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# **City of Vacaville Infrastructure, Facilities and Services Status Report January 2007**

For City Council Review:  
March 13, 2007



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# I. INTRODUCTION

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## Background

The Infrastructure, Facilities, and Services Status Report is prepared at the direction of the City Council pursuant to the Planned Growth Ordinance (PGO), which is contained within Division 14.05 - Planned Growth of the Land Use & Development Code (see Appendix A). The report evaluates the existing levels and capacities of public services, facilities, and infrastructure and the ability of planned services, facilities, and infrastructure to support potential levels of construction during the next five years. The report is informational and used as a part of the decision-making process by the City Council regarding making determinations for allocations and phasing plans per the provisions of the PGO.

The primary intent of the PGO is to achieve an annual growth rate of 750 residential units by maintaining an inventory of 1,000 residential units within Final Maps which are eligible for permit issuance. This inventory also includes units contained within larger developments where units are guaranteed an annual number of building permits per a phasing plan or development agreement. In January of each year, the City Council reviews the inventory and determines the number of additional units, if any, that will be allowed to be added to the inventory during the upcoming year in order to maintain an inventory of 1,000 units. When the inventory exceeds 1,000 units, the City Council may consider approving additional allocations, on a case-by-case basis. One of the considerations in reviewing such requests is making a determination that there are adequate public facilities, infrastructure and services to serve the residential development. The information in this report is used to make that determination. On average during the past ten years, less than 50 percent of the inventory reaches the building permit stage. During each of the past three years, less than one-third of the inventory has reached the building permit stage. Appendix B provides a summary of the existing inventory of residential allocations. Appendix C provides a listing of pending projects and projects without allocations.

## Components of Report

The PGO requires that this report evaluate the existing levels and capacities of public services, facilities, and infrastructure, and their ability to support continued residential growth during the next five years. Per the PGO, and additional direction from the City Council, this report examines the following specific areas:

- ❖ Transportation facilities
- ❖ Water supply and water distribution facilities
- ❖ Wastewater treatment capacity
- ❖ Drainage and flood control facilities
- ❖ Fire services
- ❖ Police services
- ❖ Review of City's housing mix compared to General Plan goals

## Growth Assumptions

The report compares existing conditions for December 2006 to projected conditions in December 2011. Existing conditions are based upon actual completed development as of December 31, 2006. Projected conditions are based upon a five year development forecast which takes into consideration approved and pending projects as well as Planned Growth

Ordinance goals. The five-year growth projection is an optimistic forecast which assumes development based upon project approvals and development agreements which include commitments to builders on the number of permits allowed per year. The current market is unlikely to accommodate this level of growth in the near-term, however, it is important that the City evaluate the impacts of this level of growth should current economic and market conditions change. Table 1 provides a summary of the growth assumptions which provide the basis for the analysis within this report.

**Table 1. Five Year Growth Projection**

Land Use Category <sup>a</sup>	Dwelling Units (DUs)	Forecast by Year			Potential Growth
		2007	2008	2011	Annual Average 2007–2011
Residential	DUs	32,413	33,247	36,584	834
Commercial <sup>b</sup>	acres	1,291	1,328	1553	37.4
Office	acres	103	111.2	144	8.2
Industrial	acres	585	599	657	14.4
Schools <sup>c</sup>	students	16,785	16,827	16,995	42

Source: City of Vacaville Land Use Databases, downloaded from Web-Based Land Use Data Management System. January 2007 data is existing development as of December 31, 2006; 2008 values interpolated based on 5-year projected land uses; 2011 forecast is based upon 5-year land use forecast prepared by the Community Development Department.

Notes:

- <sup>a</sup> Excludes non-flow producing categories such as agriculture, open space, parks, public facilities (low water use), and school acreage.
- <sup>b</sup> Commercial categories include downtown commercial, highway commercial, retail sales, and service commercial, plus business parks, hospitals, private recreation facilities, and public facilities (medium and high water use).
- <sup>c</sup> The public school districts are facing declining enrollment which is monitored and annually updated in the database. There are projected increases in private school enrollment.

### Residential Projections

Residential growth is projected at the 750 units per year as permitted by Section 14.05, Planned Growth, of the Land Use and Development Code. In addition, additional units with entitlements to build and a likelihood to have infrastructure in place within the next five years are included in the forecast. Projecting residential growth at the maximum rate of permissible growth allows the City to evaluate the existing levels and capacities of public services, facilities, and infrastructure, and the ability of such services, facilities, and infrastructure to support projected levels of construction during the subsequent five years.

To provide an adequate level of analysis of the City's services, facilities and infrastructure, units are assigned to various land use zones (LUZs) throughout the City. Assignment to various LUZs depends on several factors including: recorded final maps; approved and pending tentative maps; and the availability of City services and infrastructure to specific residentially zoned lands.



## Non-Residential Projections

Non-Residential growth projection rates are based on a detailed version of the ten-year Building Activity Report. This report provides detailed information on which buildings were issued building permits; the square footage and address of each building; and the building classification for each building (retail, office, industrial, etc.) The total square footage for each building classification is averaged over the ten-year time span and converted into acreage based on the floor area ratio (FAR) prescribed for each classification by the General Plan.

For example: Average Annual Industrial Development: 200,000 square feet  
 $200,000 \text{ square feet} / (43,560 \times 0.225) = 20.4 \text{ acres per year}$

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## **II. SUMMARY OF REPORT FINDINGS**

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Overall, the City's infrastructure and services are operating at acceptable levels of service. Through the assessment of development impact fees on both residential and non-residential new construction, "development pays its' own way." Infrastructure improvements needed to accommodate growth are funded in part from these impact fees and improvements are constructed in a timely manner. The report finds that the City's infrastructure and services are generally expected to be able to accommodate projected residential growth in the next five years. However, there are some areas which will require continued monitoring to maintain acceptable levels of services. Below is a summary of highlights for each topic area.

### **Transportation Facilities**

The Transportation analysis identifies 3 intersections currently operating at LOS D or below and 20 intersections which have the potential to operate at level of service D or below within five years. Mitigation measures and potential improvements to achieve acceptable levels of service are identified for each intersection. Near-term priorities for capital projects are improvements at the Hume/Davis intersection and Davis Street south of Hume, interim and long-term improvements at the Vaca Valley Pkwy./I-505 intersection and the construction of the California Drive overcrossing.

### **Water Supply and Treatment**

The City has ample water supplies to serve the existing and projected growth for the next five years. The City's Water Supply Assessment was prepared to document adequate water supply to serve 20 years of projected growth. Existing and planned water treatment facilities and reservoirs have capacity to serve existing and planned growth.

### **Wastewater Treatment Facilities**

Recent improvements to the Easterly Wastewater Treatment Plant (WWTP) have increased the available plant capacity to 15 million gallons per day. As flows continue to increase in the future, the City will set priorities for use of available plant capacity through the Easterly Wastewater Treatment Allocation Plan, which is reviewed periodically as a part of this report. Existing treatment plant capacity is adequate to accommodate planned residential, commercial, and industrial growth.

### **Drainage and Flood Control Capacity**

There are several existing outflow areas identified along creeks that flow through the City. The City has completed several CIP projects, including detention basins to mitigate incremental runoff caused by new development. Additional detention basins studies are being explored within the next few years, including the completion of the Pleasants Valley Detention Basins off Encinosa Creek in 2007

## **Fire Services**

The Fire Department is implementing the following programs to assist in meeting response time goals:

- ❖ Installation of Opticom along the Alamo Drive corridor to reduce travel time to emergencies in south Vacaville and Lagoon Valley
- ❖ Installation of a pre-alert system in all new fire stations to reduce response times to emergencies; Retrofitting of existing fire stations with a pre-alert system in phases, beginning with Station 71
- ❖ Developer-funded construction of additional fire stations for new development
- ❖ Funding for on-going fire services for new development through public safety Community Facilities Districts

## **Police Services**

The Police Department meets performance goals for traffic enforcement and response times for Priority 2 calls. Average response time for Priority 1 calls is 6 minutes and 22 seconds, longer than the 6 minute goal. Funding of on-going police services for new residential development through public safety Community Facilities Districts will assist in achieving this goal. The average clearance rates for violent crimes and property crimes exceed the national average but are somewhat lower than the Vacaville established benchmark.

In addition, the Crime Free Multi-Housing Program, the revised alarm ordinance, the community safety ordinance, citywide sweeps and the addition of a second crime suppression team (CST) should have an impact on improving Priority 1 call response times and reducing calls for service.

## **Housing Mix Review**

The City's housing mix is 64% single family, 14% moderate density and 18% apartments. At buildout of the General Plan, the housing mix is projected at 61% single family, 18% moderate density and 18% apartments. These percentages are consistent with General Plan policies requiring an approximate housing mix of 60% single family, 20% moderate density and 20% apartments.

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### III. TRANSPORTATION FACILITIES

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The City's General Plan establishes Level of Service (LOS) "C" as the desired LOS for intersections. Levels of Service are applied to intersections based upon traffic flows with LOS "A" as the optimal situation where there is free traffic flow and no delays; LOS "F" is the worst traffic flow where there are jammed conditions and extreme back-ups. LOS "C" allows stable traffic flow where drivers only occasionally may have to wait through one signal cycle at an intersection. When a signalized intersection operates at LOS D, drivers experience "tolerable" delay with short periods of substantial delay. LOS E represents an unstable traffic flow with intolerable delays of up to several signal cycles. Appendix B provides a detailed description of traffic levels of service.

The City's General Plan contains policies related to LOS, and the Traffic Impact Mitigation Ordinance further defines the City's policy and requires that adequate circulation facilities are available to support new development. Every new development project with expected trip generation greater than 100 PM Peak Hour Trips (4:00-6:00 PM) is subject to providing a technical traffic analysis. This analysis identifies the project's impact on transportation capacity based on both existing plus approved development, and projected cumulative development, in order to determine if mitigation is needed to achieve the acceptable level of service. Per General Plan policy, LOS C is a citywide goal. Under defined circumstances, LOS D can be found to be an acceptable level of service, without mitigation. Mitigation is required to be identified to improve intersections found to be at LOS E or below, and responsibility for this mitigation is established unless extraordinary situations, defined in the General Plan, are identified and adopted by the City Council. In those situations, the City Council is required to adopt findings to support LOS E condition(s).

This report provides analysis based on the volume to capacity ratio (V/C) for 89 intersections citywide, including all signalized and freeway interchange intersections citywide for the PM Peak hour 4-6 PM, and 22 interchange intersections for the AM Peak Hour 7-9 AM. Expressed as "V/C," LOS is a measure of traffic demand on a roadway facility (expressed as volume, or the number of vehicles) compared to the roadway traffic-carrying capacity. The information is used to calculate the level of service for a roadway segment or intersection. For example, a V/C ratio of 0.75 indicates that a traffic facility is operating at 75 percent of its capacity, LOS C. A ratio of 1.0 or greater would mean that a roadway facility is operating beyond its capacity. The detailed tables containing the intersection analysis provide both the V/C ratio as well as the more common LOS letter for each intersection. It should be noted that the V/C ratios reported for each intersection are based on the critical turning movements that generate the highest V/C ratio.

#### **Existing Conditions**

The analysis of transportation facilities focused on the LOS at 89 major intersections for the PM Peak Hour (4-6:00 PM) and shown in Table 2 and corresponding Figure 1. Twenty-two of these intersections associated with a freeway interchange are also analyzed for the AM Peak Hour (7-9:00 AM). Table 3 documents AM Peak hour results to verify acceptable levels of service are also maintained during the morning commute. Existing analysis is accomplished for all signalized intersections; intersections with proposed signals, unsignalized freeway ramp intersections and potential future signalized intersections. For consistency, all intersections were analyzed as signalized intersections.

In fall 2006, PM peak hour turning counts were taken at each of the study intersections. This is the fourth year that counts were also taken for the AM Peak Hour at freeway ramps intersections. The LOS was calculated based upon the traffic counts and existing lane configurations and compared to the LOS determined for five years ago, in 2002, and last year, 2006.

It should be noted that significant transportation improvements have been completed in recent years. These improvements include:

- ❖ *Interstate 505 Northbound Ramps / Vaca Valley* – Intersection was widened and a signal installed at this intersection.
- ❖ *Davis Street* - Davis Street/Interstate 80 undercrossing widened to four lanes from Hume to Hickory and intersection of Bella Vista and Davis was widened and reconfigured to incorporate the Interstate 80 Eastbound Off Ramp.
- ❖ *Hume Way* - Hume Way was recently completed and provides an east west connection from Davis Street to Peabody Road.
- ❖ *Cernon and Parker Streets* – Cernon Street from Mason to Monte Vista was converted from one way to two-way traffic as was Parker from Main to Monte Vista. The traffic signal at the intersection of Cernon and Monte Vista was modified to provide for northbound traffic added to intersection.
- ❖ *Mason Street*- Construction to widen Mason Street from east Davis Street to McClellan from two to four lanes has been completed.
- ❖ *Jepson Parkway (Leisure Town Road)* – Bridges in Vacaville have been widened to four lanes to facilitate the Leisure Town Road portion of Jepson Parkway, a planned four lane divided arterial, designated as a reliever route for Interstate 80.
- ❖ *Leisure Town / Interstate 80 Interchange* – Construction of new overcrossing and ramp improvements are completed and pending acceptance by the City.
- ❖ *Nut Tree Road Overcrossing* - Widening of overcrossing and reconfiguration of westbound interstate 80 ramps is completed and pending acceptance by the City.

There are also significant transportation improvements that are either in planning, design or construction phases to address roadway improvements needed to maintain LOS consistent with General Plan Policies. These improvements include:

- ❖ *Interstate 505 Southbound Ramps / Vaca Valley* – An Encroachment permit has been requested from Caltrans to allow this intersection to be widened, and signalized.
- ❖ *Davis Street* - As noted above initial phases of widening Davis Street have been completed. The design is being finalized for widening Davis Street from North of Bella Vista to Hume to four lanes and construction is scheduled to be started in 2008.
- ❖ *Elmira Road* – Construction has been initiated to widen Elmira Road from east of Peabody to Allison Drive to six lanes and provide dual left turn pockets for eastbound Elmira Road at Allison Drive.
- ❖ *Monte Vista Avenue & Dobbins Street* – Plans are being completed and right of way acquisition has been initiated to widen the Ulatis Creek Bridge on Monte Vista Avenue and provide intersection improvements at Dobbins Street and Monte Vista Avenue. This construction is schedule to begin this summer.
- ❖ *Jepson Parkway (Leisure Town Road)* – Environmental Assessment is being finalized for planned Jepson Parkway Improvements that include Leisure Town Road in Vacaville.

- ❖ *Vanden Road* – Southtown development has initiated construction of improvements that abandon a portion of Vanden Road south of Alamo Drive. Extension of Leisure Town Road and the planned extension of Foxboro Parkway provide alternative through routes.
- ❖ *Foxboro Parkway* - Southtown residential subdivision improvement plans are in process for the offsite construction of a two lane connection of Foxboro Parkway from Nut Tree Road to Vanden Road.

The prior year's analysis for 2005 identified six intersections operating at LOS D, or lower, but the current analysis found of these the three following intersections are currently operating at an improved LOS C, or better:

- ❖ Depot / Mason

2006 PM V/C=0.81 (LOS D) 2007 PM V/C= 0.69 (LOS B)

In 2006 analysis of existing counts resulted in the determination a protected westbound right turn lane was needed for this intersection to operate at LOS C. Current counts do not support this conclusion. Prior count could have been in response to an event or construction activity.

- ❖ Peabody / Mason / Elmira

2006 PM V/C=0.83 (LOS D) 2007 PM V/C= 0.74 (LOS C)

This intersection was found to operate at LOS D based on last year's count and a second westbound left would improve operation at this intersection to LOS B. There are no further improvements planned for this intersection and this current count does not support this conclusion. Construction on Elmira Road may have impacted the 2005 count.

- ❖ Allison / Elmira

2006 PM V/C=0.83 (LOS D) 2007 PM V/C=0.80 (LOS C)

Count varied enough this year that operations improved slightly to the threshold of LOS C. Planned improvements for this intersection include provision of a second eastbound left turn lane as part of the Elmira Road widening project. Construction is in process for this improvement and will allow acceptable LOS to be maintained.

The remaining three of the six intersections were found to operate at LOS D, or worse, in 2007 analysis. These three intersections are:

- ❖ Interstate 505 Southbound Ramps / Vaca Valley

2006 (PM V/C=0.84 D) 2007 (PM V/C=0.84 D)

An encroachment permit to widen the approaches to this intersection and install a traffic signal has been requested from Caltrans. Initiation of construction is dependent on getting a State encroachment permit.

- ❖ Alamo / Merchant

2006 (AM V/C=0.97 E PM V/C=0.90 D) 2007(AM V/C=0.84 D PM V/C=0.79 C)

The I-80 westbound off-ramp at Alamo Drive has been reconfigured with one left, one through and one right turn lanes. This reconfiguration has improved the operation of this signal in both the AM and PM Peak hours. No further improvements other than optimizing signal timing are planned for this intersection. The planned extension of California Drive over Interstate 80 is expected to provide relief for this intersection and increase capacity to and from westbound interstate 80. Implementation of the Traffic Mitigation Ordinance accepting LOS D would need to be applied to this intersection and area development impacting this intersection may be limited until the California Drive overcrossing is constructed.

- ❖ Davis / Hume  
2006 (AM V/C=0.85 D PM V/C=0.98 E) 2007 (AM V/C=0.90 D PM V/C=1.03 F)  
 Recent development and capital improvements have increased roadway capacity in this area with the exception of Davis Street from Hume Way to Bella Vista Road. Plans for the widening of this intersection and a segment of Davis Street have been initiated and these improvements are scheduled for construction in the spring of 2008. With these improvements, this intersection is expected to operate at LOS A (V/C=0.51) in both the AM and PM Peak Hour. This improvement is to be included in an update to the transportation portion of Development Impact Fee Program.

Current analysis establishes that 86 of the 89 intersections studied for the PM Peak Hour (4-6:00 PM) were found operate at LOS C, or better, and for the AM Peak Hour (7-9AM) 21 of the 23 locations were found to operate at LOS C, or better, for Existing Conditions. Of these intersections, the operation of Davis / Hume was found to not meet LOS standards in both the AM and PM Peak hour. Therefore there are four intersections that need to be monitored as development proposals are reviewed. The only intersection currently found to operate at LOS D and not identified in last year's analysis was Monte Vista / Dobbins found to operate at LOS D (V/C =0.84 in the PM Peak Hour). This intersection has been found to operate at LOS D in the past and an improvement has been initiated to widen Monte Vista including widening the bridge over Ulatis Creek (see following section).

### **Past Five Years**

A citywide analysis of transportation facilities has been prepared annually since 1991. Five years ago, the 2002 analysis used Fall 2001 PM peak hour counts at 80 of the current 89 major intersections to establish January 2002 Existing Conditions. (See Table 2). The analysis included all signalized intersections; intersections with proposed signals, unsignalized freeway ramp intersections and potential future signalized intersections at that time. All intersections were analyzed as signalized intersections.

All but two intersections were found to operate at LOS C or better five years ago. The past and current status of these intersections is as follows:

- ❖ Dobbins / Monte Vista  
PM 2002 V/C=0.83 (LOS D); 2007 V/C= 0.84 (LOS D)  
 Westbound traffic on Monte Vista Avenue turning right onto Dobbins Street, and southbound traffic on Dobbins Street turning left onto Monte Vista Avenue is impacting the operation of this intersection. The LOS at this intersection has fluctuated between LOS C and D for the past several years. The City has monitored this intersection for several years and diligently sought funding to widen the bridge east of this intersection. Funding has been appropriated to widen the Monte Vista Avenue bridge, add a westbound right turn lane and stripe a second southbound left turn lane. Plans are currently in process for this improvement and construction is scheduled to begin Summer 2007.
- ❖ Bella Vista / Davis (at the Interstate 80 Eastbound Ramps)  
2002 V/C=0.83 (LOS D); 2007 V/C=0.68 (LOS B)  
 The LOS at this intersection has been improved by the intersection improvements that realigned Davis, Bella Vista and the Interstate 80 Eastbound ramps to create a four legged intersection. This intersection was also widened and signalized as part of these improvements. This has improved the existing condition to LOS B.

