APPENDIX H

Water Supply Assessment

Water Supply Assessment Report
For
Gavilan College
&
Fairview Corners Residential Development

Prepared for:

Sunnyslope County Water District

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Table of Contents

List of Tables

List of Figures

1. Introduction

Gavilan College and Fairview Corners propose to develop the Gavilan College San Benito Campus and the Fairview Corners Residential Development, on two parcels (APNs 025-190-046 and 025-190-49). Both parcels have a total area of approximately 136 acres. Gavilan College will occupy the southernmost 80 acres of the project with the remaining northernmost 56 acres being devoted to residential development of Fairview Corners. Gavilan College will be located east of Fairview Drive, north of Airline Hwy. The Hollister City limits are located to the northwest of the project. The entire project is located within the service area boundaries of Sunnyslope County Water District and the entire project is located within the Sunnyslope Sphere of Influence. The residential development is expected to have approximately 220 single family residences and 4.2 acres of parks. At full campus, the college is anticipated to serve 3500 full time equivalent students and 200 full time equivalent faculty. Athletic fields, open space, supporting retail, and on-campus housing are proposed on the campus site. The primary access to the project site will be off Fairview Road, opposite Cielo Vista Drive, providing access to both the project. (Kinsella, 2008)

Under the requirements of SB 610, and in accordance with Section 10912(a) of the California Water Code (CWC), Sunnyslope County Water District (SSCWD) as the designated water supplier must prepare an assessment of whether the projected water demands of the proposed project can be met by the proposed water supply. The proposed project falls within the definition of projects requiring a water supply assessment. Since a portion of the project falls outside of Sunnyslope's existing service boundaries and the Revised Draft of the Hollister Area 2007 Urban Water Management Plan (KENNEDY/JENKS, 2006) has not been accepted as a final report, Sunnyslope County Water District is preparing this report with excerpts from the Revised Draft.

This report presents a brief description of the project, its projected water demands, a description and assessment of the proposed water supply as to its adequacy to meet those demands in accordance with the requirements of CWC 10912 to10915, and implementation requirements on the part of Gavilan College, Sunnyslope County Water District and other parties. Sunnyslope's District encompasses much of the eastern and southern portions of the Hollister urban area. Hollister is primarily a residential community supported by an agricultural economy. The major transportation route in the area is State Highways 25 and 156; the Southern Pacific Railroad also serves the area. The Hollister Municipal Airport is located in the northern portion of the city. Sunnyslope's District serves the residents of the City of Hollister located in the southern and eastern portion of the City limits and those of the unincorporated communities of Ridgemark Estates. The potable water distribution system provides potable water service to the City of Hollister and Ridgemark Estates. Ridgemark Estates is on a higher water pressure zone supplied by the Ridgemark tanks. The City of Hollister and Sunnyslope both provide potable water service to residents inside and outside the City boundary in a middle pressure zone supplied by the Fairview tanks. Finally, the City of Hollister supplies a lower pressure zone on the northern and western portions of the City with potable water tanks located on Park Hill.

SB 610 requires an assessment of whether the proposed water supply for the Gavilan College plan development and for the Sunnyslope County Water District will meet the combined

water demands during normal, single dry and multiple dry water years for the next 20 years. Following are a brief description of the project, the projected water demands for the Gavilan College plan development, the projected water demands for the Sunnyslope County Water District, the combined water demands and a description and assessment of the proposed water supply as to its adequacy to meet those demands in accordance with the requirements of CWC 10912 to 10915, and implementation requirements on the part of the Sunnyslope County Water District and other parties.

2. Sunnyslope County Water District Population Estimates

Community Population Estimate

The population of the City of Hollister has increased significantly over the past 50 years as shown from U.S. Census Bureau historical population estimates. Population projections from AMBAG are shown in Table 1. (Kennedy/JENKS, 2006)

Both San Benito County and the City of Hollister have experienced their most rapid growth since the late 1990's, mainly due to economic growth in Silicon Valley and the high priced housing market in the Santa Clara County. Many employees from Santa Clara County, who cannot afford homes close to work, are choosing to buy homes in San Benito County and commuting to work. The County experienced a more than 8% growth in population since the 2000 Urban Water Master Plan, and the City grew by nearly an equal amount. The City of Hollister and San Benito County have implemented limited growth ordinances to curb the rapid growth experienced in recent years.

