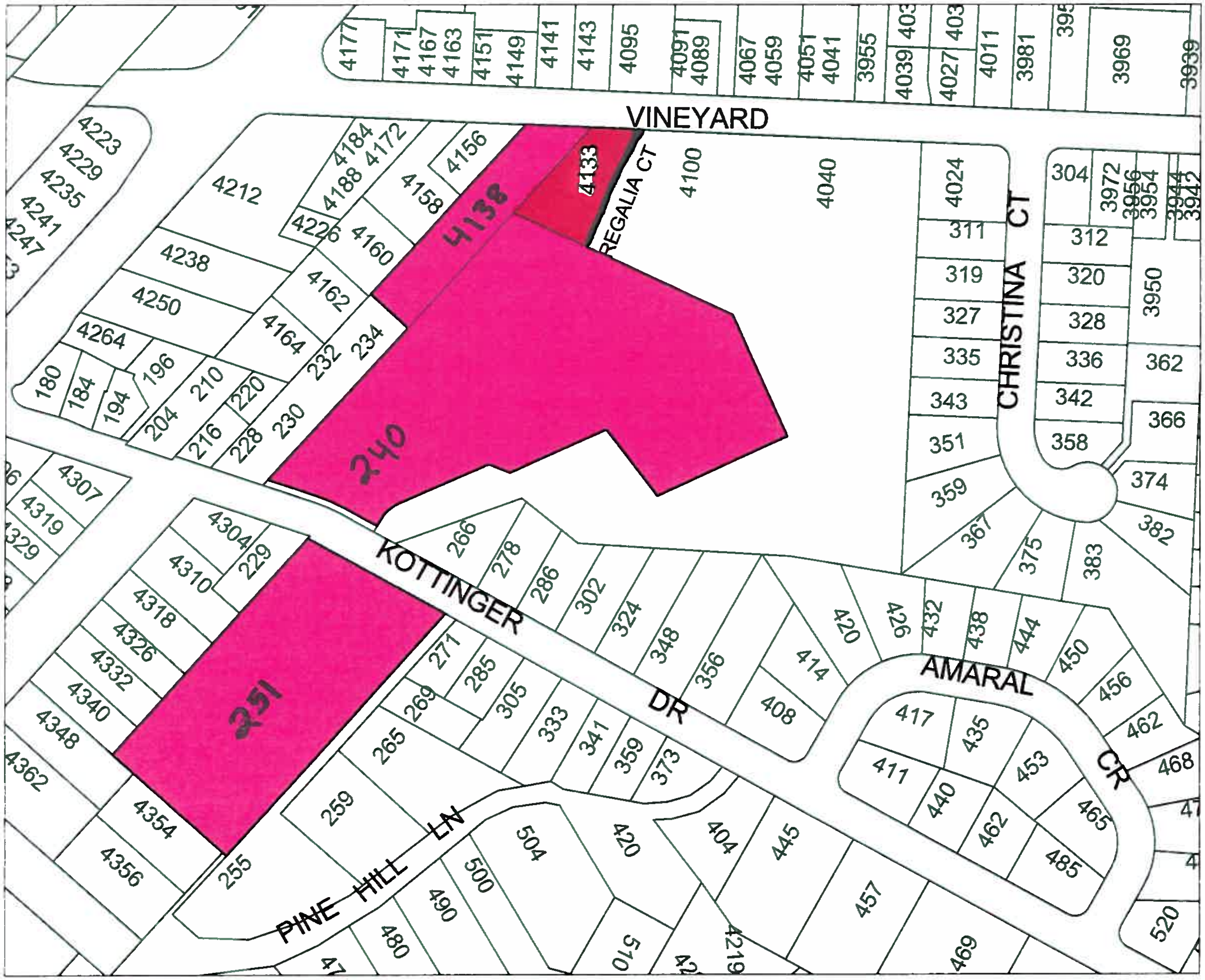
From: ERIC LARSON
Sent: Monday, March 03, 2014 8:25 PM
To: Eric Luchini
Subject: p14-0011

Hi Eric, My wife and I are concerned about parking considerations during construction and afterwards in regards to the MidPen project. We reside at 302 Kottinger dr.

Eric Larson

Click here to report this email as spam.