**Table 2. Roadway Intersections Levels of Service, 2002, 2006 and 2007**

2007 TRANSPORTATION INFRASTRUCTURE REVIEW							
COMPARISON OF YEAR 2002, 2006 & 2007 LOS PM PEAK HOUR 4-6 PM							
#	INTERSECTIONS	2002 LOS	CHANGE IN V/C	2006 LOS	CHANGE IN V/C	2007 LOS	
1	* BROWNS VALLEY / VACA VALLEY	A 0.31	0.07	A 0.38	0.03	A 0.41	
2	E. MONTE VISTA / VACA VALLEY	A 0.56	0.09	B 0.65	-0.04	B 0.61	
3	#* I-505 SB RAMPS / VACA VALLEY	B 0.66	0.18	D 0.84	0.00	D 0.84	
4	I-505 NB RAMPS / VACA VALLEY	A 0.43	0.21	B 0.64	0.02	B 0.66	
5	! VACA VALLEY / AKERLY-NEW HORIZONS	A 0.33	0.15	A 0.48	-0.08	A 0.40	
6	I-80 WB RAMPS / LEISURE TOWN	C 0.74		In Const.		A 0.39	
7	I-80 EB RAMPS / LEISURE TOWN	C 0.73	-0.12	B 0.61	-0.22	A 0.39	
8	LEISURE TOWN / ORANGE DRIVE	A 0.51	-0.10	A 0.41	-0.01	A 0.40	
9	LEISURE TOWN / SEQUOIA	B 0.65	-0.17	A 0.48	0.17	B 0.65	
10	* LEISURE TOWN / ULATIS	A 0.54	-0.04	A 0.50	0.07	A 0.57	
11	LEISURE TOWN / ELMIRA	A 0.54	0.14	B 0.68	0.01	B 0.69	
12	* LEISURE TOWN / MARSHALL	A 0.39	0.03	A 0.42	0.05	A 0.47	
13	LEISURE TOWN / ALAMO/FRY	A 0.52	0.03	A 0.55	0.23	C 0.78	
14	VANDEN / LEISURE TOWN	A 0.49	0.04	A 0.53	-0.27	A 0.26	
15	VANDEN / ALAMO	C 0.76	0.01	C 0.77	-0.26	A 0.51	
16	NUT TREE / ALAMO	B 0.66	0.12	C 0.78	-0.09	B 0.69	
17	ALAMO / BELAIR	A 0.58	0.01	A 0.59	-0.05	A 0.54	
18	ALAMO / TULARE	A 0.52	0.02	A 0.54	-0.02	A 0.52	
19	PEABODY / ALAMO	C 0.72	-0.03	B 0.69	-0.08	B 0.61	
20	ALAMO / MARIPOSA	B 0.62	-0.06	A 0.56	0.06	B 0.62	
21	ALAMO / ALAMO LANE	B 0.69	-0.08	B 0.61	0.02	B 0.63	
22	ALAMO / DAVIS	B 0.65	0.04	B 0.69	0.06	C 0.75	
23	ALAMO / MARSHALL	B 0.65	0.06	C 0.71	-0.08	B 0.63	
24	ALAMO / BUTCHER	A 0.59	0.03	B 0.62	-0.06	A 0.56	
25	ALAMO / I-80 EB RAMPS	A 0.50	0.06	A 0.56	-0.01	A 0.55	
26	ALAMO / MERCHANT	B 0.66	0.24	D 0.90	-0.11	C 0.79	
27	MERCHANT / MASON	A 0.51	0.01	A 0.52	-0.02	A 0.50	
28	MASON / DAVIS	B 0.66	0.07	C 0.73	-0.10	B 0.63	
29	MASON / MCCLELLAN			A 0.57	-0.09	A 0.48	
30	MASON / DEPOT	C 0.77	0.04	D 0.81	-0.12	B 0.69	
31	PEABODY / MASON/ELMIRA	C 0.76	0.07	D 0.83	-0.09	C 0.74	
32	ELMIRA / SHASTA/AEGEAN	B 0.65	0.14	C 0.79	-0.08	C 0.71	
33	ELMIRA / ALLISON	B 0.67	0.16	D 0.83	-0.03	C 0.80	
34	ELMIRA / BEELARD	A 0.58	0.06	B 0.64	-0.04	A 0.60	
35	NUT TREE / ELMIRA	A 0.60	0.09	B 0.69	-0.12	A 0.57	
36	ELMIRA / CHRISTINE	A 0.47	-0.02	A 0.45	-0.05	A 0.40	
37	MONTE VISTA / ORCHARD	A 0.59	0.03	B 0.62	-0.08	A 0.54	
38	MONTE VISTA / CERNON	A 0.58	-0.07	A 0.51	0.15	B 0.66	
39	MONTE VISTA / DOBBINS	D 0.83	-0.07	C 0.76	0.08	D 0.84	
40	E. MONTE VISTA / DEPOT	B 0.70	0.00	B 0.70	0.05	C 0.75	
41	E. MONTE VISTA / SCOGGINS	A 0.49	-0.10	A 0.39	0.03	A 0.42	
42	E. MONTE VISTA / BROWN	A 0.48	-0.01	A 0.47	-0.03	A 0.44	
43	E. MONTE VISTA / CALLEN	A 0.43	0.04	A 0.47	-0.07	A 0.40	
44	E. MONTE VISTA / ALLISON	B 0.62	0.11	C 0.73	-0.01	C 0.72	

NOTES: 2007 COUNTS ACCOMPLISHED SEPTEMBER -NOVEMBER 2006  
 FOR 2007 LEISURE TOWN / I-80 EB & WB RAMPS IMPROVEMENTS COMPLETE  
 FOR 2007 MONE VISTA AT NUT TREE, AIRPORT/ I-505 AND BROWNS VALLEY IMPROVEMENTS COMPLETE

LEGEND # LOS IMPACTED BY INTERSECTION IMPROVEMENTS MADE SINCE LAST COUNT  
# AN UNSIGNALIZED FREEWAY RAMP INTERSECTION  
 ! SIGNAL CURRENTLY UNDER DESIGN OR CONSTRUCTION  
 \* POTENTIAL FUTURE SIGNAL LOCATION



Table 2. - continued

2007 TRANSPORTATION INFRASTRUCTURE REVIEW								
COMPARISON OF YEAR 2002, 2006 & 2007 LOS PM PEAK HOUR 4-6 PM								
#	INTERSECTIONS	2002 LOS	CHANGE IN V/C	2006 LOS	CHANGE IN V/C	2007 LOS		
45	E. MONTE VISTA / BROWNS VALLEY	C 0.74	-0.02	C 0.72	-0.08	B 0.64		
46 *	I-80 WB RAMPS / E. MONTE VISTA	A 0.41	-0.41	In Const.		A 0.57		
47 *	NUT TREE / MONTE VISTA	A 0.45	0.04	A 0.49	-0.01	A 0.48		
48 #*	E. MONTE VISTA / AIRPORT/I505 SB	A 0.29	0.11	A 0.40	0.28	B 0.68		
49	ALLISON / ULATIS	A 0.48	0.07	A 0.55	-0.01	A 0.54		
50	ULATIS / HARBISON	A 0.42	0.07	A 0.49	0.02	A 0.51		
51	BURTON / ULATIS	A 0.57	0.01	A 0.58	-0.08	A 0.50		
52	NUT TREE / BELAIR	A 0.47	0.01	A 0.48	0.02	A 0.50		
53	NUT TREE / MARSHALL	B 0.63	0.07	B 0.70	-0.11	A 0.59		
54	NUT TREE / ULATIS	A 0.58	0.11	B 0.69	0.02	C 0.71		
55	NUT TREE / YELLOWSTONE	A 0.39	0.03	A 0.42	0.08	A 0.50		
56	NUT TREE / FACTORY STORES	A 0.54	-0.05	A 0.49	0.12	B 0.61		
57	NUT TREE / ORANGE	B 0.64	0.08	C 0.72	-0.10	B 0.62		
58	ALLISON / TRAVIS FED. C.U.	A 0.37	0.02	A 0.39	0.03	A 0.42		
59	NUT TREE PKWY. / ALLISON	C 0.74	0.05	C 0.79	-0.10	B 0.69		
60	NUT TREE PKWY. / HARBISON	A 0.47	0.12	A 0.59	-0.02	A 0.57		
61	NUT TREE PKWY. / HELEN	A 0.47	-0.01	A 0.46	0.04	A 0.50		
62	I-80 EB OFF/I-505 NB ON / ORANGE DRIVE	A 0.49	0.19	B 0.68	0.05	C 0.73		
63	ORANGE / LAWRANCE/I80 EB	A 0.46	0.05	A 0.51	0.01	A 0.52		
64 *	ORANGE DRIVE / ORANGE TREE E	A 0.25	0.26	A 0.51	0.02	A 0.53		
65	BROWNS VALLEY / ALLISON	A 0.41	0.05	A 0.46	0.00	A 0.46		
66	BROWN / BROWNS VALLEY	B 0.69	0.03	C 0.72	0.01	C 0.73		
67	BROWNS VALLEY / SHANNON/WRENTHAM	C 0.71	0.04	C 0.75	-0.06	B 0.69		
68	PEABODY / C.M.F.	A 0.47	0.09	A 0.56	0.07	B 0.63		
69	PEABODY / FOXBORO	B 0.65	0.15	C 0.80	-0.01	C 0.79		
70 *	PEABODY / CALDWELL	A 0.45	0.07	A 0.52	0.01	A 0.53		
71	PEABODY / CALIFORNIA	A 0.55	0.06	B 0.61	-0.04	A 0.57		
72 *	PEABODY / SOUTHWOOD	A 0.44	0.06	A 0.50	-0.03	A 0.47		
73	PEABODY / BEELARD	A 0.47	0.06	A 0.53	-0.05	A 0.48		
74	PEABODY / MARSHALL	C 0.71	0.03	C 0.74	0.00	C 0.74		
75	PEABODY / BERRYESSA	A 0.50	0.14	B 0.64	0.03	B 0.67		
76	PEABODY / CLIFFSIDE	C 0.73	0.07	C 0.80	-0.02	C 0.78		
77 *	DAVIS / MARSHALL	A 0.51	0.08	A 0.59	-0.01	A 0.58		
78	BELLA VISTA / DAVIS	D 0.83	-0.29	A 0.54	0.14	B 0.68		
79	DAVIS / HUME			E 0.98	0.05	F 1.03		
80	HICKORY / DAVIS	A 0.52	0.19	C 0.71	0.06	C 0.77		
81	MERCHANT / ORCHARD	A 0.44	0.01	A 0.45	-0.01	A 0.44		
82	MERCHANT / WALNUT	A 0.35	0.00	A 0.35	-0.02	A 0.33		
83 *	CHERRY GLENN (N) / I-80 WB RAMPS			A 0.15	0.00	A 0.15		
84 *	CHERRY GLENN (N) / I-80 EB RAMPS			A 0.18	-0.04	A 0.14		
85	CHERRY GLENN / PLEASANTS VALLEY			A 0.24	-0.02	A 0.22		
86	CHERRY GLENN / LYONS			A 0.19	0.00	A 0.19		
87 *	CHERRY GLENN (S) / I-80 WB RAMPS			A 0.18	0.00	A 0.18		
88 *	LAGOON VALLEY / I-80 EB RAMPS			A 0.23	0.02	A 0.25		
89	KAISER & CRESCENT / VACA VALLEY					A 0.43		

NOTES: 2007 COUNTS ACCOMPLISHED SEPTEMBER - NOVEMBER 2006  
 FOR 2007 LEISURE TOWN / I-80 EB & WB RAMPS IMPROVEMENTS COMPLETE  
 FOR 2007 MONE VISTA AT NUT TREE, AIRPORT/ I-505 AND BROWNS VALLEY IMPROVEMENTS COMPLETE

LEGEND  LOS IMPACTED BY INTERSECTION IMPROVEMENTS MADE SINCE LAST COUNT

# AN UNSIGNALIZED FREEWAY RAMP INTERSECTION  
 ! SIGNAL CURRENTLY UNDER DESIGN OR CONSTRUCTION  
 \* POTENTIAL FUTURE SIGNAL LOCATION

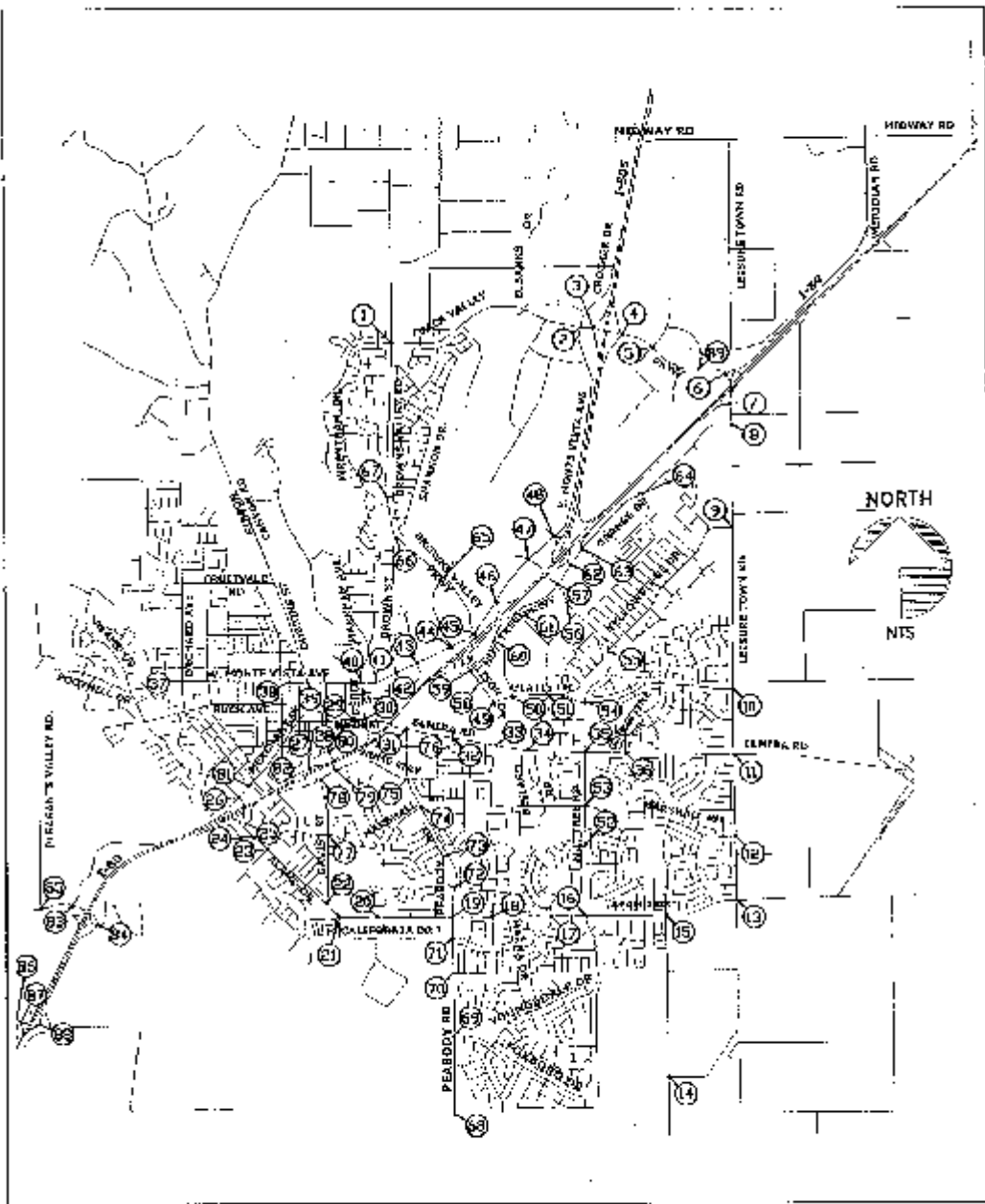
**Table 3. Roadway Intersections, AM Level of Service 2007**

2007 TRANSPORTATION INFRASTRUCTURE REVIEW						
COMPARISON OF YEAR 2005, 2006 & 2007 LOS AM PEAK HOUR 7-9 AM						
#	INTERSECTIONS	2005 AM LOS	DIF IN V/C	2006 AM LOS	DIF IN V/C	2007 AM LOS
3 #	I 505 SB RAMPS / VACA VALLEY	C 0.72	0.00	C 0.72	0.01	C 0.73
4	I-505 NB RAMPS / VACA VALLEY	B 0.62	0.00	B 0.62	0.03	B 0.65
6	I-80 WB RAMPS / LEISURE TOWN	A 0.55		In Const.		A 0.34
7	I-80 EB RAMPS / LEISURE TOWN	A 0.58	-0.10	A 0.48	-0.16	A 0.32
25	ALAMO / I-80 EB RAMPS	B 0.66	0.01	B 0.67	-0.02	B 0.65
26	ALAMO / MERCHANT	D 0.88	0.09	E 0.97	-0.13	D 0.84
30	MASON / DEPOT	A 0.48	0.04	A 0.52	0.02	A 0.54
45	E. MONTE VISTA / BROWNS VALLEY	A 0.58	-0.06	A 0.52	0.05	A 0.57
46 #	I-80 WB RAMPS / E. MONTE VISTA	A 0.26		In Const.		A 0.28
48 #	E. MONTE VISTA / AIRPORT/I505 SB	A 0.23	0.04	A 0.27	-0.07	A 0.20
59	NUT TREE PKWY. / ALLISON	A 0.44	0.02	A 0.46	0.00	A 0.46
62	I-80 EB OFF/I-505 NB ON / ORANGE DRIVE	A 0.42	0.02	A 0.44	0.05	A 0.49
63	ORANGE / LAWERANCE/I80 EB	A 0.31	0.01	A 0.32	0.03	A 0.35
76	PEABODY / CLIFFSIDE	A 0.48	0.05	A 0.53	0.03	A 0.56
78	BELLA VISTA / DAVIS	A 0.51	0.04	A 0.55	0.05	A 0.60
79	DAVIS / HUME	D 0.86	-0.01	D 0.85	0.05	D 0.90
80	HICKORY / DAVIS	B 0.66	0.00	B 0.66	0.10	C 0.76
83 #	CHERRY GLEN (N) / I-80 WB RAMPS	A 0.14	-0.01	A 0.13	0.02	A 0.15
84 #	CHERRY GLEN (N) / I-80 EB RAMPS	A 0.16	-0.02	A 0.14	-0.02	A 0.12
85 #	CHERRY GLEN (S) / LYON				0.17	A 0.17
87 #	CHERRY GLEN (S) / I-80 WB RAMPS	A 0.15	0.00	A 0.15	0.00	A 0.15
88 #	LAGOON VALLEY / I-80 EB RAMPS	A 0.23	-0.06	A 0.17	0.00	A 0.17
89	KAISER & CRESCENT / VACA VALLEY					A 0.43

NOTES: 2007 COUNTS ACCOMPLISHED TAKEN SEPTEMBER -NOVEMBER 2006  
 FOR 2007 LEISURE TOWN / I-80 EB & WB RAMPS IMPROVEMENTS COMPLETE  
 FOR 2007 MONE VISTA AT NUT TREE, AIRPORT/ I-505 AND BROWNS VALLEY IMPROVEMENTS COMPLETE

LEGEND # LOS IMPACTED BY INTERSECTION IMPROVEMENTS MADE SINCE LAST COUNT  
 # AN UNSIGNALIZED FREEWAY RAMP INTERSECTION  
 ! SIGNAL CURRENTLY UNDER DESIGN OR CONSTRUCTION  
 \* POTENTIAL FUTURE SIGNAL LOCATION

Figure 1. Intersection Locations for Level of Service Analysis



**Table 4. Roadway Intersections, Levels of Service, Existing and Five-Year Forecast**

2007 TRANSPORTATION INFRASTRUCTURE REVIEW					
COMPARISON OF YEAR 2007 & 2012 LOS PM PEAK HOUR 4-6 PM					
#	INTERSECTIONS		2007 LOS	CHANGE IN V/C	2011 LOS
1	*	BROWNS VALLEY / VACA VALLEY	A 0.41	0.08	A 0.49
2		E. MONTE VISTA / VACA VALLEY	B 0.61	0.09	B 0.70
3	#*	I 505 SB RAMPS / VACA VALLEY	D 0.84	0.09	E 0.93
4		I-505 NB RAMPS / VACA VALLEY	B 0.66	0.01	B 0.67
5	!*	VACA VALLEY / AKERLY	A 0.40	0.33	C 0.73
6	!	I-80 WB RAMPS / LEISURE TOWN	A 0.39	0.32	C 0.71
7	!	I-80 EB RAMPS / LEISURE TOWN	A 0.39	0.27	B 0.66
8		LEISURE TOWN / ORANGE DRIVE	A 0.40	0.10	A 0.50
9		LEISURE TOWN / SEQUOIA	B 0.65	0.10	C 0.75
10	*	LEISURE TOWN / ULATIS	A 0.57	0.07	B 0.64
11		LEISURE TOWN / ELMIRA	B 0.69	0.04	C 0.73
12	*	LEISURE TOWN / MARSHALL	A 0.47	0.13	A 0.60
13		LEISURE TOWN / ALAMO/FRY	C 0.78	0.04	D 0.82
14		VANDEN / LEISURE TOWN	A 0.26	0.27	A* 0.53
15		VANDEN / ALAMO	A 0.51	-0.03	A 0.48
16		NUT TREE / ALAMO	B 0.69	-0.04	B 0.65
17		ALAMO / BELAIR	A 0.54	-0.04	A 0.50
18		ALAMO / TULARE	A 0.52	0.11	B 0.63
19		PEABODY / ALAMO	B 0.61	0.24	D 0.85
20		ALAMO / MARIPOSA	B 0.62	0.14	C 0.76
21		ALAMO / ALAMO LANE	B 0.63	0.17	C 0.80
22		ALAMO / DAVIS	C 0.75	0.11	D 0.86
23		ALAMO / MARSHALL	B 0.63	0.10	C 0.73
24		ALAMO / BUTCHER	A 0.56	0.07	B 0.63
25		ALAMO / I-80 EB RAMPS	A 0.55	-0.05	A 0.50
26		ALAMO / MERCHANT	C 0.79	-0.06	C 0.73
27		MERCHANT / MASON	A 0.50	-0.12	A 0.38
28		MASON / DAVIS	B 0.63	0.14	C 0.77
29		MASON / MCCLELLAN	A 0.48	-0.08	A 0.40
30		MASON / DEPOT	B 0.69	0.32	F 1.01
31		PEABODY / MASON/ELMIRA	C 0.74	-0.27	A 0.47
32		ELMIRA / SHASTA/AEGEAN	C 0.71	-0.11	A 0.60
33		ELMIRA / ALLISON	C 0.80	-0.05	C 0.75
34		ELMIRA / BEELARD	A 0.60	-0.09	A 0.51
35		NUT TREE / ELMIRA	A 0.57	0.00	A 0.57
36		ELMIRA / CHRISTINE	A 0.40	-0.10	A 0.30
37		MONTE VISTA / ORCHARD	A 0.54	-0.27	A 0.27
38		MONTE VISTA / CERNON	B 0.66	-0.42	A 0.24
39		MONTE VISTA / DOBBINS	D 0.84	-0.04	C 0.80
40		E. MONTE VISTA / DEPOT	C 0.75	0.08	D 0.83
41		E. MONTE VISTA / SCOGGINS	A 0.42		A 0.55
42		E. MONTE VISTA / BROWN	A 0.44	0.29	C 0.73
43		E. MONTE VISTA / CALLEN	A 0.40	0.00	A 0.40
44		E. MONTE VISTA / ALLISON	C 0.72	-0.05	B 0.67