Table 1. Historical Population Figures in the Hollister Area. (KENNEDY/JENKS, 2006)

Year	City of Hollister Population	San Benito County Population
1950	4,903	14,370
1960	6,071	15,306
1970	7,663	18,226
1980	11,488	25,005
1990	19,212	36,697
2000	34,424	53,234

Population Projections

Population projections for the Hollister area are shown in Table 2, and are based on figures published by the CA Department of Finance (DOF) and the Association of Monterey Bay Area Governments (AMBAG). Population ordinances in effect in the City of Hollister and County of San Benito are also incorporated in these projections. (KENNEDY/JENKS, 2006)

Table 2. Population Projections for the Hollister Area. (KENNEDY/JENKS, 2006)

Year:	2005	2010	2015	2020	2025	2030
City of Hollister Population[(a)]	38,280	44,423	48,954	53,485	56,594	59,703
San Benito County Population[(a)]	58,411	63,890	69,533	75,176	79,484	83,791

[(a)] AMBAG Projections

Specific population projections for the Gavilan College would include approximately 220 single family residential units at 3.17 persons per unit or 697 persons in the residential development (Kier & Wright, 2008). There would be additional persons living in on 70 on multi-family on campus housing units (Kier & Wright, 2008). At two persons per unit, on campus housing would contain a population of 140 persons. The total residential population of Gavilan College and Fairview Corners Residential Development is projected to be 837 residents. There would also be additional students, faculty, and staff utilizing the campus during daytime hours, but these persons would not be considered full time residents for population purposes. However, the water use of students, faculty, and staff is calculated in the water demand portion of this water supply assessment

3. Project Description

Gavilan College is proposing to develop a campus on 80 acres of a 136-acre parcel at the corner of Airline Highway and Fairview Road as shown in Figure 1. A private residential development has been proposed for the remainder of the parcel. Although the two developments are independent of one another, they will eventually share roadways, infrastructure, and open space.