EXHIBIT J



P14-0011

City of Pleasanton

GIS

Department

PUD-101 MidPen
240/251 Kottinger Dr
4138 Vineyard Ave
4133 Regalia Ct

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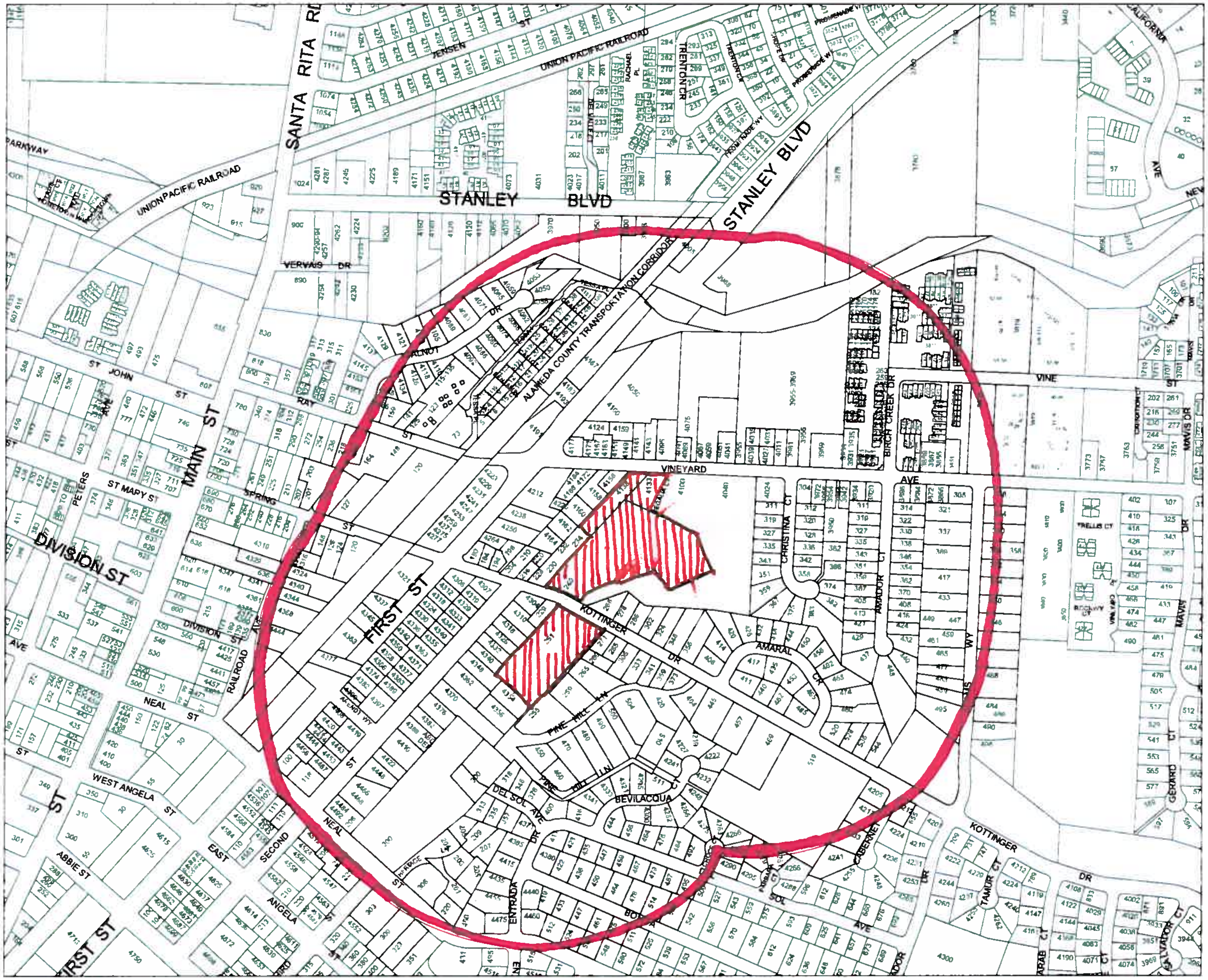
THE CITY OF PLEASANTON.

Printed 2/26/2014



City of Pleasanton

GIS

Department

MidPen Housing

240/251 Kottinger Dr
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