NOTES: 2006 COUNTS TAKEN SEPTEMBER -NOVEMBER 2005

**In Const.** FOR 2006 LEISURE TOWN / I-80 EB RAMPS ARE IN CONSTRUCTION AND THERE IS NO EAST LEG OF THIS INTERSECTION.  
 FOR 2006 LEISURE TOWN & EAST MONTE VISTA / I-80 WB RAMPS IN CONSTRUCTION AND NO CROSS TRAFFIC ALLOWED.  
 FOR 2006 NUT TREE I-80 OVERCROSSING IN CONSTRUCTION

LEGEND # AN UNSIGNALIZED FREEWAY RAMP INTERSECTION  
 ! SIGNAL CURRENTLY UNDER DESIGN OR CONSTRUCTION  
 \* POTENTIAL FUTURE SIGNAL LOCATION

**Table 4. - Continued**  
**Roadway Intersections, Levels of Service, Existing and Five-Year Forecast**

2007 TRANSPORTATION INFRASTRUCTURE REVIEW						
COMPARISON OF YEAR 2007 & 2012 LOS PM PEAK HOUR 4-6 PM						
#	INTERSECTIONS		2007 LOS	CHANGE IN V/C	2011 LOS	
45	E. MONTE VISTA	/ BROWNS VALLEY	B 0.64	-0.09	A 0.55	
46	!* I-80 WB RAMPS	/ E. MONTE VISTA	A 0.57		C 0.76	
47	* NUT TREE	/ MONTE VISTA	A 0.48	0.41	D 0.89	
48	#* E. MONTE VISTA	/ AIRPORT/I505 SB	B 0.68	0.16	D 0.84	
49	ALLISON	/ ULATIS	A 0.54	0.03	A 0.57	
50	ULATIS	/ HARBISON	A 0.51	-0.13	A 0.38	
51	BURTON	/ ULATIS	A 0.50	-0.08	A 0.42	
52	NUT TREE	/ BELAIR	A 0.50	0.00	A 0.50	
53	NUT TREE	/ MARSHALL	A 0.59	0.05	B 0.64	
54	NUT TREE	/ ULATIS	C 0.71	0.13	D 0.84	
55	NUT TREE	/ YELLOWSTONE	A 0.50	-0.01	A 0.49	
56	NUT TREE	/ FACTORY STORES	B 0.61	-0.02	A 0.59	
57	! NUT TREE	/ ORANGE	B 0.62	0.28	D 0.90	
58	ALLISON	/ TRAVIS FED. C.U.	A 0.42	0.03	A 0.45	
59	NUT TREE PKWY.	/ ALLISON	B 0.69	0.08	C 0.77	
60	NUT TREE PKWY.	/ HARBISON	A 0.57	-0.21	A 0.36	
61	NUT TREE PKWY.	/ HELEN	A 0.50	-0.06	A 0.44	
62	I-80 EB OFF/I-505 NB ON	/ ORANGE DRIVE	C 0.73	0.31	F 1.04	
63	ORANGE	/ LAWERENCE/I80 EB	A 0.52	0.36	D 0.88	
64	* ORANGE DRIVE	/ ORANGE TREE E	A 0.53	-0.19	A 0.34	
65	BROWNS VALLEY	/ ALLISON	A 0.46	-0.05	A 0.41	
66	BROWN	/ BROWNS VALLEY	C 0.73	0.05	C 0.78	
67	BROWNS VALLEY	/ SHANNON/WRENTHAM	B 0.69	0.02	C 0.71	
68	PEABODY	/ C.M.F.	B 0.63	0.17	C 0.80	
69	PEABODY	/ FOXBORO	C 0.79	0.07	D 0.86	
70	* PEABODY	/ CALDWELL	A 0.53	0.05	A 0.58	
71	PEABODY	/ CALIFORNIA	A 0.57	0.27	D 0.84	
72	* PEABODY	/ SOUTHWOOD	A 0.47	0.20	B 0.67	
73	PEABODY	/ BEELARD	A 0.48	0.14	B 0.62	
74	PEABODY	/ MARSHALL	C 0.74	0.14	D 0.88	
75	PEABODY	/ BERRYESSA	B 0.67	0.18	D 0.85	
76	PEABODY	/ CLIFFSIDE	C 0.78	0.09	D 0.87	
77	* DAVIS	/ MARSHALL	A 0.58	-0.01	A 0.57	
78	BELLA VISTA	/ DAVIS	B 0.68	0.10	C 0.78	
79	DAVIS	/ HUME	F 1.03	0.12	F 1.15	
80	HICKORY	/ DAVIS	C 0.77	0.00	C 0.77	
81	MERCHANT	/ ORCHARD	A 0.44	-0.02	A 0.42	
82	MERCHANT	/ WALNUT	A 0.33	-0.01	A 0.32	
83	* CHERRY GLENN (N)	/ I-80 WB RAMPS	A 0.15	-0.03	A 0.12	
84	* CHERRY GLENN (N)	/ I-80 EB RAMPS	A 0.14	0.14	A 0.28	
85	CHERRY GLENN	/ PLEASANTS VALLEY	A 0.22	0.37	A 0.59	
86	CHERRY GLENN	/ LYONS	A 0.19	0.34	A 0.53	
87	* CHERRY GLENN (S)	/ I-80 WB RAMPS	A 0.18	0.44	B 0.62	
88	* LAGOON VALLEY	/ I-80 EB RAMPS	A 0.25	0.40	B 0.65	
89	KAISER & CRESCENT	/ VACA VALLEY	A 0.43	0.42	D 0.85	

NOTES: 2006 COUNTS TAKEN SEPTEMBER -NOVEMBER 2005

**In Const.** FOR 2006 LEISURE TOWN / I-80 EB RAMPS ARE IN CONSTRUCTION AND THERE IS NO EAST LEG OF THIS INTERSECTION.  
FOR 2006 LEISURE TOWN & EAST MONTE VISTA / I-80 WB RAMPS IN CONSTRUCTION AND NO CROSS TRAFFIC ALLOWED.  
FOR 2006 NUT TREE I-80 OVERCROSSING IN CONSTRUCTION

LEGEND # AN UNSIGNALIZED FREEWAY RAMP INTERSECTION  
! SIGNAL CURRENTLY UNDER DESIGN OR CONSTRUCTION  
\* POTENTIAL FUTURE SIGNAL LOCATION

## Five Year Forecast

The intersections that were evaluated for existing conditions were also analyzed using a five year traffic volume projection. The detailed analysis is shown in Table 4. To determine the impact of development expected over the next five years the recently validated Vacaville Citywide TP+ traffic model was used to develop a five year traffic volume forecast for the year 2011. Incorporated into this traffic model are land use and roadway (network) assumptions to represent an expected Year 2011 condition. The roadway improvements as outlined for existing conditions have been included in this model scenario as well as a five year development forecast. The five year forecast was obtained from the Land Use Database maintained by the Community Development Department and was used to develop the trip generation for a five year traffic volume projection.

The purpose of this analysis is to provide an early identification of intersections expected to have the potential to be impacted by future development. Applying the above assumptions to a five year projection, the following 20 intersections would be expected to operate at LOS D, or worse, without any mitigation – 19 in the PM and one in the AM Peak hour. With monitoring and mitigation, all intersections are expected to operate at an acceptable LOS.

**Table 5.**  
**Roadway Intersections, Levels of Service, Existing and Five-Year Forecast**  
**2007 TRANSPORTATION INFRASTRUCTURE REVIEW**  
**COMPARISON OF YEAR 2007, 2012 & 2011 WITH MITIGATION**  
**SORTED BY 2012 LOS**

#	INTERSECTIONS	2007 LOS	CHANGE IN V/C	2011 LOS	CHANGE IN V/C	2011w/MIT LOS
<b>AM PEAK HOUR 7-9</b>						
26	ALAMO / MERCHANT	D 0.84	0.04	D 0.88	0.12	C 0.76
<b>PM PEAK HOUR 4-6</b>						
13	LEISURE TOWN / ALAMO/FRY	C 0.78	0.04	D 0.82	0.31	A 0.51
40	E. MONTE VISTA / DEPOT	C 0.75	0.08	D 0.83	0.14	B 0.69
48	E. MONTE VISTA / AIRPORT/I505 SB	B 0.68	0.16	D 0.84	0.30	A 0.54
54	NUT TREE / ULATIS	C 0.71	0.13	D 0.84	0.09	C 0.75
71	PEABODY / CALIFORNIA	A 0.57	0.27	D 0.84	0.13	C 0.71
19	PEABODY / ALAMO	B 0.61	0.24	D 0.85	0.10	C 0.75
75	PEABODY / BERRYESSA	B 0.67	0.18	D 0.85	0.13	C 0.72
89	KAISER & CRESCENT / VACA VALLEY	A 0.43	0.42	D 0.85	0.12	C 0.73
22	ALAMO / DAVIS	C 0.75	0.11	D 0.86	0.15	C 0.71
69	PEABODY / FOXBORO	C 0.79	0.07	D 0.86	0.08	C 0.78
76	PEABODY / CLIFFSIDE	C 0.78	0.09	D 0.87	0.08	C 0.79
63	ORANGE / LAWERANCE/I80 EB	A 0.52	0.36	D 0.88	0.06	D 0.82
						C 0.78
74	PEABODY / MARSHALL	C 0.74	0.14	D 0.88	0.12	C 0.76
47	NUT TREE / MONTE VISTA	A 0.48	0.41	D 0.89	0.10	C 0.79
57	NUT TREE / ORANGE	B 0.62	0.28	D 0.90	0.11	C 0.79
3	I 505 SB RAMPS / VACA VALLEY	D 0.84	0.09	E 0.93	0.24	B 0.69
30	MASON / DEPOT	B 0.69	0.32	F 1.01	0.17	D 0.84
						C 0.73
62	I-80 EB OFF/I-505 NB ON / ORANGE DRIVE	C 0.73	0.31	F 1.04	0.21	D 0.83
79	DAVIS / HUME	F 1.03	0.12	F 1.15	0.46	B 0.69
LEGEND						
Intersections at LOS D, or below, in 2006 Infrastructure Review - Projection for Year 2010						

Table 5 identifies 20 intersections projected to operate at Level of Service D, or below based on the current Vacaville Citywide Traffic Model, updated to include land use and roadway data assumptions for a five year projection for 2011. Development proposals in the area of these 20 intersections will be required to provide traffic analysis to monitor the operation of these intersections and determine the potential responsibility for mitigation measures. Implementation of these policies, in conformance with the Traffic Impact Mitigation Ordinance, would result in one of the following actions:

- ❖ to require improvements to mitigate impact;
- ❖ to substantiate a finding of LOS D as an acceptable LOS; or
- ❖ to delay development until acceptable LOS standard can be met

With these improvements, continued implementation of the Traffic Impact Mitigation Ordinance as part of the development review process, ongoing monitoring and appropriate mitigation, intersections city-wide are expected to operate at an acceptable Level of Service in five years. It also should be noted that the five-year forecast is based on a maximum development forecast which is unlikely given historical trends and current market conditions, such that the projected levels of service would occur only if development occurred at the maximum projected forecast. Following is a detailed description for each intersection identified to operate at LOS D, or below, within five years and the action proposed to maintain an acceptable Level of Service.

❖ Alamo / Merchant

AM V/C=0.88 (LOS D); With Mitigation V/C=0.76 (LOS C)

Cumulative AM Peak hour traffic northbound on Alamo Drive at Merchant Street, left runs to access westbound Interstate 80 are expected to impact this intersection such that it operates at LOS D within five years during the AM Peak Hour. To mitigate this impact to LOS C would require a third northbound left (for traffic heading towards the westbound I-80 on-ramp) and widening on Merchant Street to receive these left turns. This improvement would require right-of way acquisition from adjacent existing commercial development. No funding has been established for this improvement. The California Drive Overcrossing is part of the Transportation portion of the Development Impact Fee Program and is expected to have a positive impact on the operation of this intersection by providing an alternative route to and from westbound Interstate 80. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.

❖ Alamo / Fry/ Leisure Town

PM V/C=0.82 (LOS D); With Mitigation V/C=0.51 (LOS A)

Cumulative northbound and southbound traffic on Leisure Town Road is expected to impact this intersection such that it operates at LOS D within five years. Jepson Parkway improvements are currently undergoing environmental assessment and include widening Leisure Town Road to provide two lanes in each direction. Widening Leisure Town Road and Jepson Parkway with two lanes in each direction will improve the operation of this intersection to LOS A. These improvements will be funded by adjacent development and the transportation portion of the Development Impact Fee program. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection

❖ East Monte Vista / Depot

PM V/C = 0.83 (LOS D); With Mitigation V/C=0.69 (LOS B)

Cumulative westbound traffic on Monte Vista Avenue at Depot Street is expected to impact this intersection such that it operates at LOS D within five years. Reconfiguring the westbound approach and receiving lanes to provide for a second left turn lane would improve the operation of this intersection to LOS B. These improvements can be accomplished within the existing improvements and right-of-way. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.

❖ East Monte Vista /Airport /Interstate 505

PM V/C=0.84 (LOS D); With Mitigation V/C=0.54 (LOS A)

This intersection is expected to operate at LOS D within five years due to area and cumulative development and a heavy movement from the I-505 off ramp to westbound East Monte Vista. Reconfiguring and lengthening the off-ramp approach to provide two left turn lanes would result in LOS A. This improvement would be accomplished within existing City and State right-of-way. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations, implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection and consider inclusion of improvements for this intersection in the transportation portion of the Development Impact Fee program.

❖ Nut Tree / Ulatis

PM V/C=0.84 (LOS D); With Mitigation V/C=0.74 (LOS C)

Cumulative traffic southbound on Nut Tree Road at Ulatis Drive is expected to impact this intersection such that it operates at LOS D within five years. To mitigate this traffic to LOS C would require a third southbound through lane. This improvement would require right-of-way acquisition on the west side of Nut Tree Road on both sides of Ulatis. Funding for this improvement has not been identified. The City shall continue to monitor this intersection, evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Peabody / California

PM V/C=0.84 (LOS D); With Mitigation V/C=0.71 (LOS C)

Cumulative traffic northbound on Peabody Road at California Drive is expected to result in LOS D at this intersection within five years. Providing a third northbound through lane with a receiving lane will improve the operation of this intersection to LOS C. A preliminary review of right-of-way and improvements finds that existing Peabody Road right-of-way and improvements north of California Drive could be wide enough to provide for this improvement and right-of-way, but additional improvements and right-of-way would be needed south of California Drive adjacent to Al Patch Park. Funding for this improvement has not been identified. The City will continue to monitor this intersection, particularly since full development of Jepson Parkway (Leisure Town Road) as a reliever route may divert traffic from this intersection. The City will also evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Peabody / Alamo

PM V/C=0.85 (LOS D); With Mitigation V/C=0.75 (LOS C)

This intersection is expected to operate at LOS D within five years and the eastbound through volume on Alamo Drive is the critical volume contributing to this LOS. Provision of a third eastbound thru lane on Alamo Drive would improve operation of this



intersection to LOS C. This improvement would require acquisition of right-of-way from adjacent developed commercial properties. No funding has been allocated to this improvement. The City will continue to monitor this intersection, particularly since full development of Jepson Parkway (Leisure Town Road) as a reliever may divert traffic from this intersection. The City will also evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Peabody / Berryessa / Hume

PM V/C=0.85 (LOS D); With Mitigation V/C=0.72 (LOS C)

Within five years, the cumulative southbound traffic on Peabody Road at Hume Way and Berryessa Drive is expected to impact this intersection such that it operates at LOS D. Provision of a third lane through this intersection would improve the operation to LOS C. This improvement would require the acquisition of right-of-way and construction of additional street width. No funding source has been allocated to this project. The City will continue to monitor this intersection, particularly since full development of Jepson Parkway (Leisure Town Road) as a reliever route may divert traffic from this intersection. The City shall also evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Quality Drive & Crescent Way / Vaca Valley Parkway

PM V/C=0.85 (LOS D); With Mitigation V/C=0.73 (LOS C)

Area development and cumulative traffic eastbound traffic on Vaca Valley Parkway at Quality Drive and Crescent Way is expected to impact this intersection such that it operates at LOS D within five years. Provision of a third eastbound lane on Vaca Valley Parkway through this intersection would improve the operation to LOS C. The City has acquired right-of-way for widening of Vaca Valley Parkway. However, a plan line needs to be prepared for the intersection in order to determine if additional right-of-way is needed to provide for lane alignments through the intersection and for the receiving lane on the east side of Kaiser Driveway. The City will continue to monitor this intersection, implement the Traffic Impact Mitigation Ordinance to assign fair share responsibility for this improvement to future development, review signal timing for the potential to optimize operations, and update the transportation portion of Development Impact Fee Program to address cumulative development impacts at this intersection to maintain an acceptable LOS.

❖ Alamo / Davis

PM V/C=0.86 (LOS D); With Mitigation V/C=0.71 (LOS C)

Eastbound traffic on Alamo Drive at Davis Street is expected to result in the intersection operating at LOS D within five years. Provision of an additional, third eastbound through lane on Alamo Drive through this intersection would improve the operation of this intersection to LOS C. Right-of-way from adjacent existing residential development would be required to provide this improvement. The City shall continue to monitor this intersection to maintain an acceptable LOS. City shall continue to monitor this intersection, evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Peabody / Foxboro

PM V/C=0.86 (LOS D); With Mitigation V/C=0.78 (LOS C)

Area development with cumulative traffic and trips from points south of Vacaville are expected to impact this intersection such that it operates at LOS D within five years. Provision of a third northbound thru lane on Peabody Road would improve operation of this intersection to LOS C. Monitoring of this intersection will also continue to determine if full development of Jepson Parkway (Leisure Town Road) as a reliever route diverts some traffic from this intersection. The width of right-of way on the west side of Peabody

adjacent to state facilities will need to be evaluated to determine if right-of-way exists since east side of Peabody has been improved. No funding has been established for this improvement. The City shall continue to monitor this intersection, evaluate signal timing for the potential to improve operations, implement the Traffic Mitigation Ordinance to maintain an acceptable LOS and consider this improvement in future updates of the transportation portion of the Development Impact Fee Program.

❖ Peabody /Cliffside

PM V/C=0.87 (LOS D); With Mitigation V/C=0.79 (LOS C)

Within five years the cumulative southbound traffic on Peabody Road results in the expectation that the intersection of Peabody Road and Cliffside Drive will operate at LOS D. Providing a third southbound through lane, and providing a receiving lane would improve operations to LOS C. Right-of-way from existing commercial development would be required to provide this improvement. No funding has been established to provide for this improvement. Monitoring of this intersection will also continue to determine if full development of Jepson Parkway (Leisure Town Road) as a reliever route diverts some traffic from this intersection. The City will also evaluate signal timing for the potential to improve operations, and implement the Traffic Mitigation Ordinance to maintain an acceptable LOS.

❖ Orange/Lawrence/Interstate 80 On-Ramp

PM V/C=0.88 (LOS D); With Mitigation V/C=0.81 or 0.82 (LOS D), or V/C=0.78 (LOS C)

As a part of the review of the March 2002 Nut Tree Redevelopment EIR and March 2005 updated traffic analysis, LOS D was determined to be an acceptable LOS for this intersection. Cumulative southwest bound traffic on Orange Drive and northeast bound traffic turning left to access Interstate 80 is expected to impact this intersection such that it operates at LOS D within five years. Provision of a third southwest bound lane on Orange Drive through this intersection, or widening of Orange Drive to provide a second left turn and widening on-ramp to receive two lanes would improve the operation, but it would still be expected to operate at LOS D. To achieve LOS C would require accomplishing both of these improvements. Funding for improvements at this intersection is included in the transportation portion of the Development Impact Fee program. The City will continue to monitor the operation of this intersection and as part of the design of improvements establish the right-of way need to accomplish these improvements.

❖ Peabody / Marshall

PM V/C=0.88 (LOS D); With Mitigation V/C= 0.86 (LOS D), or V/C=0.76 (LOS C)

Within five years Cumulative northbound through traffic on Peabody Road and left turns from southbound Peabody Road to eastbound Marshall Road are expected to result in the intersection of Peabody and Marshall Roads operating at LOS D. Provision of a third northbound through lane on Peabody Road or adding a second southbound left turn lane would improve the conditions but the intersection would still be expected to operate at LOS D. To achieve LOS C would require accomplishing both of these improvements. Funding for improvements at this intersection is included in the transportation portion of the Development Impact Fee program. As part of the design of improvements, the right-of way needs for the improvements will be determined. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.