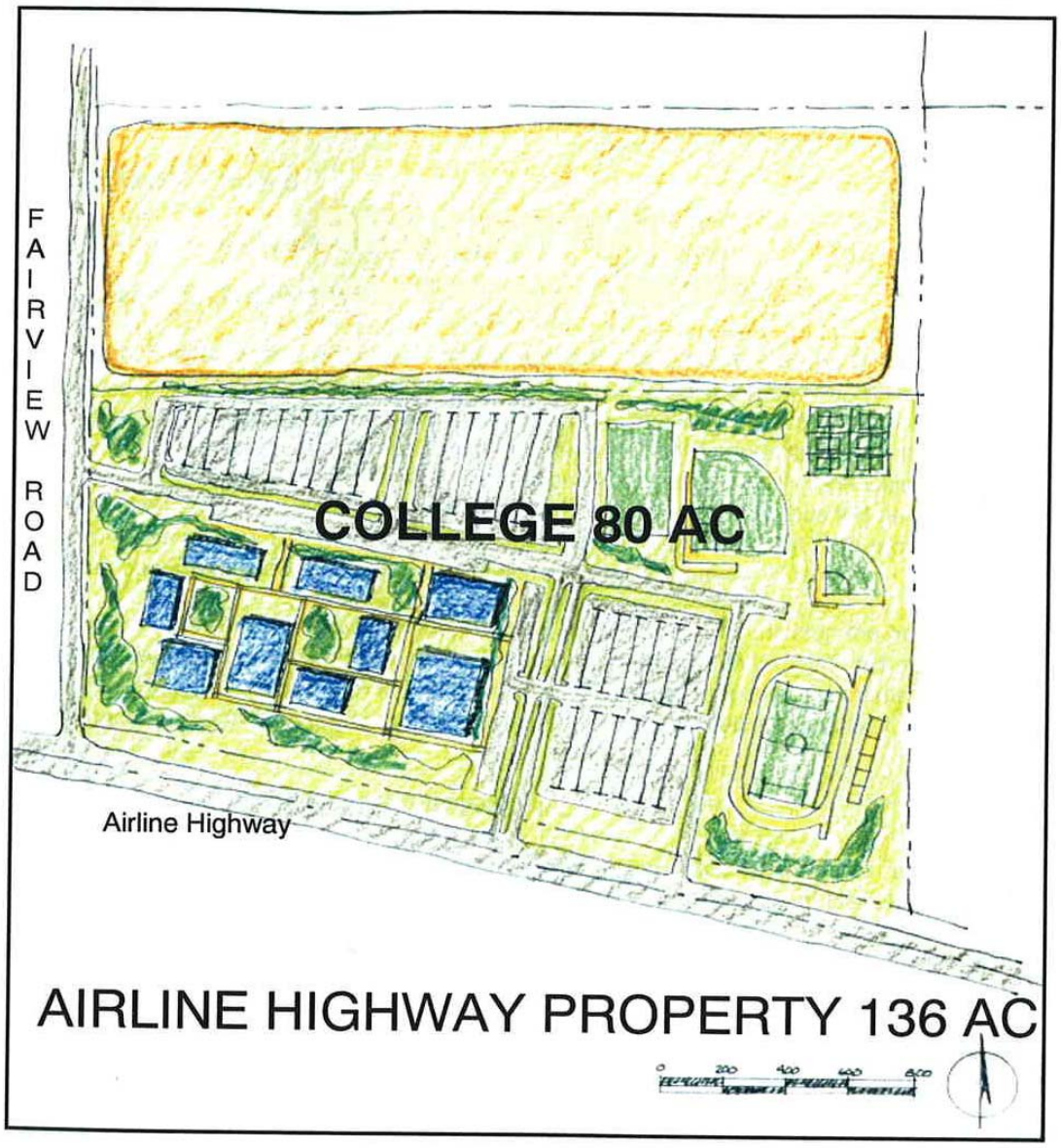

Figure 1. Map of Gavilan College and Fairview Corners Residential Development

Table 3 shows the total demand for Gavilan College and Fairview Corners Residential Development to be 246.7 acre-feet per year, which includes 35.6 acre-feet per year for irrigation.

Table 3 – Summary of Water Use Estimates for Gavilan College and Fairview Corners (Kier & Wright, 2008)

Residential	**Units**	**Area (acres)**	**GPD/DU**	**GPD/SF**	**WU Coefficient (AFY/unit)**	**Water Use Estimate (AFY)**
Single-Family Residential	220		300		0.33604	73.9
Open Space/Park*		4.20		0.0195	.095147	4.0
Landscape Buffer*		2.42		0.0195	0.95147	2.3
Residential Subtotal						80.2
College Campus	**Square Feet**	**Area (acres)**	**GPD/DU**	**GPD/SF**	**WU Coefficient (AFY/unit)**	**Water Use Estimate (AFY)**
Retail	35,000	0.80		0.4530	22.10344	17.8
Campus Facilities	298,600	6.85		0.3130	15.27236	104.7
On-Campus Housing	70		189		0.21171	14.8
Landscape Buffer*	220,414	5.06		0.0195	0.95147	4.8
Open Space/Park*	323,215	7.42		0.0195	0.95147	7.1
Athletic Fields/Facilities	794,970	18.25		0.0195	0.95147	17.4
Campus Subtotal						166.5
Project Total Potable Water Demand						**246.7**
Possible Reclaimed Water Allocation (currently included in Total Potable Demand)						***35.6***

*Athletic fields, open space, parks and landscape buffers are all assumed to be xeriscape or artificial turf; supplied by reclaimed water.