- ❖ Nut Tree / Monte Vista  
PM V/C=0.89 (LOS D); With Mitigation V/C=0.87, 0.85 or 0.81 (LOS D)  
 LOS D was determined to be an acceptable LOS for this intersection, as part of the review of the March 2002 Nut Tree Redevelopment EIR and March 2005 updated traffic analysis. Area development and cumulative northbound traffic on Nut Tree Road overcrossing and westbound on Monte Vista is expected to result in LOS D within five years. Providing a third northbound and/or westbound left would improve LOS, but it would remain at LOS D. Right-of way would be required from adjacent existing commercial development to provide for these improvements. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.
- ❖ Nut Tree / Orange  
PM V/C=0.90 (LOS D); With Mitigation V/C=0.79 (LOS C)  
 As a part of the review of the March 2002 Nut Tree Redevelopment EIR and March 2005 updated traffic analysis, LOS D was determined to be an acceptable LOS for this intersection. Within five years area development and cumulative northbound traffic on Nut Tree Road is expected to result in LOS D at this intersection. Providing a designated northbound right turn lane would result in LOS C. Right-of way would be required from adjacent existing commercial development to provide for these improvements. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.
- ❖ I-505 SB Ramps/Vaca Valley PM V/C=0.93 (LOS E); With Mitigation V/C=0.69 (LOS B)  
 With expected area development and cumulative traffic on Vaca Valley Parkway and the southbound Interstate 505 ramp, this intersection is expected to operate at LOS E within five years. Provision of a signal at this intersection to control turning movements, widening the intersection to provide separate through and turn lanes on Vaca Valley Parkway and providing a left turn lane on the southbound Interstate 505 off ramp at Vaca Valley Parkway would result in this intersection operating at LOS B. This interim improvement is funded through the transportation portion of the Development Impact Fee program. Right-of way exists to accommodate these improvements. The process has been initiated to obtain a Caltrans encroachment permit to accomplish these improvements. These are interim improvements and the update of the transportation portion of Development Impact Fee Program will determine appropriate timing for the funding of the widening of the Vaca Valley Overcrossing at Interstate 505. Ultimate overcrossing improvements include the provision of slip ramps for traffic accessing Interstate 505 by turning left from Vaca Valley Parkway.
- ❖ Depot /Mason  
PM V/C=1.01 (LOS F); With Mitigation V/C=0.84 (LOS D), or V/C=0.73 (LOS C)  
 Cumulative traffic exiting from westbound Interstate 80 to northbound Depot Street and eastbound on Mason Street turning left to northbound Depot Street is expected to result in LOS F at this intersection within five years. Reconfiguration of the northbound approach with a free right turn from northbound Depot Street to eastbound Mason Street also requires reconfiguration of the outside eastbound lane on Mason to be a designated right turn lane. Accomplishing this reconfiguration along with reconfiguring the eastbound approach to provide two lefts, one shared with through is needed to achieve LOS C. These improvements can be accomplished within the existing improvements and right-of-way. The City will continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic

Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.

❖ Orange/I-80 Eastbound & I-505 NB Ramps  
PM V/C=1.04 (LOS F); With Mitigation V/C=0.83 (LOS D)

As a part of the review of the March 2002 Nut Tree Redevelopment EIR and March 2005 updated traffic analysis, LOS D was determined to be an acceptable LOS for this intersection. Widening of Orange Drive to provide three southwest bound lanes and a second left turn for the Interstate 80 Off-Ramp to northeast bound Orange Drive would improve the operation of this intersection to LOS D. Update to the transportation portion of the Development Impact Fee Program includes improvements at the Interstate 80 Off-Ramp and this intersection. The design of these improvements will include the determination of the need for right-of-way. City will continue to monitor this intersection and evaluate the schedule for the provision of these improvements. The City will also continue to monitor the operation of this intersection, review signal timing for the potential to improve operations and implement the Traffic Impact Mitigation Ordinance to maintain an acceptable level of service at this intersection.

❖ Davis / Hume  
PM V/C=1.15 (LOS F); With Mitigation V/C=0.69 (LOS B)

Recent capital improvement projects widened the Davis Street undercrossing to two lanes in each direction and reconfigured the intersection of Bella Vista, Davis and the Interstate 80 eastbound ramps. Davis Street widening south of Hume is the final stage of these improvements, which are in design. Right of way acquisition required to provide these improvements has been initiated and the improvements are being funded by the transportation portion of the Development Impact Fee Program. Construction is scheduled to commence in 2008. With these improvements this intersection is expected to operate at LOS B in five years.

Based on this analysis, the following priority for the provision of transportation improvements through the transportation portion of Development Impact Fees Program in the near term has been established:

1. Davis Street/ Hume Way intersection Improvements
2. Southbound Interstate 505 Ramps/ Vaca Valley Parkway interim widening & signalization improvements;
3. California Drive Interstate 80 Overcrossing; and
4. Vaca Valley Parkway Interstate 505 interchange improvements.

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## IV. WATER SUPPLY AND TREATMENT

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### WATER SUPPLY

#### Existing Supply and Projected Water Supply

Water supply for the City of Vacaville comes from two sources – groundwater and surface water. The current water supply available from these sources is approximately 33,700 acre feet per year (ac-ft /yr).

Vacaville's groundwater supply consists of twelve municipal wells, most of which are located on the east side of the City. Last year the groundwater wells supplied approximately 6,650 ac-ft/yr of water to the City's distribution system.

The surface water supply comes from two different sources: the Solano Project and the State Water Project (SWP).

- ❖ The Solano Project provides approximately 8,750 ac-ft/yr of surface water delivered by the Solano Irrigation District (SID) via the Putah South Canal (5,750 ac-ft City Entitlement and 3,000 ac-ft SID) through the year 2009. In 2010, the SID entitlement will increase to 8,000 ac-ft/yr.
- ❖ The State Water Project (SWP) provides 8,978 ac-ft/yr (6,100 ac-ft/yr - Vacaville Table A and 2,878 ac-ft/yr – Kern County Water Agency Agreement) of surface water delivered by the North Bay Regional (NBR) Plant via the North Bay Aqueduct (NBA).
- ❖ The Department of Water Resources (DWR) can provide 9,320 ac-ft/yr of surface water from its State Water Project entitlement as per the 2003 "Settlement Water" agreement with Vacaville. This water is provided in lieu of Vacaville pursuing an Area of Origin water right.

For the year 2007, the City has adequate raw water supplies that would not be affected by drought. This is because the Solano Project reservoir (Lake Berryessa) continues to be over 90 percent full. Also, groundwater levels are higher than before the last drought conditions, which began in 1990. Because droughts take years to affect the City's supplies, the City is in an excellent position relative to reduced supply caused by drought impacts. In addition, if drought conditions were to occur within the next five years, the City Council could implement portions of the Water Conservation Ordinance, including tiered water rates resulting in water conservation. The City could also, if necessary, acquire additional water supplies from other agencies.

A summary of the projected water supply from these three sources (groundwater, Solano Project, and State Water Project) for the City of Vacaville is presented in Table 6.

**Table 6. Projected Water Supply 2006 through 2011**

Water Supply Source	Water Supply <sup>a</sup> , ac • ft/yr					
	2006	2007	2008	2009	2010	2011
<b>Groundwater</b>	7,000	7,000	7,000	7,000	7,500	7,500
<b>State Water Project</b>						
City Entitlement	8,978	8,978	8,978	8,978	8,978	8,978
Settlement Water	9,320	9,320	9,320	9,320	9,320	9,320
<b>Solano Project</b>						
City Entitlement	5,750	5,750	5,750	5,750	5,750	5,750
Solano Irrigation District	3,000	3,000	3,000	3,000	8,000	8,000
<b>TOTALS</b>	<b>34,048</b>	<b>34,048</b>	<b>34,048</b>	<b>34,048</b>	<b>39,548</b>	<b>39,548</b>

<sup>a</sup> Source: City of Vacaville, 2005 Urban Water Management Plan Update, December 2005.

The Solano Project provides surface water to the City of Vacaville delivered by SID via the Putah South Canal (PSC). The surface water is treated by diatomaceous earth (DE) filters at the DE Water Treatment Plant (DE Plant) on Elmira Road adjacent to the City Corporation Yard. PSC water is also treated at the North Bay Regional (NBR) Water Treatment Plant on Peabody Road, which is a joint facility with the City of Fairfield.

The North Bay Aqueduct provides State Water Project (SWP) and "Settlement Water" to the NBR Plant. The surface water is then treated and conveyed from the NBR Plant to the City of Fairfield and the City of Vacaville.

Vacaville's groundwater supply consists of twelve municipal wells, most of which are located on the east side of the City. The groundwater wells currently supply approximately 6,650 ac-ft/yr of water to the City's distribution system. A thirteenth well (Well 16) is currently in the final construction stage and is expected to be on-line by spring 2007. It is estimated that approximately 6,650 ac-ft/yr will be used from the groundwater wells in 2007.

In 1995, SID and the City of Vacaville entered into a long-term master water agreement, under which the City of Vacaville will obtain additional water entitlements. Vacaville will receive an increasing supply through the year 2016 and a constant supply thereafter until the year 2045. SID will supply 3,000 ac-ft/yr of water to Vacaville through 2009 and increasing to 8,000 ac-ft/yr in 2010.

### **Projected Water Demand Versus Supply**

The City's water demand is estimated based upon land use quantities from both existing development and projected future development (growth). The 2006 average day water demand is estimated at 17,810 ac-ft/yr (15.9 million gallons per day, or mgd). The maximum day demand observed in 2006 was 29.8 mgd at a peaking factor (PF) of 1.9. Using the year 2011 land use database (prepared by Community Development) it is estimated that the City will experience a 5 year growth water demand of approximately 2,910 ac-ft/yr (2.6 mgd) from January 2007 to January 2011. Thus, the projected water demand for 2011 is approximately 20,720 ac-ft/yr (18.5 mgd) and the projected maximum day water demand for 2011 is 37.0 mgd (using the *1990 Water System Master Plan (WSMP)* PF = 2.0). Interpolating between the 2006 water demand and the estimated 2011 water demand, the projected 2007 water demand is approximately 18,390 ac-ft/yr (16.4 mgd) and maximum day demand of 32.8 mgd. A comparison of projected annual water demand versus water supply for 2006 through 2011 is presented in Table 7.

**Table 7. Projected Water Supply versus Demand 2006 - 2011 (ac-ft/yr)**

Item	2006	2007	2008	2009	2010	2011
Projected Supply <sup>a</sup>	34,048	34,048	34,048	34,048	39,548	39,548
Projected Demand <sup>b</sup>	17,810	18,390	18,970	19,560	20,140	20,720

<sup>a</sup> See Table 6.

<sup>b</sup> Projected demands are interpolated from the Year 2011 and Year 2006 water demands.

### Water Production Facilities

The City operates two water treatment facilities: 1) a treatment plant located on Elmira Road, designated as the DE Plant owned by the City, and 2) the NBR Plant on Peabody Road, which is jointly owned with the City of Fairfield. The DE WTP is nominally rated at 8,200 gpm, however it cannot operate for a full 24 hours because the filters must be backwashed. The NBR Plant provides a capacity of 13.0 mgd of treated surface water to the City of Vacaville distribution system. The City also owns and operates 12 municipal groundwater wells generally located along the Elmira Road corridor, east of I-80, and west of Leisure Town Road.

All existing groundwater wells in service provide a total capacity of approximately 20.7 mgd. A new well (Well 16) is currently in the final construction stage and is expected to go into production in the spring of 2007 with a design capacity of 2.5 mgd. Well 17 will be the next municipal well and is currently in early planning stages with a design capacity of 2.5 mgd and expected to be on-line in 2010. Including Well 16 and Well 17 the total groundwater capacity from the wells is approximately 25.7 mgd. However, due to well interference and distribution system impacts, approximately 5.0 mgd of well capacity is assumed unavailable. For the year 2011, Wells 1, 8, and 15 are assumed out of service (approximately 5 mgd) and the groundwater maximum capacity is approximately 20.7 mgd.

The “firm capacity” is defined as 90 percent of the maximum capacity. This takes into account equipment failures, loss of power, supply disruptions, and other unforeseen disruptions in production. A summary of the water production firm capacity versus maximum day demand from 2002 to 2011 is presented in Table 8.

**Table 8. Maximum Day Water Demand versus Firm Production Capacity 2002 – 2011**

Actual	2002	2003	2004	2005	2006
Maximum Day Demand, mgd	27.4	28.0	28.3	28.5	29.8
Firm Production Capacity, mgd	28.4	28.4	28.4	31.1	31.6
Projected	2007	2008	2009 <sup>e</sup>	2010	2011
Maximum Day Demand, mgd <sup>a</sup>	32.9	33.9	35.0	35.9	37.0
Firm Production Capacity, mgd <sub>b</sub>	34.3 <sup>c</sup>	34.3	35.2	37.4 <sup>d</sup>	37.4

<sup>a</sup> Maximum day demand is estimated for Year 2007-Year 2011 as 2.0 x average day demand (Table 7).

<sup>b</sup> Firm production capacity is 90% of the maximum production capacity from NBR Plant, DE Plant, and wells.

Maximum production from wells assumes approximately 5 mgd of well maximum production is unavailable.

<sup>c</sup> Assumes Well 16 is in service at 2.5 mgd in 2007.

<sup>d</sup> Assumes Well 17 is in service at 2.5 mgd in 2010.

<sup>e</sup> If maximum demand increases to 35mgd, the D.E. Plant time of operation will increase to 16 hours

of production.

To minimize peak power use during the summer, Utilities Division has prepared a Power Optimization Plan (POP). In summary, the plan is to use the groundwater wells during low power use times in the day. The planned production assuming POP is in place for 2007 is presented in Table 9. In 2007, the POP indicates a planned production of approximately 32.8 mgd.

**Table 9. Power Optimization Plan (POP) for Maximum Day 2007**

Source of Supply	Maximum Capacity, mgd	Planned Production, mgd		Time of Operation
NBR Plant	13.0	13.0	(24 hrs production at 13.0 mgd)	12:00 AM to 12:00 AM
DE Plant	6.9	6.9	(14 hrs production at 8,200 gpm)	7:00 AM to 9:00 PM
Wells <sup>a</sup>	18.2	9.1	(12 hrs production at 18.2 mgd)	12:00 AM to 12:00 PM
		3.8	(5 hrs production at 18.2 mgd)	7:00 PM to 12:00 AM
<b>Total</b>	<b>38.1</b>	<b>32.8</b>		

<sup>a</sup> Includes Well 15 and 16 at 2.5 mgd each. Due to well interference Wells 1, 8, and 15 are placed out of service (approx. 5 mgd) for a total of 18.2 mgd.

As shown in Table 10, in 2007 the maximum production capacity is estimated at 38.1 mgd, based on 18.2 mgd from groundwater wells, 6.9 mgd from the DE Plant, and 13.0 mgd from the NBR Plant. The “firm capacity” is 34.3 mgd which exceeds the projected maximum day demand for 2007.

**Table 10. Firm Capacity for Maximum Day 2007**

Source of Supply	Maximum Capacity, mgd	Firm Capacity, mgd		Time of Operation
NBR Plant	13.0	11.7	(24 hrs production at 90% of 13.0 mgd)	12:00 AM to 12:00 AM
DE Plant	6.9	6.2	(14 hrs production at 8,200 gpm, 90% of 6.9 mgd)	7:00 AM to 9:00 PM
Wells <sup>a</sup>	18.2	16.4	(24 hrs production at 90% of max capacity)	12:00 AM to 12:00 AM
<b>Total</b>	<b>38.1</b>	<b>34.3</b>		

<sup>a</sup> Includes Well 15 and 16 at 2.5 mgd each. Due to well interference Wells 1, 8, and 15 are placed out of service (approx. 5 mgd) for a total of 18.2 mgd.

In year 2011 the maximum production is approximately 41.6 mgd based on 20.7 mgd from groundwater wells, 7.9 mgd from the DE Plant, and 13.0 mgd from the NBR Plant. The “firm capacity” is 37.4 mgd (90 percent of the maximum capacity). This takes into account equipment failures, loss of power, supply disruptions, and other unforeseen disruptions in production. The firm capacity scheduled for 2011 to meet maximum day demand is presented in Table 11.



**Table 11. Firm Capacity for Maximum Day 2011**

Supply	Capacity, mgd	Firm Capacity, mgd		Time of Operation
NBR Plant	13.0	11.7	(24 hrs production at 90% of 13.0 mgd)	12:00 AM to 12:00 AM
DE Plant	7.9	7.1	(16 hrs of production at 8,200 gpm (90% of 7.9 mgd))	7:00 AM to 11:00 PM
Wells <sup>a</sup>	20.7	18.6	(24 hrs production at 90% of max production)	12:00 AM to 12:00 AM
<b>Total</b>	<b>41.6</b>	<b>37.4</b>		

<sup>a</sup> Includes Wells 16 and 17 at 2.5 mgd each. Due to well interference Wells 1, 8, and 15 are placed out of service (approx. 5 mgd) for a total of 20.7 mgd.

### Water Storage

The City's water reservoirs serve the Main Zone (up to elevation 222 ft as per new City datum) as well as three upper pressure zones. A summary of the existing storage reservoirs and planned storage reservoirs with nominal capacities is presented in Table 12.

**Table 12. Water Storage Capacity**

Reservoir	Capacity (MG)
<b>Existing - Storage</b>	
<b>Main Zone</b>	
Butcher Reservoir No. 1	2.0
Butcher Reservoir No. 2	4.0
Buck Reservoir	2.0
Browns Valley Reservoir	5.0
<b>Upper Pressure Zones</b>	
Wykoff Reservoirs	0.13
Hidden Valley Reservoir	0.07
Vine Street Reservoir	0.62
<b>Total - Existing Storage</b>	<b>13.82</b>
<b>Planned - Storage</b>	
<b>Main Zone</b>	
McMurtry Reservoir (2007)	5.1
<b>Upper Pressure Zones</b>	
Lower Lagoon Valley - Zone 2 (2008)	2.60
Lower Lagoon Valley - Zone 3 (2010)	0.34
Rice McMurtry - Zone 2 (2008)	0.53
<b>Total - Planned Storage</b>	<b>8.57</b>
<b>Total - Storage (Year 2011)</b>	<b>22.39</b>

The volume of water in storage must be sufficient to provide the sum of operational, fire, and emergency needs:

- ❖ Operational Storage: This is the volume required to equalize the diurnal fluctuations in water system supply and demand (25% of maximum day demand).

- ❖ Fire Storage: Fire storage is the amount of water reserved for fire protection. It is calculated from a specified flow rate and duration (4,500 gpm at 4 hours = 1.08 MG).
- ❖ Emergency Storage: Emergency storage is the amount of water reserved for use in the case of a power outage, loss of a critical water supply source, or other emergency (50% of maximum day demand).

During loss of PG&E power, the City is able to provide emergency production of water. Emergency production consists of the DE water treatment plant operating at 5 mgd and groundwater Well No. 8 operating at 2 mgd for a total of 7 mgd.

The net water demand during emergency conditions is the maximum day demand minus the emergency production. This net water demand is the rate at which the reservoirs will supply water assuming all the water production facilities are off-line except for emergency production facilities. The amount of time that the reservoirs can continuously supply the net demand is referred to as "Emergency Run Time". The City's emergency storage goal is 12 hours at maximum day demand.

A summary of the storage components, demands, needed storage, and emergency run time are summarized in Table 13. The City is currently in the final construction stages of a new 5.1 MG (million gallons) capacity Main Zone reservoir (McMurtry Reservoir). It is anticipated that the new reservoir would be operational in the summer of 2007.

**Table 13. Water Reservoir Emergency Storage Capability, 2005 – 2011**

DEMAND & STORAGE	Actual		Projected				
	2005	2006	2007	2008	2009	2010	2011
Maximum Day Demand (mgd) <sup>a</sup>	28.5	29.8	32.8	33.9	34.9	36.0	<b>37.0</b>
Total Reservoir Capacity (MG) <sup>b</sup>	13.8	13.8	18.9	22.0	22.0	22.4	<b>22.4</b>
Available Emergency Storage (MG) <sup>c</sup>	5.6	5.3	9.6	12.5	12.2	12.3	<b>12.0</b>
Required Emergency Storage (MG) <sup>d</sup>	10.8	11.4	12.9	13.4	14.0	14.5	<b>15.0</b>
Emergency Run Time (hours) <sup>e</sup>	6.3	5.6	8.9	11.1	10.5	10.2	<b>9.6</b>
Required Additional Emergency Storage (MG) <sup>f</sup>	5.1	6.1	3.3	1.0	1.8	2.2	<b>3.0</b>

Notes:

<sup>a</sup> Maximum Day Demand = MDD, is projected with a peaking factor = 2.0 as used in the 2005 UWMP Update.

<sup>b</sup> Assumes a new 5.1 MG Main Zone reservoir (McMurtry Reservoir) constructed and on-line in 2007. Also assumes a new 2.6 MG Zone 2 reservoir serving LLV and new 0.53 MG Zone 2 reservoir serving Rice McMurtry in Year 2008. A new 0.34 MG reservoir for Zone 3 in LLV for a total storage in 2010 and 2011 of 22.4 MG.

<sup>c</sup> Available Emergency Storage = Total Reservoir Capacity - Operational Storage - Fire Storage

<sup>d</sup> Required Emergency Storage = (Maximum Day Demand - Emergency Production) x 0.5  
Emergency Production = DE Plant (5.0 mgd) + Well 8 (2 mgd) = 7.0 mgd in max day.

<sup>e</sup> Emergency Run Time = Available Emergency Storage/(Net Demand/24 Hours). Net demand equals MDD less Emergency Production.

<sup>f</sup> Required Additional Emergency Storage = Required Emergency Storage - Available Emergency Storage

### Water Distribution System Deficiencies

The existing water distribution system has adequate capacity to supply water to the City, with the exception of a few areas: North Orchard Avenue, North Eubanks Drive, Allison Parkway, and Midway Road.

The North Orchard area is one of the most critical areas in Vacaville in terms of the ability of the existing distribution system to meet fire flows and peak hour demands. Several improvement alternatives were considered in the *City of Vacaville 1990 Water Master Plan* but the construction cost and lack of new development in this sector of the City has put improvements in this area on hold. In the interim, low residual pressures may occur in this area during fire flow and peak hour demand conditions.

The North Eubanks Drive area also has problems meeting fire flow and peak hour demands. The lack of a loop system at the dead end of North Eubanks Drive and Midway Road is the reason for this deficiency in the water distribution system. In addition to the low residual pressures during fire flow and peak hour demand conditions, the area is susceptible to water quality concerns. Improvements to this area have been suggested but all are driven by development in the northeast sector. An intermediate mitigation to this deficiency is the construction of the PG&E Towers Loop. The loop would consist of a 12-inch water main from the dead end water main at Crocker Drive along the PG&E Towers easement to the existing 12-inch water main at North Eubanks Drive. The proposed North Village Development Area Plan 1 and Area Plan 2 projects are scheduled for completion within the next 10 years and should include the improvements to completely loop this long dead end water main along North Eubanks Drive at Midway Road.

The existing Allison Parkway includes a 12-inch dead-end water main than extends south from Vaca Valley Parkway. A developer funded water improvement will loop this dead-end water main with a new 12-inch water main connecting to the existing 12-inch water main on Allison Parkway and the existing 8-inch water main in the Ridgeview subdivision.

The existing Midway Road and I-80 corridor includes a 12-inch dead-end water main that extends south of I-80 and Leisure Town Road east along I-80 and north along Meridian Road and finally east along Midway Road to Gentile Lane (approximately 24,000 ft). The length of the dead-end water main will be minimized by a new developer funded improvement (DIF 142) with connection to the proposed Leisure Town Road pipeline (DIF 141) and existing Meridian Road water main.

### **Projected Water Distribution System Improvements**

The City of Vacaville is currently in the process of updating the water distribution system model (tentative completion date of April 2007) and the model update will include water quality modeling. The results of the model update and water quality modeling should provide a better understanding of the need for water distribution system improvements. At present, the following improvements are projected within the next 5 years:

- ❖ Well No. 16 - expected on-line by year 2007 (spring)
- ❖ Well No. 17 - expected construction/on-line by year 2010
- ❖ McMurtry Reservoir - expected on-line by year 2007 (spring)
- ❖ 18-inch Nut Tree Road and Interstate 505 Pipeline (final portion of DIF 53) - expected construction/on-line by year 2010 (fall)
- ❖ 12-inch North Village Parkway Pipeline (DIF 145) - expected construction/on-line by year 2010 (summer)
- ❖ 12-inch Leisure Town Road, Midway Road, Eubanks Drive Pipelines (DIF 141) - expected construction/on-line by year 2010 (summer)

Several other Development Impact Fee (DIF) funded projects are projected for construction in the upcoming years (i.e. DIF 10, DIF 88, and DIF 146) but the majority of them are driven by development in the Lower Lagoon Valley, Southtown, and Rice McMurtry areas.

- ❖ 24-inch Alamo Drive Pipeline (portion of DIF 10) - expected construction/on-line by year 2010 (summer). This pipeline will ensure adequate water supply to the Lower Lagoon Valley area.
- ❖ 18-inch Leisure Town Road Pipeline (portion of DIF 88) - expected construction/on-line by year 2010 (summer). This pipeline will ensure adequate water distribution to the Southtown area.
- ❖ 12-inch Browns Valley Road Pipeline (portion of DIF 146) - expected construction/on-line after year 2008. This pipeline will ensure adequate water distribution and supply to the Rice McMurtry area and Main Zone McMurtry Reservoir.

With development in the Lower Lagoon Valley and/or the Rice McMurtry areas additional improvements will be required. At a minimum, two new upper pressure zones (Zone 2 and Zone 3) will be necessary serve the Lower Lagoon Valley and another upper pressure zone (Zone 2) to serve the Rice McMurtry area. Each new upper pressure zone will require a booster pump station and an elevated storage reservoir in addition to the local water transmission and distribution system improvements. The City is in various design stages of these development projects. The EIRs for these projects identify all the improvements necessary to provide these projects with adequate water supply to meet their demands.

After completion of the City's water model update (expected completion spring 2007) the Water DIF Study should be updated to identify a comprehensive schedule for the proposed improvements to the distribution system. The updated DIF Study should provide a better understanding of the schedule for the proposed improvements. A summary of the proposed improvements is presented in Table 14.

**Table 14. Proposed Water Distribution System Improvements**

Project	Projected On-Line Date
Well No. 16 (2.5 mgd)	Spring 2007
Well No. 17 (2.5 mgd)	Fall 2007
McMurtry Reservoir (5.1 MG)	Spring 2007
18-inch Nut Tree Road and Interstate 505 Pipeline (DIF 53)	Fall 2010
12-inch North Village Parkway Pipeline (DIF 145)	Summer 2010
12-inch Leisure Town Road, Midway Road, Eubanks Drive Pipeline (DIF 141)	Summer 2010
24-inch Alamo Drive Pipeline (DIF 10)	Summer 2010
18-inch Leisure Town Road Pipeline (DIF 88)	Summer 2010
12-inch Browns Valley Road Pipeline (DIF 146)	Fall 2008
Zone 2 Upper Pressure Zone Reservoir – LLV	Summer 2008
Zone 3 Upper Pressure Zone Reservoir - LLV	Summer 2010
Zone 2 Upper Pressure Zone Reservoir - Rice McMurtry	Summer 2008

□□□

## V. WASTEWATER TREATMENT FACILITIES

### Treatment Plant Capacity

The Easterly Wastewater Treatment Plant (Easterly Plant), located southeast of the town of Elmira, is the main wastewater treatment plant for Vacaville. The plant is currently capable of treating an average dry weather flow (ADWF) of 15 million gallons per day (mgd). Temporary pumping facilities are necessary to utilize the North Plant capacity. The Easterly Completion Project is under construction and permanent plant improvements will be completed in 2007. Under the projected flow scenario, the ADWF (defined as the projected maximum 30-day average flow during the six-month period of May through October) is calculated to be about 10.26 mgd as of the end of 2006 and 11.21 mgd at the end of 2007. Anticipated flow conditions at the Easterly Plant for the end of 2006 and 2007 are summarized in Tables 15, and 16, respectively.

**Table 15.  
Existing Easterly Wastewater Treatment Plant Flow and Design Capacity**

2006 Flow Statistic	Flow, mgd
Permitted Dry Weather Design Capacity	15.00
Historical Average Dry Weather Flow in May 2006 <sup>a</sup>	10.23
Estimated 7-month Net Increase, June through December <sup>b</sup>	0.08
Subtotal, Estimated Dry Weather Flow, End Of 2006	10.31
Adjustment for Dry Weather I&I in Wet Years <sup>c</sup>	-0.05
Max Month Dry Weather Flow (ADWF), December 2006 <sup>d</sup>	10.26
Rated Wet Weather Capacity (Hourly PWWF)	55.00
Estimated Historical Hourly PWWF <sup>e</sup>	43.00

Notes:

- <sup>a</sup> From City self-monitoring reports.
- <sup>b</sup> Net, based on observed 0.20 mgd decrease from California State Prison-Solano and 0.02 mgd increase from Novartis (formerly Chiron), May through October 2006, plus an estimated increase due to growth. In addition, Albertsons and Mariani Packing Company connected to the Easterly Plant collection system in 2006, adding 0.01 mgd and 0.115 mgd of average flow, respectively. The non-special case growth increase is based on linear regression of recorded May flow over the past 10 years, which indicates an average annual increase of 0.22 mgd. An increase of 0.13 mgd is seven twelfths of the average annual increase. Net is  $-0.20+0.02+0.13+0.01+0.115 = 0.08$  mgd.
- <sup>c</sup> The adjustment for dry weather infiltration and inflow (I&I) is relative to measured May flow, and varies each year depending on actual versus projected wet year conditions. In 2006, actual I&I produced flows that exceeded the 75<sup>th</sup> percentile predicted May flow, and therefore a negative adjustment is included.
- <sup>d</sup> Projected maximum month dry weather flow with development through the end of 2006. Includes the noted adjustment for dry weather infiltration, growth, and newly connected industrial flows through December 2006.
- <sup>e</sup> The historical hourly peak wet weather flow is estimated based upon flows during the January 22, 1997 storm.

**Table 16.  
Projected Easterly Wastewater Treatment Plant Flow and Design Capacity – 2007**

2007 Flow Statistic (Projected)	Flow, mgd
Permitted Dry Weather Design Capacity	15.00
Estimated Average Dry Weather Flow, Through End Of 2006 <sup>(a)</sup>	10.26
Projected 5-month Flow Increase Due to Growth, January through May <sup>(b)</sup>	0.12
Projected Average Dry Weather Flow, May 2007	10.38
Projected 7-month Flow Increase Due to Growth, June through Dec. <sup>(c)</sup>	0.17
Projected Increase in Special Case Industrial Flows, 2007	0.66
Projected Average Dry Weather Flow, Through End Of 2007	11.21

Notes:

- (a) See Table 15
- (b) Estimated to be five twelfths of the projected sanitary flow increase for calendar year 2007. The flow increase for 2007 is projected to be one fifth of the five-year flow increase projected using the land use databases for end of second quarter 2006, and 2011. Special Case flows excluded.
- (c) Estimated to be seven twelfths of the projected sanitary flow increase for calendar year 2007.

Wet weather flows at the Easterly Plant in January 1997 exceeded all previous and subsequent peak flow events. These high flows resulted from excessive infiltration and inflow (I&I) caused by heavy rainfall. Inflow consists of rainfall runoff that enters the system through openings at or near the ground surface, such as vented manhole covers in flooded streets, illegal yard drains, or illegally connected roof drains. Infiltration is groundwater or rainwater moving through the upper soil layers and entering the wastewater collection system through joints or cracks in pipes and manholes. Wet weather flows are not significantly affected by short-term growth; however, excessive infiltration and inflow must be addressed through rehabilitation of the wastewater collection system because it reduces pipeline capacity and taxes the treatment plant during storms.

Through the ongoing I&I program (outlined below), flow monitoring, field inspections, and wet weather observations have identified a number of possible I&I reduction measures which are being implemented. Hourly Peak Wet Weather Flows (Hourly PWWF) in 1998 were estimated to be above 41 mgd, but may have been higher. (Before the recent improvements, flows approaching 42 mgd and higher needed to be estimated because these flows exceeded the metering capacity at the treatment plant.) Thereafter, a series of I&I control measures were implemented throughout the City. Until December 31, 2005, the Hourly PWWF has been lower, ranging from about 18.2 mgd in the 2004/2005 wet season to about 29.3 mgd in the 2002/2003 wet season. The Hourly PWWF during the 2005/2006 wet season of 42.5 mgd occurred on December 31, 2005, and corresponded to some of the most severe street flooding in the history of Vacaville. I&I control efforts have apparently resulted in significant reductions during most peak rainfall events, and may have helped reduce the impact of the extreme event experienced on New Years Eve 2005. Rainfall characteristics prior to and during the storm events when the peak flows occurred can significantly effect the quantity of I&I, regardless of control measures that may have been implemented.

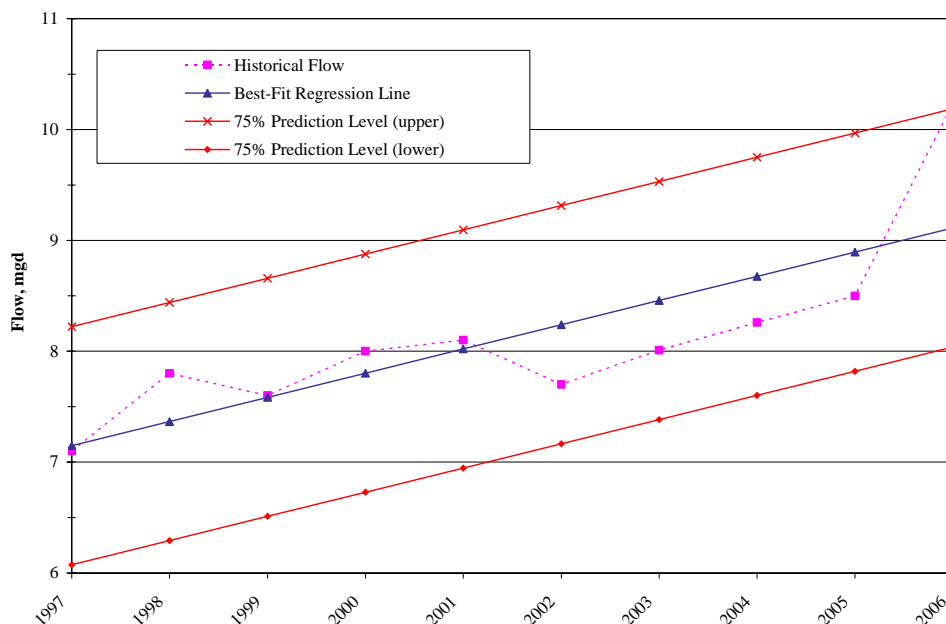
The maximum month ADWF typically occurs in May, the first of the six months defined by the Easterly Plant waste discharge permit as the dry weather months. For the purpose of this analysis, actual and anticipated growth is added to the flow reported in May to predict the equivalent flow after all growth has occurred through the end of the year. However, variability in groundwater and/or rainfall events occurring in May can significantly increase or decrease the

actual flow in May, such that flows can vary up or down from projections based on historical ADWF values plus growth. The May 2006 flow (10.23 mgd) was much higher than the flow previously projected for the end of 2005 (8.59 mgd). As noted, this discrepancy reflects either or both of the following conditions:

- ❖ New base sanitary flows associated with growth could be higher than anticipated due to more growth than predicted and/or changing actual flow generation rates. (Note that there is no evidence that base sanitary flows are higher than anticipated.)
- ❖ Groundwater entering the sewers as infiltration and/or inflow during rainfall events in May was more than the I&I present in the past as a result of higher groundwater levels and/or wetter May weather conditions as compared to previous years.

The increased flows are primarily attributed to the latter source in the form of increased groundwater infiltration and a significant storm on May 21 and 22, 2006. The total rainfall for March and April 2006 was 12.1 inches. The historical average rainfall for March and April is 4.9 inches. The spring 2006 rainfall was therefore about 2.5 times the historical average. An I&I adjustment of 0.05 mgd has been subtracted from the flow projection to account for the apparently higher infiltration that was observed during the unusually wet May 2006. This allowance was obtained by analyzing May flow data for the 10-year period of 1997 through 2006, fitting a line to those data using linear regression, and then calculating the upper 75% confidence interval for that best fit line. The result is a projected maximum month ADWF during an especially wet (but not extreme) rainfall year. The results of that analysis are presented graphically in Figure 2. As indicated, the projected maximum month ADWF encompasses all but one of the historical May flow values for the period of analysis (10.23 mgd in 2006). This analytical method was selected because it is repeatable and will tend to reflect improvements in the performance of the collection system as the 10-year analysis window is shifted to incorporate new data each year. Historical May flow, projected maximum month ADWF (for May), and hourly peak wet weather flow for the period of 1997 through 2006 are summarized in Table 17.

**Figure 2.**  
**Projected ADWF (Peak Month Dry Season Flow), Easterly Plant, 1997-2006**



**Table 17.  
Average and Peak Flow Statistics, Easterly Plant, 1997–2006**

<b>Year</b>	<b>Historical May Flow, mgd<sup>a</sup></b>	<b>Projected Max Month ADWF, mgd<sup>b</sup></b>	<b>Hourly PWWF, mgd<sup>c</sup></b>
<b>1997</b>	7.1	8.22	43
<b>1998</b>	7.8	8.44	41.2
<b>1999</b>	7.6	8.66	26.3
<b>2000</b>	8.0	8.88	28.6
<b>2001</b>	8.1	9.09	21.8
<b>2002</b>	7.7	9.31	29.3
<b>2003</b>	8.01	9.53	21.7
<b>2004</b>	8.26	9.75	27.2
<b>2005</b>	8.50	9.97	18.2
<b>2006</b>	10.23	10.18	42.5

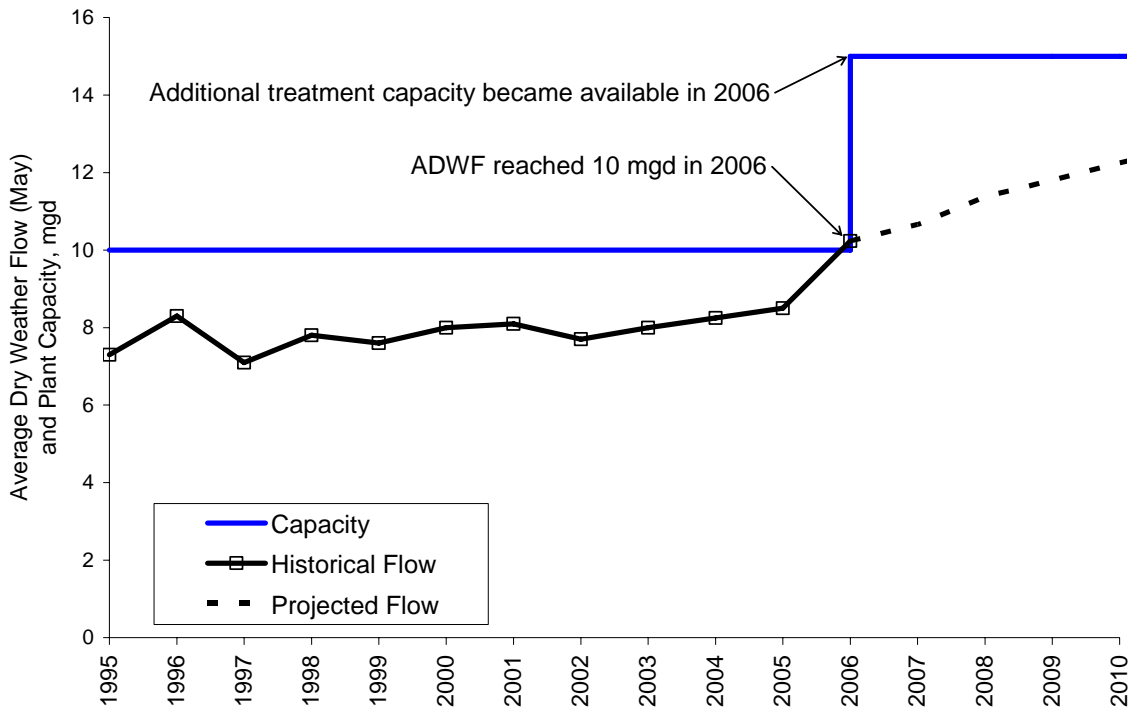
Notes:

- a Taken from monthly Easterly Plant self-monitoring reports, except for 2004, which is interpolated from 2003 and 2005 values. The 2006 value is based on effluent flow monitoring because the influent flume was not operational.
- b Based on linear regression analysis of May flows for the period of 1997 through 2006. These values will change each year as the 10-year window used to calculate the linear regression shifts.
- c Taken from the City of Vacaville Infiltration and Inflow (I&I) Program report.

Construction to expand the treatment capacity of the Easterly Plant from ten to fifteen million gallons per day was started on October 16, 2000. New secondary treatment facilities have now been placed into operation. The plant has an available hourly peak wet weather capacity of 55 mgd. Until construction is completed in 2007, onsite temporary pumping equipment will be employed (if necessary) to fully utilize the available capacity. The historical and projected ADWF (May) flow through 2011 is shown on Figure 3.



**Figure 3.  
Easterly Plant Flow and Capacity, Historical and Projected**



In addition to the flow capacity, plant capacity is also based on the level of treatment required. The Easterly Plant was designed as a standard secondary treatment facility. A discharge permit issued by the Regional Water Quality Control Board in 2001 contains new, significant treatment requirements that far exceed the capabilities of the existing treatment plant. The recent plant expansion enables the plant to meet some of the new requirements at an ADWF of 15 mgd. However, because the new requirements surpass the design criteria for the expansion project, as well as requirements for most wastewater treatment plants in the United States, a much larger and more sophisticated treatment plant would be required if the permit is not modified. The City has filed suit over the permit on the basis that newly interpreted beneficial uses of the downstream waterways into which the Easterly Wastewater Treatment Plant effluent is discharged are not appropriate and that the new requirements would impose an enormous cost on the City while providing no discernable benefit. It is anticipated that at a minimum seasonal filtration will need to be added to the treatment train to comply with the permit, even after obtaining partial relief from the requirements of the 2001 permit. The permitting issues remain unresolved and the pending litigation is expected to move forward in 2007.