In the near future, Sunnyslope County Water District will also be required to serve Santana Ranch. Estimated water use for Santana Ranch is detailed below. The estimated water demand for the project is presented in the Table 4 (RJA, 2007). The expected Average Day Demand for the project is 342,225 Gallons/Day with an expected Maximum Day Demand of 2.0 times Average Day Demand. Annual demand for Santana Ranch is expected to be 383 acre-feet per year.

Table 4. Estimated Potable Water Demand for Santana Ranch (Dobbins, 2007)				
Land Use	**Size (acres)**	**Description**	**Water Demand Factor (gallons/day)**	**Average Day Demand (gallons/day)**
Single Family Residential	188.9	741 DUs	300	222,300
Multi-Family Residential (indoor)	57.9	351 DUs	225	78,975
Commercial (indoor) (retail, office and mixed use)	6.0	65,000 SF	0.269	17,500
Elementary School (indoor)	8.0	800 students	30	24,000
Detention Basins	7.9		0	0
Total Demand = (1 acre-foot of water equals 325,900 gallons)				**342,775 gallons per day** or **1.05 acre-feet per day**

Note: Water use factors are from the 2005 Marina Coast Water District Urban Water Management Plan. The water demand for the 6.0 acre Commercial Parcel assumes 25 percent building floor area-to-gross area (FAR) coverage. Therefore the water demand calculation for commercial development is: (6.0 acres x 43,560 sq ft/acre x 0.25 FAR x0.0003 ac-ft/year x 325,900 gallons/ac-ft) /365 days/year = 17,500 gallons per day.

With annual demand for Gavilan College and Fairview Corners Residential Development at 247 acre-feet per year, and annual demand at Santana Ranch at 383 acre-feet per year, the total additional demand from both developments will be 630 acre-feet per year at build out of both developments.

5. Conceptual Overall Supply

Sunnyslope County Water District (SSCWD) is the expected water purveyor for the Gavilan College Project since the project lies entirely with the SSCWD Sphere of Influence. SSCWD provides domestic water services to approximately 5,200 accounts in the neighborhoods to the north, south and west of the project. SSCWD's firm water supply is generated from four existing wells, which produce approximately 3,450 Gallons/Minute.

Sunnyslope also receives half the potable water production of the LESSALT Water Treatment Plant (jointly owned with the City of Hollister) which produces approximately 1,000 Gallons/Minute. The LESSALT capacity is considered to be an enhanced water supply for water quality enhancement for salinity reduction. The LESSALT Plant treats surface water from the Central Valley Project-San Felipe Division for distribution to the Sunnyslope County Water District and the City of Hollister. The LESSALT surface water treatment plant must be upgraded to meet new stricter requirements for the disinfection of by-products. The LESSALT treatment

plant will also have additional pumps added to the discharge side of the treatment plant to boost the current 1000 gpm operating capacity to a minimum of 2100 gpm capacity, which it is currently rated. Due to changes in the membrane filtering units, the modified LESSALT treatment plant could have a future operating capacity in excess of 2100 gpm. A portion of this future operating capacity could be utilized as firm water capacity even during a long extended drought. Other major SSCWD facilities include three storage tanks, a booster station, and approximately 29 miles of pipelines.

The existing SSCWD supply, storage and distribution systems must be supplemented to serve the proposed development. This project would require either additional well capacity, additional treated surface water capacity, or a combination of the two. Currently, SSCWD will be supplemented by two additional wells: well #11, and well #12. Well #11 is expected to produce approximately 1300 gpm. Well #12 would probably produce approximately 2100 gpm. The LESSALT production capacity could be increased to treat additional CVP water if CVP was available from San Benito County Water District which is the United States Bureau of Reclamation (USBR) contract agency for CVP water.

Projected Gavilan College Water Supply

For the purpose of this report, the Gavilan College Project is assuming all water is being provided by Sunnyslope County Water District. Initially, the 247 acre-feet of total water demand will be provided by groundwater wells and supplemental water from the Lessalt Treatment Plant when surface water is available to the Lessalt Treatment Plant. When Sunnyslope's proposed reclaimed water treatment plant is constructed in the Ridgemark area in approximately 2010, reclaimed water will become available to supplement existing water supply and provide for a portion of the 46 acre-feet of irrigation demand. However, for the purposes of this report, it is assumed that the entire 247 acre-feet per year of water demand (including irrigation demand) for Gavilan College and Fairview Corners Residential Development will initially come from groundwater. In order to meet this need Sunnyslope will need to construct additional groundwater wells to increase production capacity.

6. Potable Water Demand Forecast

Assuming that Gavilan College and Santana Ranch would be built in beginning in approximately 2010, population increases, from 2005 to 2010, in the City of Hollister would be approximately 16% and population increases in the entire County would be approximately 9.4%. As Sunnyslope serves much of the expansion of the City of Hollister to the south and east of the current city limits, the overall growth rate for Sunnyslope will be closer to the City of Hollister expansion rate as opposed to the slower expansion rate of the overall County of San Benito. For the purposes of this report, it is assumed that the customer base of Sunnyslope Water District will increase by 15% by 2010, and that Gavilan College and Santana Ranch would be built in approximately 2010. Should Gavilan College and Santana Ranch be built at a time frame significantly different from this time frame, this report would need to be updated with more current water supply and demand data. The forecast in this report will assume that Sunnyslope demand will expand by 15% plus the addition of Santana Ranch by the time Gavilan College is built. Sunnyslope 2006 Annual Drinking Water Quality Report states that Sunnyslope has 5290 customers. A 15% increase to the current customer base of 5290, would result in a customer base

of approximately 6084 customers, or an increase of approximately 794 accounts prior to the construction of Gavilan College and Santana Ranch.

Year 2010 City of Hollister Water Demand Forecast for Sunnyslope Water District

For the City of Hollister, the projected build out schedule after the Regional Water Quality Control Board's Cease and Desist Order is lifted is shown in table 5. (Lenoir, 2007)

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Table 5. City of Hollister Build out Schedule Post RWQCB Cease and Desist Order

Project	CY2008	CY2009	CY2010	CY2011	CY2012	CY2013	CY2014	CY2015
Award Homes	125 units	125 units	70 units	75 units	75 units	75 units	75units	57 units
Anderson Homes	6 units	-	-	-	-	-	-	-
Palmtag	2 units	-	-	-	-	-	-	-
Intravia Duplex	2 units	-	-	-	-	-	-	-
Westside Apt.	11 units	-	-	-	-	-	-	-
Valley View 3	9 units	-	-	-	-	-	-	-
Valley View 6	5 units	-	-	-	-	-	-	-
Hillock Ranch	41 units	-	-	-	-	-	-	-
Walnut Park A	5 units	-	-	-	-	-	-	-
Walnut Park B	27 units	-	-	-	-	-	-	-
La Baig	45 units	-	-	-	-	-	-	-
Brigantino	15 units	-	-	-	-	-	-	-
Las Brisas 7	3 units	-	-	-	-	-	-	-
Las Brisas 8	14 units	-	-	-	-	-	-	-
Cerra Vista	20 units	-	-	-	-	-	-	-
Eden West	20 units	35 units	-	-	-	-	-	-
Vista Meadows	-	72 units	-	-	-	-	-	-
Annotti (MillerFerrara)	-	93 units	77 units	-	-	-	-	-
Hillview	-	25 units	-	-	-	-	-	-
							-	-
Remaining	0	0	203 units	240 units	240 units	240 units	240 units	240 units
Total	350	350	350	315	315	315	315	315

(Personal communication by email from Carol Lenoir [carol.lenoir@hollister.ca.gov]
Sent: Friday, May 18, 2007 3:12 PM)

Sunnyslope's portion of the projected build out schedule within the City of Hollister is shown in table 6. This is the portion of the City of Hollister which Sunnyslope can expect to serve after the RWQCB's Cease and Desist Order is lifted.