A Wastewater Treatment Allocation Plan was adopted in 1996 and is reviewed periodically by the City Council. The Wastewater Treatment Allocation Plan sets priorities for the remaining treatment capacity. Wastewater flow predictions for future years were based on the projected growth from 2006 through 2011 as defined by the current land use databases produced by the Community Development Department. An updated allocation plan is presented as Table 18.

A second treatment plant, the Gibson Canyon Creek Wastewater Treatment Plant (Gibson Plant), is located to the east of North Village. The plant capacity was completely allocated in servicing Mariani Packing Company and Albertsons Distribution Center. Per a 2005 cease and desist order from the Regional Water Quality Control Board, all discharge to the Gibson Plant was halted by the end of 2006 and both discharges were connected to the Easterly Plant. The Regional Board Order also requires the City to complete a closure plan by the end of 2008 for the Gibson Plant.

**Table 18.  
Easterly Wastewater Treatment Allocation Plan**

Use Category	Estimated Flow <sup>a</sup> , mgd	Projected Flow <sup>a, b</sup> , mgd				
	2006	2007	2008	2009	2010	2011
Residential	6.53	6.72	6.91	7.10	7.29	7.48
Commercial	1.17	1.24	1.31	1.38	1.45	1.53
Office	0.05	0.06	0.07	0.08	0.09	0.11
Industrial – Dry	0.29	0.31	0.33	0.35	0.37	0.40
<b>Subtotal</b>	<b>8.04</b>	<b>8.33</b>	<b>8.62</b>	<b>8.91</b>	<b>9.20</b>	<b>9.52</b>
<b>Special Case<sup>c</sup></b>						
CMF <sup>d</sup>	0.49	0.64	0.64	0.64	0.64	0.64
CSP-S	0.89	0.85	0.85	0.85	0.85	0.85
Genentech <sup>e</sup>	0.37	0.83	0.87	0.91	0.95	1.00
Kaiser	0.04	0.09	0.14	0.14	0.14	0.14
Mariani Packing Co.	0.12	0.12	0.13	0.14	0.15	0.15
Novartis (formerly Chiron) <sup>f</sup>	0.08	0.10	0.10	0.20	0.25	0.31
Other	0.23	0.25	0.25	0.30	0.30	0.30
<b>Subtotal</b>	<b>2.22</b>	<b>2.88</b>	<b>2.98</b>	<b>3.18</b>	<b>3.28</b>	<b>3.39</b>
<b>Total Sanitary Flow</b>	<b>10.26</b>	<b>11.21</b>	<b>11.60</b>	<b>12.09</b>	<b>12.48</b>	<b>12.91</b>
<b>Treatment Capacity</b>	<b>15.00</b>	<b>15.00</b>	<b>15.00</b>	<b>15.00</b>	<b>15.00</b>	<b>15.00</b>

Notes:

- <sup>a</sup> Flows shown are average dry weather flows in the maximum month, projected to the end of the year.
- <sup>b</sup> Flows are projected based upon growth assumptions incorporated in the land use databases prepared by the Community Development Department in October 2006, development agreements, commitments for non-residential uses and sewer master planning flow factors.
- <sup>c</sup> Major special case dischargers that are not accounted for in the land use database. Implementation of this plan (*i.e.*, use of planned allocation) is subject to payment of connection fees and the terms of applicable agreements with the City.
- <sup>d</sup> 0.1 mgd portion of capacity purchased by CMF may only be used after the expanded treatment plant is operational.
- <sup>e</sup> The 2007 projection for Genentech is equal to the capacity purchased by Genentech. The current amended development agreement allows a total average flow of 1.58 mgd from Genentech, subject to payment of applicable connection fees.
- <sup>f</sup> Novartis has purchased an average flow capacity of 0.075 mgd.

## Collection System Capacity

Based on available information, flows have reached capacity, or may in the near future reach capacity, in several wastewater collection system facilities listed below. Preliminary results from updated computer modeling have been used to identify sewer segments that are likely to require replacement with larger facilities within a five-year time frame. The mitigation projects listed here are subject to further verification as collection system master planning is completed.

- ❖ **Centennial Park / Nut Tree (Airport Trunk) Sewer.** This trunk sewer runs along a cross-country route from near the Brown Street/Browns Valley Parkway intersection, along Pine Tree Creek, across Putah South Canal, through the Nut Tree Airport, and on to East Monte Vista Avenue at Nut Tree Road. Wet weather flow metering data confirm earlier sanitary sewer modeling results that indicated significant surcharging in the existing 18-inch sewer line from Putah South Canal to East Monte Vista Avenue during Hourly PWWF conditions. Various upstream sewer lines located west of Putah South Canal have been and continue to be the subject of flow monitoring efforts. Smoke testing and additional field investigations have been conducted in the Brown Street area for the purpose of identifying effective I&I reduction measures. In addition, measures have been taken to reduce the possibility of outflows along the Centennial Park / Nut Tree Sewer during extreme wet weather conditions. The 18-inch trunk sewer is a potential limitation to upstream growth and should be upsized prior to any significant development (such as in the Rice-McMurtry area) along or upstream of that line. Replacement of the sewer is identified as Development Impact Fee (DIF) sewer projects 16 and 17. Preliminary design for replacement of this trunk sewer is complete. Detailed design for the downstream portion, DIF 17, is complete and a portion has been constructed. Construction of the remainder of DIF 17 and the downstream portion of DIF 16 is anticipated in 2007. Design and construction of the remainder DIF 16 should be completed within the next few years, but has not yet been scheduled.
- ❖ **Brown Street Collector Sewer and Lift Station.** Existing flows in existing 8-inch and 10-inch lines on Brown Street and East Monte Vista Avenue have been determined to significantly exceed gravity flow capacity and produce surcharging during wet weather conditions. In addition, peak flows exceed the firm capacity of the Brown Street Lift Station. To date, these capacity shortfalls have not resulted in known outflows. However, extreme wet weather coinciding with peak sanitary flows would likely produce excessive surcharging, with some risk of outflows. Project scoping is underway and construction of a larger diameter replacement sewer is anticipated in 2008 or 2009. The nature of improvements needed at the Lift Station will be determined in the near future as well, and pump replacements or other improvements will be performed as appropriate to better accommodate peak flows.
- ❖ **Trunk Sewer Facilities Affected by Development of Lower Lagoon Valley.** The five-year growth projection includes significant development in Lower Lagoon Valley. A major sewer infrastructure extension will be needed to deliver flow from the Lower Lagoon Valley area to the existing collection system, and design of these facilities is underway. Development of Lower Lagoon Valley will increase downstream flows on Elmira Road, which has already been identified as needing DIF sewer projects 80 and 81. DIF 80 extends along Elmira Road from Nut Tree Road to Pocket Park, and DIF 81 extends from Pocket Park to Leisure Town Road. Construction of both DIF 80 and 81 are scheduled to be completed in 2009.

- ❖ **Allison Parkway Lift Station and Trunk Sewers.** The five-year growth projection includes growth in the Rice-McMurtry area. Most of the proposed development in this area is upstream of the Laurel Wood development, and is therefore tributary to the existing Allison Parkway Lift Station and upstream and downstream trunk sewers. The lift station and a portion of the sewers immediately upstream and downstream of the lift station will need to be replaced with larger facilities to accommodate any significant growth upstream of the Laurel Wood and Villagio developments. Design of these improvements is underway. To meet projected increased sewer loads from development, construction of the upstream trunk sewer needs to be completed before the number of new connections exceeds 60; construction of the lift station force main needs to be completed before the number of new connections exceeds 88; and construction of the upsized lift station and downstream trunk sewer need to be completed before the number of new connections exceeds 120. These projects are anticipated to be completed between the end of 2007 and the end of 2008.
  
- ❖ **Leisure Town Road Trunk Sewer.** The five-year growth projection includes significant growth in North Village, which will increase flows on Leisure Town Road. Peak wet weather surcharging for existing flow conditions is predicted by the City-wide model in the parallel sewers on Leisure Town Road between Ulatis Drive and Elmira Road, and the anticipated growth will increase such peak flow surcharging. Preliminary design for an improvement to construct additional capacity should be initiated in 2007. This improvement is identified as DIF sewer project 38A.
  
- ❖ **Ulatis Drive Sewer: Nut Tree Road to Leisure Town Road.** Improvement of this sewer is identified as DIF sewer project 37. This trunk sewer comprises several segments, including multiple parallel reaches, with varying capacity. Under existing conditions, the modeled design flow in some of these segments exceeds the gravity flow capacity. The 2011 trunk sewer model predicts that portions of this trunk sewer would surcharge excessively under peak wet weather conditions. Design and construction of the downstream portion of DIF 37 (Christine/Ulatis Drive portion) should be started in the next several years, and the flows in the existing trunk sewer should be monitored closely in the meantime.
  
- ❖ **Leisure Town Road Lift Station.** The five-year growth projection includes significant development in North Village and Vaca Valley Business Park. Development of these areas will increase downstream flows at the Leisure Town Road Lift Station. Improvements to this lift station were completed in 1997, with provisions for future expansions to accommodate growth. The 2011 trunk sewer model predicts that the existing capacity of the lift station would be exceeded under peak wet weather conditions. Design and construction of lift station improvements should be started in the next several years, and the flows in the existing trunk sewer should be monitored closely in the meantime.
  
- ❖ **Monte Vista Avenue Lift Station.** The existing conditions trunk sewer model indicates that the capacity of this lift station may be exceeded under peak wet weather conditions. Wet weather flow monitoring at the lift station is recommended to verify the modeling results and further evaluate the need for increasing the capacity of the lift station. No substantive flow increases associated with growth are anticipated at this location.

The mitigation projects described previously are summarized in Table 19.

**Table 19.  
Proposed Wastewater Collection System Improvements**

Project	Projected On-Line Date
Centennial Park / Nut Tree (Airport Trunk) Sewer (DIF 17)	Fall 2007
Centennial Park / Nut Tree (Airport Trunk) Sewer (DIF 16)	Fall 2008
Brown Street Collector Sewer and Lift Station	Fall 2008
Trunk Sewer Facilities Affected by Development of Lower Lagoon Valley (DIFs 80 and 81)	Fall 2008
Allison Parkway Lift Station and Trunk Sewers	Winter 2007 to Fall 2008
Leisure Town Road Trunk Sewer (DIF 38A)	Spring 2009
Ulatis Drive Sewer: Nut Tree Road to Leisure Town Road (DIF 37-downstream portion) <sup>a</sup>	Fall 2010
Leisure Town Road Lift Station	Spring 2009
Monte Vista Avenue Lift Station	Further evaluation needed

<sup>a</sup> Christine/Ulatis Drive portion.

**Collection System Infiltration and Inflow Control Program**

As part of the ongoing management of the wastewater collection system, the City conducts flow monitoring and sanitary sewer system evaluations each year. Activities include extensive field work and data analysis to characterize the relative performance of various areas of the collection system and to identify specific problems or problem areas. Activities planned for the 2006/2007 wet season include:

- ❖ Flow metering and data analysis at 20 sites (including pump stations, City-owned sewer flow meters, sewer flow meters at CMF and CSP-S, and influent flow metering at the Easterly Plant)
- ❖ Field inspections of sanitary sewer manholes throughout the City
- ❖ Sewer line surcharge monitoring
- ❖ Installation of additional manhole top inserts and/or replacements to reduce inflow during street surface flooding events
- ❖ Continued I&I assessment, and development and implementation of a long-term I&I control plan
- ❖ Data analysis and preparation of an annual report for the 2006/2007 monitoring season.

These activities will focus on identifying major sources of I&I and defining corrective measures that will help to reduce peak flows in the collection system and at the treatment plant. I&I control measures preserve pipeline and treatment capacity for residential and commercial uses, and reduce the likelihood of a system outflow caused by high flows.

### **General Waste Discharge Requirements**

The State Water Resources Control Board has adopted regulations intended to promote proper management of wastewater collection systems and reduce the instance of sanitary sewer overflows. The State Board's order is referred to as waste discharge requirements (WDRs) for collection systems.

The WDRs contain provisions that require wastewater collection system agencies (such as the City) to develop programs and plans for operation and maintenance of the wastewater collection system, and that those programs and plans be adequately documented in what the WDRs refer to as a sewer system management plan (SSMP). Each element of the SSMP will describe how the City's programs and plans comply with the various provisions of the WDRs. Another major requirement of the WDRs is the development of a program for monitoring SSOs and reporting them to the State Board.

The WDRs require several work products that can be grouped into three categories. The three work products are as follows:

- ❖ Application for statewide collection system WDRs permit
- ❖ Sewer system management plan (SSMP)
- ❖ Reporting and monitoring program

These work products will be due over the next several years.

Based on a preliminary evaluation, for the most part, the City has the major programs, plans, and documentation in place to comply with the WDRs. However, certain additional activities will be needed in order to fully comply with the WDRs. The remaining major actions needed to achieve compliance are:

- ❖ Submit the permit application.
- ❖ Prepare the SSMP development plan and schedule.
- ❖ Prepare an SSMP umbrella document, primarily compiling or referring to existing programs, plans, and documents.
- ❖ Modify the existing reporting and monitoring program so that it will satisfy the requirements of the WDRs.
- ❖ Complete an update of the City utilities map.
- ❖ Develop a replacement parts and emergency equipment inventory.
- ❖ Expand the collection system cleaning and CCTV program to include manhole inspection reporting.
- ❖ Develop a system for ranking the condition of sewer pipes and scheduling rehabilitation of smaller projects (larger projects are prioritized through capital improvement plans).
- ❖ Document any undocumented existing preventative operation and maintenance procedures in the SSMP.

- ❖ Develop and implement a method to assess capacity and flows in sewers not included in the trunk sewer model.
- ❖ Develop an implementation plan and schedule for a public education outreach program in residential areas that promotes proper disposal of fats, oils, and grease (FOG).
- ❖ Develop and implement source control measures for fats, oils, and grease discharged from residential areas.
- ❖ Continue the process of updating the FOG municipal codes and Pretreatment Program Manual to clearly define grease interceptor maintenance requirements, best management practices, and record keeping and reporting requirements.
- ❖ Consider funding additional inspector hours so that all high producers of fats, oils, and grease can be inspected on the three-year interval specified in the Pretreatment Manual.
- ❖ Identify and illustrate SSO trends, including frequency, location, and volume.
- ❖ Develop performance indicators relevant to the Vacaville collection system that will be used to track activities associated with each SSMP element.

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## VI. DRAINAGE AND FLOOD CONTROL CAPACITY

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### Existing Drainage Facilities

The existing drainage system consists of the following three elements:

- ❖ An extensive network of storm drain pipes which collect runoff from the street system.
- ❖ A network of major stream courses which collect and convey runoff from the storm drain pipes and rural areas outside the City limits.
- ❖ Detention storage basins which reduce peak flows; thereby, reducing flows in downstream drainage facilities.

The network of storm drain pipes within the City's streets, ranging in size from 12 to 96 inches in diameter, make up the collection system that conveys storm water runoff to the various creeks. These pipelines were designed to handle the runoff from a 10-year storm, a standard design practice. Storm water in excess of a 10-year event would be conveyed in the streets until it reaches the Channel or creek. A 10-year storm is defined as a storm that has a 10 percent change of occurring in any given year.

The major stream courses, shown in Figure 4, generally flow in an east-southeasterly direction and ultimately drain into the Sacramento River via the Cache Slough. The major stream courses within the City include: Alamo Creek, including its tributaries Laguna Creek and Encinosa Creek; Ulatis Creek; Horse Creek, including its tributary Pine Tree Creek; and Gibson Canyon Creek. The major stream courses, which flow through the City of Vacaville, are largely in their natural state and alignment. The natural, unaltered portions of the creeks generally do not have adequate flow capacity to convey a 100-year storm event. A 100-year storm is defined as a storm that has a one percent chance of occurring in any given year.

In the 1960's the U.S. Natural Resources Conservation Service ("Service"), formerly the Soil Conservation Service, modified the downstream channels to provide a 10-year level of protection and maintain a minimum freeboard of 1.5 to 3.5 feet (with the exception of the few reaches along Horse Creek and Ulatis Creek that were designed by the Service for a 50-year level of protection). The channel modifications by the Service consisted of realigning and widening along Ulatis, Alamo, Horse, Gibson Canyon, Sweeney, and McCune creeks; the channel modifications generally extended from the eastern City limits at the time to Cache Slough. The Alamo Creek channel modification begins just downstream of Nut Tree Road. The Ulatis Creek channel modifications begin just downstream of Ulatis Drive. The Horse Creek and Gibson Canyon Creek modifications begin at I-80. Other improvements constructed by the Service included stabilization structures on Ulatis, Alamo, and Horse creeks; and levees along the lower reaches of Ulatis Creek and Alamo Creek.

A majority of the natural streams in the City upstream of Interstate 80 are owned by the adjacent property owners to the channel centerline, generally with a drainage easement dedicated to the City. Downstream of Interstate 80, the same situation exists where the adjacent landowner owns to the centerline of the creek, but the City generally has right of way along one side of the creek as part of its bike trail system. The City maintains only the channel reaches they have access to in an effort to minimize the amount of debris and vegetation in the channel flow lines along these reaches. The Solano County Water Agency (SCWA), not the City, is responsible for the on-going maintenance of the modified channels.

There are several detention storage basins located within the City that include both constructed detention basins and “natural” detention areas created by man-made obstructions. The existing constructed detention basins were installed to mitigate the increase in storm flows that sometimes occur from unanticipated, unusual storm events. The location of the detention basins is shown in Figure 4.

Table 20 provides a summary of the existing detention facilities.

**Table 20. Summary of Detention Basins**

Basin Name	Map ID	Basin Type	Date Constructed	Surface Area, acres	Operational Storage, acre-feet
<b>Horse Creek Watershed</b>					
North Horse Creek No. 1	NHOBSN1	Natural	N/A	2.5	5
North Horse Creek No. 2	NHOBSN2	Under Design	Fall 2007	17	53
Vaca Valley Business Park Basin	VVBPBSN	Constructed	1995	9	35
I-80 Basin	I80BSN	Constructed	1995	6	52
North Village Basin No.1	NVBSN1	Constructed	2005	5.7	37
Middle Horse Creek No. 1	MIDBSN1	Constructed	1985	1	3
Middle Horse Creek No. 2	MIDBSN2	Constructed	1984	11	32
South Horse Creek No. 2	SHOBSN2	Natural	N/A	N/A	9
South Horse Creek No. 1	SHOBSN1	Natural	N/A	N/A	30
Pine Tree Creek No. 1	PINBSN1	Natural	N/A	N/A	162
<b>Ulatis Creek Watershed</b>					
Ulatis Basin No. 3	ULTBSN3	Constructed	1988	1.8	16
Ulatis Basin No. 2	UTLBSN2	Constructed	1991	3.7	3.5
<b>Alamo Creek Watershed</b>					
Pleasants Valley Basins <sup>a</sup>	PVBSN	Under Design	Fall 2007	30	300
Lagoon Lake	LAKE	Constructed	1981	105	271 <sup>b</sup>
Lagunitas Basin	LAGUNITAS	Constructed	2001	10	46
Alamo Creek No. 2	ALMBSN2	Constructed	2003	2.9	16
<b>Noonan Drain Watershed</b>					
Southeast Vanden Basin	STWNBSN	Under Construction	2007	16	101
<b>Union Creek Watershed</b>					
Union Creek-Peabody Basin	UNION	Constructed	1989	11	50

Notes:

- a. Pleasants Valley Detention Basins include three basins, with a combined total storage volume of 300 ac-ft.
- b. Detention storage volume depends on water surface elevation in the Lake at the start of the storm. The indicated storage assumes a starting water surface elevation equal to the crest elevation of the outlet spillway.

Analysis of the storm drain pipe network, conducted as part of the draft Storm Drainage Master Plan, indicate that a majority of the storm drains, because of the standard 10-year design criteria, may experience surcharging during a 10-year storm event, but flows will remain below the street level. As experienced recently, some of the major stream courses do not have sufficient natural capacity to convey some storm events, which can result in flooding in some portions of the City.

### Gibson Canyon Creek

Gibson Canyon Creek has sufficient capacity for the 100-year storm upstream of I-505; however, between I-505 and I-80, Gibson Canyon Creek overtopped its banks during both the December 16, 2002 and December 31, 2005 storms. The City, in conjunction with the Solano County Water Agency (SCWA), and the developer of the North Village Plan Area II, is conducting studies to determine the extent of the flooding and to identify alternatives to alleviate such flooding. Possible improvements include converting the Gibson Canyon Wastewater Treatment Plant evaporation ponds into storm water detention basins.

### Horse Creek

Within the Horse Creek Watershed, only two localized areas of flooding have been identified. With nearly 370 acre-feet of detention storage within the Horse Creek Watershed, with another 100 acre-feet coming online in the next couple years, most of the channel reaches should have sufficient capacity to convey the peak flows from the 100-year storm.

### Rice Lane/Aldridge Road Area

The Rice Lane /Aldridge Road area experienced flooding during the December 2002 and 2005 storm events. Efforts to mitigate flooding in this area included the removal of trash racks from the upstream and downstream end of the pipeline through the Laurelwood Development. A parallel large diameter pipeline will be installed along the lower reaches of the existing trunk line to increase the capacity of the storm drain system. Combined with the proposed upstream detention storage, to be installed with the Rancho Rogelio Development, these improvements should help to reduce the flooding in this area.

### Ulati and Alamo Creeks

Along Ulati and Alamo Creek most of the flooding that occurred during the December 2005 storm resulted from flow in the creeks greater than the natural capacity of those creeks. Along Alamo Creek, there is approximately 7 miles of natural channel that do not have sufficient capacity to convey the 100-year storm; and along Ulati Creek there is about 3 miles of natural channel that do not have sufficiency capacity. Additionally, there are several natural reaches along both creeks that do not have sufficient capacity to convey the 10-year storm event.

Along Ulati Creek two locations where channel outbreaks occurred during the December 2005 were identified and include the following:

- ❖ Just downstream of I-80, the creek has a natural conveyance capacity of about 3,000 cfs, while the estimated FEMA 100-year peak flow is about 5,200 cfs.
- ❖ Just upstream of Nut Tree Road, the creek has a natural conveyance capacity of about 3,000 cfs, while the estimated FEMA 100-year peak flow is about 5,300 cfs.

Along Alamo Creek several areas flooded during the December 2005 storm, but the only known outbreak was in the Peabody/Tulare area. Outbreaks occurred both upstream and downstream of Peabody Road and on both sides of the creek. The root cause for flooding in the Peabody/Tulare area is due to limited, natural channel capacity upstream of Peabody Road, through the Peabody Road Bridge, and downstream of Peabody Road. The channel capacity through this area is about 3,000 to 3,200 cfs while the flow during the peak of the December 2005 storm was estimated at about 5,800 cfs through this area. During the December 2002 storm, the peak flow through this area was estimated at about 3,500 cfs. To reduce the natural flooding in this area, large regional detention basins upstream of the City will be necessary along with channel improvements to increase the channel capacity. Potential detention basin configuration and channel improvements are currently under evaluation by the Solano County Water Agency (SCWA).

Other areas within the Alamo Creek Watershed that have flooded include the Seneca Way, Cheyenne Drive, and Encinosa Avenue areas. The flooding in these areas results from one or more of the following conditions: natural overland flow from the open space west of Iroquois Drive, and high water levels in Alamo Creek. The City recently acquired about 60 acres of land west of Iroquois Drive and Encinosa Avenue and is currently designing detention basins with about 300 acre-feet of detention storage. These detention basins should help to mitigate flooding of this area, except when there are high water levels in Alamo Creek. Further, these detention basins should help to reduce peak flows downstream along Alamo Creek.

#### Upstream Regional Detention Basins

The City's 1990 General Plan calls for the ultimate construction of upstream regional detention basins to reduce the peak flows within Alamo and Ulatis Creeks. The draft Storm Drainage Master Plan reaffirms the need for regional detention basins; however, with recently updated rainfall data based on the unanticipated 2002 and 2005 storms, the recommended detention basin sizes have been increased. The regional detention basins range in size from 300-1,000 acre feet, and would need to be installed on the following major creeks: Ulatis Creek, Encinosa Creek, Laguna Creek, and Alamo Creek. Construction of the proposed regional detention basin is a long term, multi-million dollar solution that the City must seek to implement through various funding mechanisms since it does not have the resources to do it without financial assistance. The City is pursuing grant monies to aid in funding the land purchase and construction for the proposed regional detention basins. The City is also currently in preliminary negotiations with landowners for each of the proposed detention basin sites.

#### **Five Year History**

Table 21 provides a summary of the peak flows recorded at the City's five stream gauging stations during the December 2002 and 2005 storm events and also present a comparison with the estimated channel capacity and the FEMA 100-year peak flow. The peak flow rates shown in Table 21 take into account the overbank losses that occur during moderate to large storm events along Ulatis Creek and Alamo Creek.

**Table 21. Summary of December 2002 & 2005 Peak Gauged Flows, and Comparison of the Estimated Channel Capacity and FEAM 100-Year Peak Flows <sup>(a)</sup>**

<b>Stream Gage Location</b>	<b>Estimated Channel Capacity, cfs</b>	<b>December 2002 Peak Gauged Flow <sup>(b)</sup>, cfs</b>	<b>December 2005 Peak Gauged Flow <sup>(c)</sup>, cfs</b>	<b>Estimated FEMA 100-Year Peak Flow, cfs</b>
Gibson Canyon Creek at Browns Valley Road	N/A	315	290	580 <sup>(d)</sup>
Horse Creek at Leisure Town Road	3,500	1,750	1,990	2,700 <sup>(d)</sup>
Ulatis Creek at Leisure Town Road <sup>(e)</sup>	8,900	3,750	4,140	2,800 <sup>(f)</sup>
Alamo Creek at Marshall Road <sup>(e)</sup>	6,000	4,170	5,060	6,200 <sup>(f)</sup>
Alamo Creek at Vanden Road <sup>(e)</sup>	5,000	3,390	5,470	3,700 <sup>(f)</sup>

(a) Flows presented in cubic feet per second (cfs).

(b) Peak flows from *City of Vacaville Stream Gauging Program – Technical Memorandum – 2003 Water Year*, West Yost Associates, October 7, 2003.

(c) Peak flows from *City of Vacaville Stream Gauging Program – Technical Memorandum – 2006 Water Year*, West Yost Associates, October 9, 2006.

(d) Peak flows based on FEMA Flood Insurance Study for the City of Vacaville, published May 7, 2001.

(e) Both gauged and estimated FEMA 100-year peak flows include overbank losses. Undiverted peak flows with no overbank losses would be significantly higher under all storm events.

(f) Peak flows from *FEMA Flood Insurance Study City of Vacaville – Hydrologic Analysis*, Borcalli & Associates, Inc., Revised February 1994

Due to the unanticipated storm events of 2002 and 2005, the City and other local agencies have conducted several drainage studies over the past few years. The City has also completed several CIP projects to help mitigate future flooding. Some of these projects included channel and culvert improvements along Pine Tree Creek, construction of a 40 acre-foot detention basin along Laguna Creek, construction of a 15 acre-foot detention basin along Alamo Creek, construction of about 60 acre-feet of detention storage in the Horse Creek watershed, and construction of about nine acre-feet of detention storage in the Ulatis Creek watershed.

Construction of a high flow bypass channel along Alamo Creek just upstream of the Putah South Canal was completed in 2004. The bypass channel should help to reduce the water surface elevations in Alamo Creek from the Putah South Canal to just upstream of Tulare Drive.

### Five Year Forecast

In conjunction with the preparation of the draft Storm Drainage Master Plan and the Drainage Development Impact Fee Study, it was determined that interim solutions were needed to help mitigate future flooding. The current policy calls for the City to construct small regional drainage detention basins using Drainage Development Impact Fees that mitigate the storm water flows. The City is working towards the construction of several of these small regional detention basins identified in the Storm Drainage Master Plan within the next few years, including:

- ❖ Construction of a 53 acre-foot detention basin along Horse Creek just west of the Putah South Canal and north of Vaca Valley Parkway. Completion scheduled for fall 2007.

- ❖ Construction of a seven to ten acre-foot detention basin along Alamo Creek east of Leisure Town Road. Completion of the project is proposed in conjunction with the Moody (Southtown Commons) development.
- ❖ Construction of 300 acre-foot detention basins along Encinosa Creek just east of Pleasants Valley Road. The basins should help to mitigate flooding as part of the regional proposed flood control detention basins. Construction is scheduled to be completed by fall 2007.

The regional detention basins will mitigate the increase in the 10 and 100-year peak flows within the downstream channels due to development. New development within the Ulatis, Alamo, Horse, and Gibson Canyon Creek watersheds are required to either pay a development impact fee for their share of the regional drainage detention basin, or may be required to detain their storm water runoff on-site on a case-by-case basis. In some cases, such as upstream of Peabody Road in the Alamo Creek Watershed, new development is required to reduce flows to 90 percent of pre-development levels. This results in a 10% reduction in overall peak stormwater flows from the pre-development level, through on site or regional detention facilities. Table 22 provides a summary of the proposed major development projects within the City with the required mitigation measure(s) and result peak discharge from the project. The location of the each development project is shown in Figure 4.

**Table 22. Summary of Development Project Drainage Mitigation and Resulting Peak Flows**

Development Project	Pre-Development Peak Flow, cfs		Mitigation Measure	Post-Development Peak Flow, cfs	
	10-year Storm	100-year Storm		10-Year Storm	100-Year Storm
Rice-McMurtry Area Developments	230	350	36 ac-ft detention storage <sup>(a)</sup>	60	80
North Village – Plan Area I	160	320	70 ac-ft detention storage <sup>(b)</sup>	155	320
North Village – Plan Area II	The project proposes to install detention storage basin. The exact configuration has not been determined.				
Lower Lagoon Valley	830	1,165	80 ac-ft additional detention storage <sup>(c)</sup>	730	1,025
Southeast Vanden Area	360	590	101 ac-ft detention basin, capacity improvements along downstream channel	335	455

Notes:

- (a) Total detention storage is provided by three detention basins located in separate development projects
- (b) Detention storage for Plan Area I only, and includes storage for several basins.
- (c) 80 ac-ft is additional storage over the existing detention storage included in Lagoon Lake, which adds an additional 270 ac-ft of detention storage.

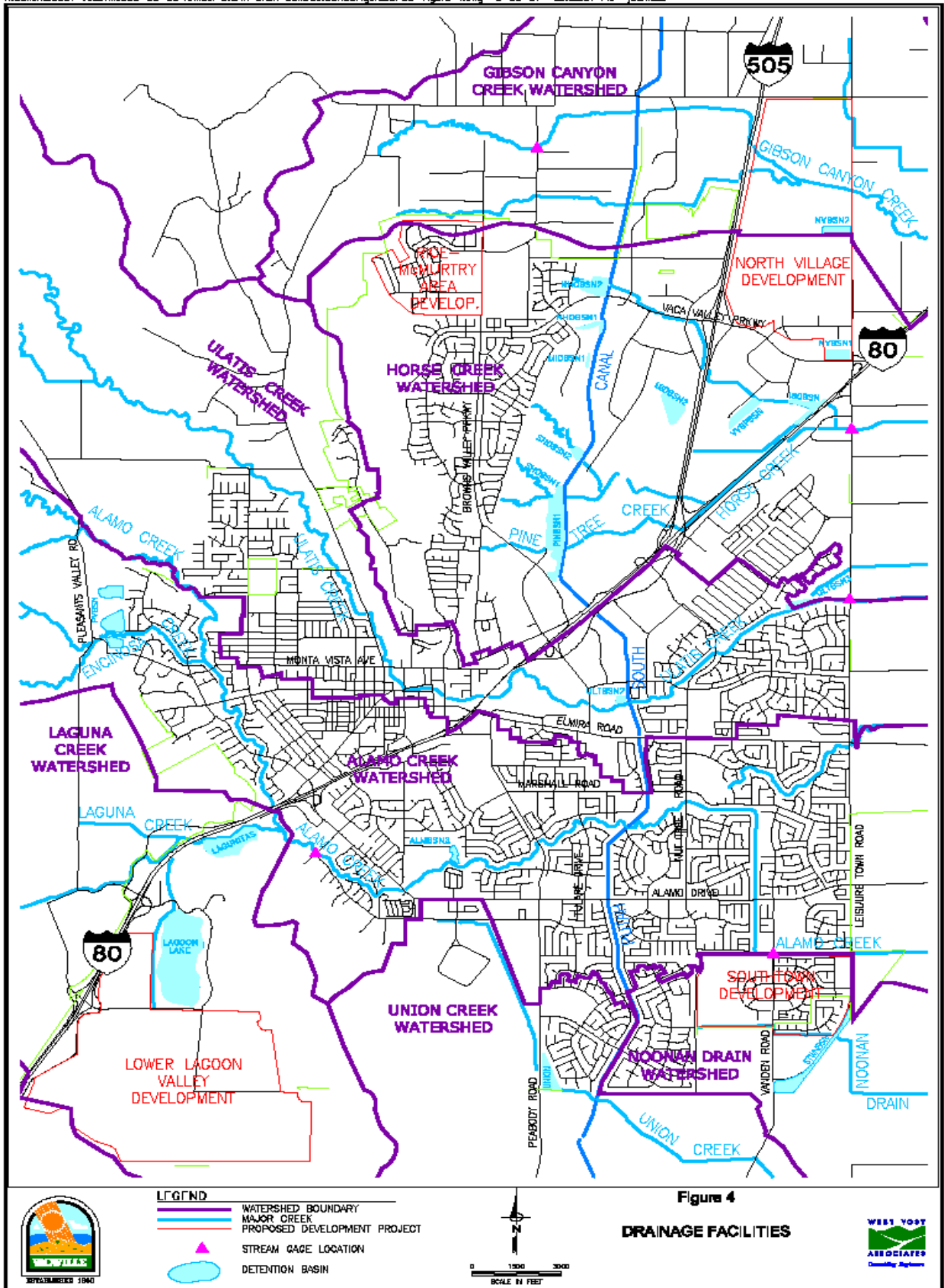
All recent projects and future projects were and will be subject to the City's drainage mitigation policy. The projects have been conditioned to provide for improvements or fees to address conveyance and flooding problems. Development of areas within the Alamo, Ulatis, Horse, and Gibson Canyon Creek watershed areas might possibly generate additional runoff and the loss of overflow areas, but such runoff should be mitigated through local or on-site detention basins. Based on information currently available to the City, the potential impact is anticipated to be mitigated.

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Figure 4. Drainage Features

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## VIII. FIRE SERVICES

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The Vacaville Fire Department provides fire suppression, rescue, hazardous materials and non-fire emergency response services for the City of Vacaville. In addition, the Fire Department provides emergency medical services (EMS) for the City and surrounding area, including advanced and basic life support (ALS and BLS) transport service. The Department also provides code enforcement, fire and life safety public education and fire investigation services for the City.

Almost four years ago, the City Council authorized the Fire Chief to enter into a consultant services contract with Citygate Associates, LLC, to develop a fire service deployment assessment for the City. This was done at a time when it was becoming apparent that growth associated with several large-scale residential projects would increase demands for fire and emergency medical services. A report titled "Standards of Response Cover Study" was completed in August 2003. Central to the report was an evaluation and discussion of the Department's deployment of emergency response crews, including what impacts any future development may have on the existing level of service provided by the Fire Department. The report described three concerns to fire station deployment:

1. Distribution – the spreading out or spacing of first-due fire units to control everyday moderate emergencies.
2. Concentration – the clustering of fire stations close enough together so that serious emergencies such as building fires or vehicle accidents with several patients trapped and/or injured can receive enough resources from multiple fire stations quickly enough.
3. Effective Response Force – the collection of a sufficient number of firefighters on-scene arrived within the concentration time goal to stop the escalation of the problem.

In terms of defining what constitutes effective emergency response for the community, the Fire Department first developed a response time performance measure in 1994. The Department's current performance measurement goal was adopted by the City Council in September 2003 in conjunction with the acceptance of the "Standards of Response Cover Study" report. It states:

*"An appropriately staffed ambulance or engine will arrive on the scene of critical emergencies within 7 minutes of the call receipt, 90 percent of the time."*

The 7:00 minute response time is divided into three distinct segments:

- ❖ Call processing time – measured from receipt of 911 call in the Communications Center until crews are notified: 1 minute (1:00) goal 90% of the time.
- ❖ Turnout time – measured from time of crew notification until crews start driving to the emergency scene: 1 minute 30 seconds (1:30) goal 90% of the time.
- ❖ Travel time – measured from the start of the driving time until crews arrive on the emergency scene: 4 minutes 30 seconds (4:30) goal 90% of the time.

When evaluating the impact that growth has on the ability of the Fire Department to maintain effective emergency response, the City needs to consider both the number of firefighters on-duty and their location for prompt, effective outcomes. The "Standards of Response Cover

Study” report serves as an important blueprint for the deployment of Fire Department resources as the City continues to grow.

### Existing Conditions

The Fire Department currently has an authorized staff of 84 full time positions, 76 of which are safety and 8 are non-safety. The current ratio of safety staff per every 1,000 residents (excluding the State prisons) is 0.88 and the ratio for non-safety staff is 0.09. Fire Department personnel provide services through two Divisions: Field Operations and Support Services.

72 of the safety positions are assigned to the three operational shifts that provide emergency response services 24 hours a day, seven days a week. It is the minimum daily staffing level that ultimately determines the Department’s ability to provide all types of emergency services and many non-emergency services. The minimum daily on-duty staffing is currently 19 personnel and they are deployed at the four existing fire stations in the following manner:

- ❖ Station 71: 111 S. Orchard Avenue, 5 personnel plus the duty Battalion Chief (6 total)
- ❖ Station 72: 2001 Ulatis Drive, 5 personnel
- ❖ Station 73: 650 Eubanks Court, 3 personnel
- ❖ Station 74: 1850 Alamo Drive, 5 personnel

It is important to note that the Department is currently in the process of hiring six new safety positions that were approved in the current budget. When these firefighter/ paramedics have completed their recruit academy in early 2007, Station 73’s daily staffing will be increased to 5 personnel.

The most recent response time performance measurement report shows that the Department has a Citywide (all fire stations) response time of 7 minutes 29 seconds (7:29) at the 90 percent measure. This is in excess of the 7 minute (7:00) goal.

In terms of emergency responses, the Department responded to 7,678 calls for service in 2006.

### Three Year History

The Fire Department is limiting this historical review to three years (instead of five) because of the significant change to the response time performance measure that occurred in late 2003. Comparable data does exist for 2004, 2005 and 2006. That data is presented in Table 23.

**Table 23. Fire Department Response Time**

	2004	2005	2006
Station 71	7:08	7:08	7:04
Station 72	7:28	7:19	7:31
Station 73	8:43	8:24	8:32
Station 74	7:16	7:29	7:19
<b>Citywide</b>	<b>7:27</b>	<b>7:29</b>	<b>7:29</b>

Emergency calls for service over the same time period were:

- ❖ 2004: 7,229 (2% increase over 2003)
- ❖ 2005: 7,576 (4.8% increase)
- ❖ 2006: 7,678 (1.4% increase)

This historical information indicates both a steady increase in the number of calls for emergency service and a consistent shortfall in meeting the response time performance goal. Department staff has analyzed this historical response time performance data. Station 73, with its current three-person staffing level, is well in excess of the performance goal year after year. The single three-person crew “cross-staffs” the engine and ambulance located at that station. The other three stations staff both the engine and the ambulance with their five assigned personnel. When the Station 73 crew responds to an emergency, there is not a second crew at that station to cover a simultaneous call in that response area. A crew from a more distant station responds into Station 73’s area in that case, resulting in a longer travel time. As noted in the “Existing Conditions” section, Station 73’s daily staffing is being increased to five personnel. The Department expects to see marked improvement in that station’s response time performance as a result.

The ratio of safety staff per every 1,000 residents (excluding the State prisons) was:

- ❖ 2004: 0.83 / 1,000
- ❖ 2005: 0.82 / 1,000
- ❖ 2006: 0.88 / 1,000

## **Five Year Forecast**

### Facilities

The Standards of Response Cover Study (referenced previously) identifies the following additional fire station locations – and an existing station relocation – based on future growth:

- ❖ Southtown area: Construct a new fire station in the Southtown development.
- ❖ Lower Lagoon Valley: Construct a new fire station in the Lower Lagoon Valley development.
- ❖ Northeast area / I-80 corridor: Construct a new fire station in the vicinity of Vaca Valley Parkway and North Village Parkway.
- ❖ Rice-McMurtry / Browns Valley area: Relocate existing Station 73 along Browns Valley Road near Wrentham Drive.

During the development approval process for the Southtown and Lagoon Valley projects, City staff required the developers to provide the following capital improvements at no cost to the City:

- ❖ Dedication of the fire station sites at locations approved by the Fire Chief.
- ❖ Fire station designs and specifications approved by the Director of Public Works and the Fire Chief.
- ❖ Construction of the fire stations.
- ❖ Equipment for the fire stations (including Type 1 engine, brush unit and ambulance).

Southtown development: The Fire Chief has given his preliminary approval for the fire station location. Based on the development agreement and growth projections, the Developer should

dedicate the site to the City in 2007. The Developer has hired an architectural firm to design the fire station and that firm has been working with City staff on the site and floor plans. Final design and specifications should be completed in 2007. Based on the five-year residential growth estimate for this development, the Southtown Fire Station should be constructed and operational prior to the end of 2011. The additional staffing will be funded through the Southtown CFD #11.

Lower Lagoon Valley development: The Fire Chief has tentatively identified a location for the fire station in the "Business Village" portion of the project. The Developer is obligated to: 1) dedicate the fire station site at the time of City recording of the Initial Final Map; 2) start construction of the station no later than the issuance of building permits for the 200'th equivalent dwelling unit (EDU); and 3) complete construction prior to the issuance of building permits for the 400'th EDU. Based on the five-year residential and commercial growth estimate for this project, the Lagoon Valley Fire Station should be constructed and operational prior to the end of 2011. The additional staffing will be funded through the future Lagoon Valley CFD.