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Table 6. Sunnyslope's Portion of City of Hollister Build out Schedule Post RWQCB Cease and Desist Order

Project	CY2008	CY2009	CY2010	CY2011	CY2012	CY2013	CY2014	CY2015
Award Homes	125 units	125 units	70 units	75 units	75 units	75 units	75units	57 units
Anderson Homes	6 units	-	-	-	-	-	-	-
Valley View 3	9 units	-	-	-	-	-	-	-
Valley View 6	5 units	-	-	-	-	-	-	-
Walnut Park A	5 units	-	-	-	-	-	-	-
Walnut Park B	27 units	-	-	-	-	-	-	-
La Baig	45 units	-	-	-	-	-	-	-
Brigantino	15 units	-	-	-	-	-	-	-
Las Brisas 7	3 units	-	-	-	-	-	-	-
Las Brisas 8	14 units	-	-	-	-	-	-	-
Cerra Vista	20 units	-	-	-	-	-	-	-
Annotti (MillerFerrara)	-	93 units	77 units	-	-	-	-	-
Total	274	218	147	75	75	75	75	57

Grand Total for City of Hollister from 2008 to 2010 = 639 New Residential Units Inside City

Year 2010 Unincorporated County of Hollister Water Demand Forecast for Sunnyslope Water District

Outside of the City Limits Sunnyslope has a current backlog for water meters service as shown in table 7.

Table 7. Unincorporated San Benito County Requests for water service outside of the City of Hollister

Project	# of Units
Church of Latter Day Saints	1 units
Tyler Knoll	1 units
Walnut Park	27 units
Gavilan Acres	4 units
605 RMK Drive	6 units
Lico Water Mutual Co	14 units
Kane Drive	16 units
Rosebud Drive	
Nader Javid Senior Center	64 units
Rick Pennington	1 units
Creekside Village	100 Units
RG&CC, Inc	2 units
Venture Estates	18 units
Total	253

The unincorporated County has a growth restriction of 1% growth which would correspond to a maximum of 84 units per year pursuant to telephone communication in September of 2007 with Chuck Ortwein, Senior Planner, County of San Benito. Once the

RWQCB Cease and Desist Order lifts, the County could permit development up to 84 units per year as a maximum. Development would more likely be in the range from 47 to 85 units per year. Some of these units would require water from Sunnyslope while others could rely upon private wells or private water mutual companies. For the purposes of this study, it is assumed that Sunnyslope will need to supply 89 units in the unincorporated County by 2010 when construction of Gavilan College begins. This figure would represent the 253 outstanding requests for water service minus the 64 units for Nader Javid and the 100 units for Creekside Village. These two developments will probably be built after 2010.

Year 2010 Total Unincorporated County & City of Hollister Water Demand for Sunnyslope Water District

By the year 2010 water demand should increase approximately 15% prior to the construction of Gavilan College and Santana Ranch. Currently, Sunnyslope has 5290 customers. With the addition of 89 units in the unincorporated county and 639 units in the City of Hollister, total connections should be approximately 6018 connections. The addition of 89 units in the unincorporated county and 639 units in the City adds 14% to the customer base, which is consistent with expected 15% increase in population. For the purposes of this study, it is assumed that Sunnyslope County Water District will need to supply its existing water demand, plus 15% for growth by the year 2010, and the additional demands of Gavilan College and Santana Ranch.

Santana Ranch will need a total of 383 acre-feet per year. Gavilan College and Fairview Corners Residential Development will need a total of 247 acre-feet of water. Together, Santana Ranch and Gavilan College will need an additional 630 acre-feet of water per year.

Sunnyslope's 2006 Annual Drinking Water Quality Report estimates annual water demand as 2950 acre-feet per year. The 2004 Report estimated the annual water demand at 3409 acre-feet per year. Assuming a 15% increase above the higher 3409 acre-feet per year water demand, plus the addition of the Gavilan College demand of 247 acre-feet per year, plus the demand from Santana Ranch for 383 acre-feet per year, Sunnyslope would need to supply 4550 acre-feet per year by 2010. If Sunnyslope were to supply 4550 acre-feet per year, it would need to increase its present production capacity by approximately 33% if it was to maintain the same level of reliability of service to it's current customer demand of 3409 acre-feet per year.

Year 2010 Total Unincorporated County & City of Hollister Water Supply by Sunnyslope Water

Currently, Sunnyslope has well production capacity of 3450 gpm and a supplemental 500 gpm of treated water supply which is used solely for water quality improvement. By the year 2010, Sunnyslope County Water District will have constructed two new wells: well #11, and well #12. Well #11 is expected be completed in 2008, and will supply 1300 gpm. The addition of well #11's 1300 gpm will increase Sunnyslope groundwater supply by 38% over 2007 supply levels. Well #12 is expected to be completed in 2009 and will supply approximately 2100 gpm. The addition of well #12's 2100 gpm in addition with well #11's supply of 1300 gpm will increase Sunnyslope's groundwater supply by 98%. As Sunnyslope's demand is expected to

increase 33% by 2010, the 38% increase in groundwater supply provided by well #11 and the 98% increase by well #11 and well #12 will be more than adequate to supply new customers, Gavilan College, and Santana Ranch by the year 2010. The additional water supplied by the LESSALT treatment plant would be considered as water quality improvement, but would not be considered a reliable supply unless future improvements were made to the LESSALT treatment plant. These improvements in Lessalt should take place in approximately 2012.

7. Supply Reliability

Supply Reliability Average/Normal Water Year Assessment (Entire Region)

In past single-year and multi-year droughts, the City's and Sunnyslope's groundwater supplies have proven reliable to meet both agricultural and M&I demands. From 2000 – 2005, agricultural groundwater demand represented approximately 40% of overall groundwater withdrawals. Total groundwater withdrawals are considerably less than the believed sustainable yield of 16,000 AFY. During times of drought, both agricultural and M&I demands are likely to increase due to reduced CVP deliveries. However, groundwater can be allocated to both agricultural and M&I uses at levels required to maintain a satisfactory supply reliability. The groundwater basin currently has a large volume of groundwater in storage that can serve as a reserve for future droughts. Water level declines in the past have not interfered with pumping efficiency and water levels have eventually recovered following the drought. It is anticipated that similar future droughts will not impact the reliability of the groundwater supply. (KENNEDY/JENKS, 2006)

Table 8 provides a summary of the average water year reliability for the three sub basins included in this study. Demand estimates are described in Sections 4.3 to 4.6. Both agricultural and M&I CVP water deliveries were assumed to be the average proportion of full USBR contract entitlements for the entire Zone 6 that are delivered to the three sub basins of interest. These values represent the average volume of water allocated to the three sub basins between 2000 and 2004. Groundwater pumping is assumed to equal the 16,000 AFY sustainable yields of the underlying Tres Pinos, Hollister East, and Hollister West aquifers. (KENNEDY/JENKS, 2006)

Table 8. Supply Reliability during Average/Normal Water Year For Entire Region (KENNEDY/JENKS, 2006)

	% of Normal	2005	2010	2015	2020	2025	2030
Water Demands							
M&I for City[(a)]	100	6,174	6,880	7,752	8,624	9,445	10,265
M&I for Sunnyslope's unincorporated areas[(a)]	100	1,261	1,330	1,399	1,472	1,544	1,621
M&I for County's unincorporated areas[(b)]	100	1,632	1,715	1,799	1,886	1,973	2,065
M&I Demand Sub-total		9,067	9,925	10,950	11,982	12,962	13,951
Agricultural[(c)]	100	12,761	11,812	10,011	7,096	6,559	5,583
Demand Total		**21,828**	**21,737**	**20,961**	**19,078**	**19,521**	**19,534**
Available Water Supplies							
CVP Ag Deliveries[(d)]	100	10,913	10,913	10,913	10,913	10,913	10,913
CVP M&I Deliveries[(d)]	100	3,124	3,124	3,124	3,124	3,124	3,124
Groundwater[(e)]	100	16,000	16,000	16,000	16,000	16,000	16,000
Recycled Water[(f)]	100	0	0	0	0	0	0
Supply Total		**30,037**	**30,037**	**30,037**	**30,037**	**30,037**	**30,037**
Difference (Supply minus Demand)		**8,209**	**8,300**	**9,076**	**10,959**	**10,516**	**10,503**
Difference as % of Supply		27.33%	27.63%	30.22%	36.48%	35.01%	34.97%
Difference as % of Demand		37.61%	38.18%	43.30%	57.44%	53.87%	53.77%