Northeast area / I-80 corridor fire station: Land is not available at the general location identified in the study; however, City staff has identified a suitable location on Orange Drive east of Leisure Town Road. This site is part of a larger parcel; therefore a new parcel will be created for the fire station. The City and the current land owner have agreed to a purchase price and the property for this future fire station should be secured in 2007. The construction of the fire station at this location will be funded through Fire Development Impact Fees (DIF). City staff members have worked with Goodwin Consulting Group, Inc. on a Nexus Study and update of the Fire DIF, which includes this fire station project. The report will be reviewed by the City Council in 2007. There are no specific development agreements that stipulate the timing of the construction of this station. Based on the five-year residential and commercial growth estimate for I-80 corridor / northeast corner of the City, it is unlikely that this station will be constructed prior to the end of 2011.

Relocation of Station 73: The closest property to the area identified in the study is at Centennial Park. City staff has identified a potential site along Browns Valley Parkway north of Allison Drive. Additional studies are underway to determine the viability of that location and a preliminary site plan should be completed by early 2008. The construction of the fire station at this location will be funded through a combination of "community benefit contribution" monies from the Rice-McMurtry area developments and the proceeds from the sale of the current Station 73 property on Eubanks Court. The timing of construction for this fire station will have to be carefully coordinated with the construction of the new station on Orange Drive, which must be built and operational before the crews housed at the current Station 73 are relocated. Therefore, it is unlikely that this station will be constructed and operational prior to the end of 2011. The additional staffing will be funded through the Rice/McMurtry CFD #10 and the North Village CFD #8.

Pre-Alert System: All new fire stations will be designed to incorporate a pre-alert system which will serve to assist in meeting response time goals. The purpose of the pre-alert system is to allow for a reduced turnout time for a crew responding to start driving to an emergency. Retrofitting of existing fire stations with a pre-alert system is planned in phases, beginning with Station 71 on Orchard Avenue.

**Table 24. Fire Staffing and Facility Projection 2007 – 2011**

	Type	Crew Size	Total Staff	Funding Source
<b>Station 71 (Orchard Avenue)</b>				
	Engine	3	9	Current General Fund
	Ambulance	2	6	Current General Fund
	B/C	1	3	Current General Fund
	Truck	3	9	NEW: Portofino CFD #9 and Infill CFD #12 (2.5 positions); Future Lagoon Valley (6.5 positions)
<b>Station 72 (Ulatis Drive)</b>				
	Engine	3	9	Current General Fund
	Ambulance	2	6	Current General Fund
<b>Station 73 (Eubanks Court)</b>				
	Engine	3	9	Current General Fund
	Ambulance	2	6	NEW: Rice McMurtry CFD #10 (3 positions); North Village CFD #8 (3 positions in Phase I)
<b>Station 74 (Alamo Drive)</b>				
	Engine	3	9	Current General Fund
	Ambulance	2	6	Current General Fund
<b>Future Lower Lagoon Valley Station (projected)</b>				
	Engine	3	9	Future Lower Lagoon Valley CFD
<b>Future Southtown Station (projected)</b>				
	Engine	3	9	Southtown CFD #11
*****				
<b>Shift Vacancy Relief (Buffer) Positions</b>				
	Current	12	(4 per shift)	
	Additional	3	(1 per shift)	Lagoon Valley

Notes:

Daily minimum staffing per shift:	30	Engine Companies:	6
Minimum staffing personnel total:	90	Truck Company	1
Shift vacancy relief (buffer) positions:	15	Ambulances	4
Total Operations personnel:	105	Duty Chief	1

## Services and Staffing

Additional staffing will be needed during the 2007 – 2011 growth period to maintain fire and rescue service levels. Table 24 on the previous page provides a summary of these needs. Specific staffing increases include the following:

As noted previously, the City is in the process of hiring six (6) new personnel so that the minimum daily staffing at Station 73 can be increased from three (3) to five (5). New residential projects in that fire station's response area have formed two Community Facilities Districts (CFDs) to pay for the cost of additional fire protection services required as a result of the developments. CFD #8 (North Village) and CFD #10 (Cheyenne, Rancho Rogelio, Knoll Creek, Amber Hills, Hillview Ranch, Rogers Ranch) together will generate enough funds by 2011 to pay for the cost of the six additional personnel at Station 73.

The Southtown Fire Station will have a minimum daily staffing of three (3) which will require the hiring of nine (9) personnel. The development agreements for the Southtown and Moody projects required the formation of a single CFD to pay for the full cost of fire protection services (including the additional fire personnel) required to serve the two developments. CFD # 11 was formed for this purpose. Other residential projects located between Alamo Drive and Southtown, east of Vanden Road, are expected to join this CFD. The funding from all of those projects will be sufficient to pay for the cost of the nine new personnel when the fire station becomes operational, which is expected to occur before the end of 2011. Prior to the operation of the Southtown fire station, primary emergency response into the area will be provided from Station 74. To help mitigate the longer travel time to the Southtown/Vanden Road area, all of the traffic signals along Alamo Drive between Station 74 and the new developments will be retrofitted with pre-emption (Opticom) devices.

The Lower Lagoon Valley Fire Station will have a minimum daily staffing of three (3) which will require the hiring of nine (9) personnel. The Obligations Agreement for this project required the formation of a service district to pay for the full cost of fire protection services (including the additional fire personnel and operational costs) required to serve the development. The funding from this project will be sufficient to pay for the cost of the nine new personnel when the fire station becomes operational, which is expected to occur before the end of 2011. Prior to the issuance of the initial grading permit for the project, an interim fire protection plan, including a mechanism to fund said plan, shall be developed to provide emergency fire / medical response services to the project until the fire station becomes operational. This plan shall be approved by the Fire Chief and will include elements that will facilitate an acceptable level of response to the project prior to the operation of the Lower Lagoon Valley Fire Station.

The balance of residential growth projected during this five-year period is expected to occur as "infill" development. These projects will be built within existing fire station response areas, therefore new fire stations will not be needed to serve them. However, the additional 846 units will generate additional calls for fire protection services. To help mitigate the added cost of providing these services, two CFDs have been formed. CFD #9 is specific to the Portofino development, which is expected to add 178 single-family units during the five-year growth period. CFD #12 is applied to other residential infill projects as applicable and is expected to include 220 single-family and 417 multi-family units during the same period. Together, these two CFDs should generate enough funds to hire 2.5 firefighting personnel by 2011.

It should be noted that additional "infill" residential projects will be built, however, for various reasons those projects will not be included in CFD #12. In addition, several significant commercial and industrial projects are expected to be built in the next five years, including:

- ❖ State Compensation Insurance Fund Office Campus
- ❖ Nut Tree additional retail; office; hotel/conference center
- ❖ Kaiser Hospital and additional medical office buildings
- ❖ NorthBay ambulatory surgery center
- ❖ Comfort Suites Hotel
- ❖ Opportunity Hill mixed use
- ❖ Meridian Medical Office
- ❖ Genentech manufacturing

To help address the additional demands for fire protection services brought on by the infill residential and commercial/industrial growth – which is interspersed throughout the community – the Department is evaluating the need to staff a full-time, dedicated truck company. This resource responds to all areas of the City for all structure fires, significant vehicle accidents, technical rescues and other multi-company incidents. This would require adding a total of twelve (12) firefighting personnel (which includes three additional shift vacancy relief “buffer” positions). 2.5 of the positions would be paid for by CFD’s #9 and #12, assuming that all eligible residential infill projects participate in CFD #12. The other 9.5 positions may be funded by revenue from the Lower Lagoon Valley development.

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## **XI. POLICE SERVICES**

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### **Existing Level of Service**

The Police Department combines a full range of police services with innovative and highly successful social impact programs to produce a comprehensive response to crime in Vacaville. The Police Department is fully committed to providing outstanding public safety services that have contributed to Vacaville's ranking as one of the safest cities of its size in California.

The Vacaville Police Department currently has an authorized strength of 180 employees (113 sworn and 67 professional staff) providing services through the Office of the Chief of Police via four divisions: Patrol, Administrative Services, Family and Professional Services and Investigative Services. In July 2006, the City Council approved four additional police officers and one new sergeant. A part-time Family Support Worker (FSW) position was converted to a full-time gang prevention/intervention position along with a similar conversion of a part-time FSW to a full-time FSW assigned to address elder abuse issues. This advocate assists seniors who are victims of both sexual and physical abuse as well as fiduciary crimes. A full-time senior program coordinator for the Alcohol, Tobacco and Other Drugs (ATOD) program was hired as well. With the addition of the second crime suppression team, there will be an increase in the number of citywide sweeps. These steps were taken to ensure that violent crime and gang activity are effectively addressed. These staffing increases are also consistent with the Department's goal of providing responsive policing services to the community.

### **Facilities**

Department personnel moved into a new state-of-the-art facility adjacent to City Hall in August 2005. The building is a 2-story, 39,000 square-foot structure which consolidated multiple Department functions previously located at various off-site locations. The police facility was designed and built to serve projected staffing through 2010. The facility was also constructed to allow for future expansion up to 10,000 additional square feet, which would support future staffing increases commensurate with future residential and business growth.

The Department continues to operate an off-site location which houses the Family Investigative Response Services Team (FIRST) and the Family Resource Center (FRC). FIRST detectives investigate elder abuse, child abuse, domestic violence and sexual assault. The unit also provides victim advocates in each of these areas. The FRC assists local residents with current job listings, interview preparation, resume assistance, counseling, childcare services referral, recreational activities, community activities, housing and assistance with basic needs (food, shelter, utilities) and also with emergency assistance on a limited basis. All of these services are available primarily for both English and Spanish-speaking clients.

### **Five Year History**

Total Part I crime in the City increased from 2,341 in 2001 to 2,696 in 2006, a 15.2 percent increase. However, it is also important to note that there was a 4.2% reduction in Part I crimes in 2006 as compared to 2005, with 117 fewer Part I crimes in 2006. Part I crime includes the crime categories of homicide, sexual assault, robbery, aggravated assault, auto theft, arson, burglary and larceny (theft). Between 2000 and 2006, total police activity increased from 50,087

to 72,662 (45%), while the population increased from 88,626 to 96,735 (9.2%). Total police activity includes police responses and contacts. These include all citations, traffic collisions, field interviews, follow-ups and reports taken.

The Police Department recently completed a reorganization providing a more efficient structure thus improving communication at all levels. Contemporary, new proactive programs were implemented to deal with the prevention of crime. The Crime Free Multi-Housing program was initiated which is designed to assist apartment complex managers who work in collaboration with the Police Department, affording a systematic method to pre-screen prospective tenants with the goal of reducing police calls for service. Police staff meets monthly with Community Services Department staff to discuss strategies involving apartment complexes not yet a partner in the program. Another program called "Comp Stat" (Comparative Statistics) was also implemented which allows for early warning or the early detection of patterns of criminal activity. Staff meets weekly to discuss the trends and to develop strategies to reduce and/or alleviate identified problems. Comp Stat has assisted police managers to efficiently and effectively deploy field officers in selected areas based on criminal activity.

Another efficiency effort undertaken and implemented was an amendment to the City's False Alarm Ordinance. The refined ordinance was designed to reduce the number of false alarms, allowing officers to focus on actual crimes and suspicious activity through community policing, and to make response to true alarm activations safer and more efficient. The Police Department has experienced a decrease in false alarms from an average of 307/month in January 2005 to an average of 117 in November 2006. This translates into a 70% decrease. There are currently over 2,300 alarms registered with the City. As a result of this decrease, 136.5 hours/month of officer time is saved to allow for greater pro-active enforcement.

A performance measure the Police Department utilizes is average response times. These times are derived for all calls for service from the time the citizen calls the Communications Center, the call is entered into the computer, dispatched and the officer arrives on scene. Table 25 indicates that Priority 1 calls have an average response time of 6 minutes and 22 seconds, which is more than the 6 minute goal. Priority 2 calls have average response times of 11 minutes and 30 seconds, which is well within the 15 minute goal.

**Table 25. Police Department Average Response Times:**

Call Type	Vacaville Performance Goal	2006	2005	2004	2003
Priority 1 <sup>a</sup>	6 minutes	6 min, 22 sec	6 min, 58 sec	6 min, 9 sec	7 min, 18 sec
Priority 2 <sup>b</sup>	15 minutes	11 min, 30 sec	11 min, 2 sec	13 min, 3 sec	16 minutes

Notes:

<sup>a</sup> Priority 1 calls include crime categories of homicide, sexual assault, robbery, arson, burglary, theft.

<sup>b</sup> Priority 2 calls include crime categories of shoplifting, vandalism, etc.

Violent crime and property crime clearance rates are one snapshot demonstrating the achievement of success. Clearance rates are one reflection of the performance and effectiveness of both the patrol officer and the detective. Factors that can influence clearance rates are workloads, staffing in patrol and investigations, crime solvability factors, and officer experience. Table 26 indicates that Vacaville's clearance rates for both violent crimes and property crimes exceed the national clearance rate averages but are below the Vacaville benchmarks.

**Table 26. Violent Crime and Property Crime Clearance Rates:**

<b>National 2005 Clearance Rate Average</b>	<b>Vacaville Benchmark</b>	<b>Vacaville 2006</b>	<b>Vacaville 2005</b>	<b>Vacaville 2004</b>	<b>Vacaville 2003</b>
Violent Crime - 46.5 %	70 %	62.5 %	62.5 %	65.9 %	72.1 %
Property Crime - 14.7 %	25 %	21 %	20.9 %	21.5 %	N/A

Traffic issues are consistently the number one complaint from citizens. There are currently six motor officers and three traffic officers assigned to the unit. (Note: The three "traffic" officers drive police cars and primarily investigate traffic collisions and conduct DUI enforcement. The six motorcycle or "motor" officers primarily focus on traffic accident investigation and enforcement of the Vehicle Code). The Police Department has established a traffic enforcement index of 35 citations (moving and warning) per injury accident as the benchmark. The enforcement index is a Police Department measure to reach a citation effectiveness threshold for the purpose of reducing traffic collisions. The issuance of citations is an effective tool to reach drivers not reached through education and voluntary compliance programs. Citations that fall within this category include any moving violation considered a primary collision factor, including speed, stop sign, red light, right-of-way and unsafe lane change violations. Table 27 provides a comparison of this goal with actual performance for 2003 through 2005. The Department has consistently met and exceeded the performance goal in recent years.

**Table 27. Traffic Enforcement Index <sup>a</sup>**

<b>Vacaville Performance Goal</b>	<b>Vacaville 2005</b>	<b>Vacaville 2004</b>	<b>Vacaville 2003</b>
>35 citations	82 citations	45 citations	37.6 citations

Notes:

<sup>a</sup> The Traffic Enforcement Index is the number of moving violations issued for hazardous moving violations divided by the total number of fatal and injury collisions

### Five Year Forecast

The Community Development Department projects growth will continue with both residential and commercial developments. It is anticipated that with residential population increasing, it is likely that additional patrol sectors will need to be re-defined and staffed accordingly in an effort to balance work loads while maintaining adopted service delivery standards and established performance goals. With the increased commercial development and associated traffic

congestion in those areas, response times to emergencies may be negatively impacted as well. The Police Department will incrementally install Opticom transmitters on the patrol vehicles as another means of reducing response times to emergency calls for service.

In order to maintain our current level of service, a study conducted by the Goodwin Consulting Group completed in May 2006 indicated that the patrol force should be increased by five officers per year through 2009 and an additional two officers in 2010. This would represent an overall increase of 17 officers. Also, to continue providing adequate support services with the current ratio of sworn officers to professional staff, the study recommended an increase of nine professional personnel (dispatchers, data entry, records, CSOs, etc.) over the next five years. The City has formed public safety Community Facilities Districts (CFD's) for new residential growth areas as well as for new infill development. These CFD's are intended to provide a long-term funding mechanism to for public safety within new development areas. Staffing needs are based upon full buildout of these projects. Staff will be added incrementally as funding from the Community Facilities Districts is made available as development occurs within the individual CFDs.

Table 28 provides a summary of staffing needs to serve new residential development. These projects and new growth areas are all within existing or planned public safety Community Facilities Districts (CFD's) which are intended to provide ongoing funding for police services.

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**Table 28. Police Staffing Needs to Serve New Residential Growth Areas**

<b>GROWTH AREA</b>	<b>Staff Position</b>	<b>Current Number of Staff</b>	<b>Proposed Number of Staff<sup>a</sup></b>	<b>Funding Source</b>
<b>North Village (Community Facilities District #8)</b>				
	Police Officer	0	2	CFD #8
	Sergeant	0	1	CFD #8
	Support Staff	0	2	CFD #8
<b>Portofino (Community Facilities District # 9)</b>				
	Police Officer	0	1	CFD #9
<b>Rice McMurtry (Community Facilities District #10)</b>				
	Police Officer	0	1	CFD #10
	Community Services Officer	0	1	CFD #10
<b>Southtown (Community Facilities District #11)</b>				
	Police Officer	0	4	CFD #11
<b>Lagoon Valley (Community Facilities District is Pending Formation)</b>				
	Police Officer	0	3.6	LV CFD
	Community Services Officer	0	2	LV CFD
	Police Detective	0	1	LV CFD
	Dispatcher	0	1	LV CFD
	Record Assistant	0	1	LV CFD
<b>Residential Infill Sites (Community Facilities District #12)</b>				
	Police Officer	0	2	CFD #12

Note:

<sup>a</sup> Staffing needs are based upon full buildout of these projects. Staff will be added incrementally as funding from the Community Facilities Districts is made available as development occurs within the individual CFD's.

The following is a more detailed description of the staffing needs listed in Table 28:

Southtown Community Facilities District (Community Facilities District #11)

Although the Department has previously indicated that the Southtown Project will become part of an expanded patrol sector, the increased population associated with this project is expected to generate additional calls for service. Based on the development agreement and growth projections, the project will require two additional police officers to maintain current levels of service delivery as soon as construction on the infrastructure begins and two additional police officers the first year residents begin occupancy. The additional staffing will be funded through the CFD.

Lagoon Valley (Future Lagoon Valley Community Facilities District)

The Department's goal is to ensure police services within this development are consistent with the standards maintained in the rest of Vacaville. This project will increase the demand for police protection services, generating additional calls for service. In order to maintain current service goals, the project will generate the need for 3.6 police officers at build out. This is based on maintaining a ratio of 1.2 officers per 1,000 residents. Further, with the increase in officers, there will need to be an associated increase in support staff. These increases would include 2 community services officers, one detective, one dispatcher and one records assistant. An interim measure per section 4.9-1 of the Lagoon Valley Environmental Impact Report, the Police Department would need to add two police officer positions to provide service delivery as soon as construction begins. The additional staffing will be funded through the CFD.

North Village (Community Facilities District #8)

As a result of services extending to the North Village Development, there will be an increase in demand for police protection services as a result of additional calls for service. In order to maintain our current level of service delivery, it is estimated that the project will generate the need for 1 police sergeant, 2 police officers and 2 professional support staff serving the first phase as identified in the development agreement. It will be necessary to determine what staffing needs will be necessary once the Phase II area is developed. The additional staffing will be funded through the CFD.

Rice/McMurtry (Community Facilities District #1)

While it is necessary to keep pace with development while meeting the needs of the community, both new and existing police facilities will serve this project area. However, additional calls for service as a result of the equestrian, bike and pedestrian trails and residences in the proposed project would result in an increase in police service requests. Therefore, it is anticipated that an additional police officer and community service officer would be needed to meet this demand. The additional staffing will be funded through the CFD.

Portofino (Community Facilities District #9) and Infill Development (Community Facilities District #12)

This infill development (Portofino) will eventually generate a demand for additional police services and support staff as a result of the additional 178 units. In addition, although individual small infill projects do not have a direct impact on police services, the combination of infill projects do. It is anticipated that there will be a total of an additional 220 single family units and an additional 417 multi-family units built by 2011. In order to maintain current levels of service while meeting performance goals, these infill projects will generate the need for 2 additional police officers. The additional staffing will be funded through the CFD's.

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## VII. HOUSING MIX REVIEW

The Planned Growth Ordinance requires that there be an annual review of the percentages of the different housing types existing in the City, compared to the goals in the General Plan. The General Plan promotes a city-wide housing mix of approximately 60% detached single family homes, 20% moderate density (small lot detached houses, attached units, townhouses and manufactured homes) and 20% high density apartment-type units. The citywide housing mix, both current and projected at buildout, is consistent General Plan policy, even with the recent surge in multifamily construction.

Table 29 below provides a snapshot of the City’s existing housing mix compared to the buildout of the current City limits, and the projected buildout of the General Plan, based on present planned land uses.

**Table 29. Citywide Housing Mix**

Housing Type	Existing City Limits		Buildout of Current City Limits		Buildout of Current General Plan	
	Units	Percent	Units	Percent	Units	Percent
Single family	20,703	64%	23,611	61%	25,821	61%
Moderate Density	4,699	14%	6,630	17%	7,494	18%
Apartments (non-senior)	5,977	18%	7,269	19%	7,677	18%
Senior Apartments	1,034	3%	1,182	3%	1,182	3%
Totals	32,413	100%	38,692	100%	42,174	100%

Table 29 indicates that the moderate density component of the housing mix is projected to increase from 15 percent to 19 percent of the City’s housing stock at buildout of the current General Plan. This reflects City General Plan policy requiring a larger component of moderate density housing in new growth areas in order to provide greater housing choice as well as ownership housing that is relatively more affordable than standard single family homes on larger lots.

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## **X. APPENDIX**

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- A. PLANNED GROWTH ORDINANCE
- B. INVENTORY OF RESIDENTIAL ALLOCATIONS, JANUARY 1, 2007
- C. PENDING PROJECTS THAT MAY REQUIRE PGO ALLOCATIONS OR MAY BE EXEMPT FROM PGO