(a) M&I water demand for City and Sunnyslope were estimated using the service connection method as described in Section 4.4.

(b) M&I water demand for unincorporated County were estimated using annual groundwater reports and increased at 1% per year as described in Section 4-6.

(c) Agricultural demand data was extracted from Annual Groundwater Reports and reduced for conversion to M&I within the HSA as described in Appendix F.

(d) The values shown for CVP agricultural and M&I deliveries are the average proportion of full USBR contract entitlements (35,500 and 8,250 AFY, respectively) for the entire Zone 6 that are delivered to the three sub basins of interest. These values represent the average volume of water allocated to the three sub basins between 2000 and 2004. The M&I values may change pending the outcome of USBR contract negotiations.

(e) See Section 3.4 for discussion of groundwater allocation to M&I and agricultural purposes.

(f) All recycled water is proposed for reuse in the San Juan Groundwater Basin and is therefore not used in the Hollister Service Area.

Table 8 shows that water supplies are sufficient during an average/normal water year to satisfy both agricultural and M&I demands through 2030. Groundwater withdrawals between 2000 and 2004 (normal to wet years) averaged 12,000 AFY, with approximately 40% withdrawn for agricultural uses and 60% for M&I. This is significantly less than the sustainable yield of the underlying aquifers, resulting in a net recharge of the underlying aquifers. Sufficient

groundwater is available to satisfy both agricultural and M&I demands above and beyond those demands satisfied by imported CVP water. (KENNEDY/JENKS, 2006)

Supply Reliability Single Dry Water Year Assessment (Entire Region)

Although precipitation data in the Hollister area before 1983 are incomplete, an extreme single year drought occurred in WY 1976 (Creegan and D'Angelo 1993), when rainfall was approximately 9.9 inches or 70 percent of normal (data from the nearby Panoche station) average annual precipitation of about 13.8 inches (based on a representative period from 1983-2004). In 1976, the basin was receiving no imported water and was considered to be in overdraft. The groundwater levels in the Hollister East sub basin were at their lowest elevation in the period of record, approximately 50 feet below mean sea level. Although this scenario is unlikely to be repeated today, municipal wells would still be able to produce groundwater, given that they were able to provide sufficient supply during that drought despite the fact that portions of the screened intervals of wells could be above the water table. In addition, the effects of future droughts are likely to be less severe then past impacts, because of the large amount of groundwater in storage, decreased reliance on groundwater, and additional supplies of imported of water. (KENNEDY/JENKS, 2006)

In addition, San Benito County Water District has developed a numerical model that has been applied to future drought scenarios, including single-year droughts. Historic recharge (1974-2003) was repeated using the current conditions as initial conditions and assuming future increases in groundwater demand and the continuation of imported water. The model simulates the basin into the future by using the actual recharge that occurred in the past. This model was used to simulate what would occur if a drought similar to the one that occurred in WY 1976 occurs again in the future. Figure 2 shows the model output for simulated and actual historic water levels in Hollister West. Although the actual groundwater level data are not shown, the simulated water levels indicate that the WY 1976 drought would result in a decline in water levels in the HSA of only 25 feet (to about 215 feet mean sea level) with subsequent rapid recovery. Although the drought simulated is equal to the WY 1976 drought, the operating conditions of the basin have changed. The basin's large amount of storage and decreased reliance on ground water lessens the impact on the basin of a drought and hastens the basin's recovery. (KENNEDY/JENKS, 2006)

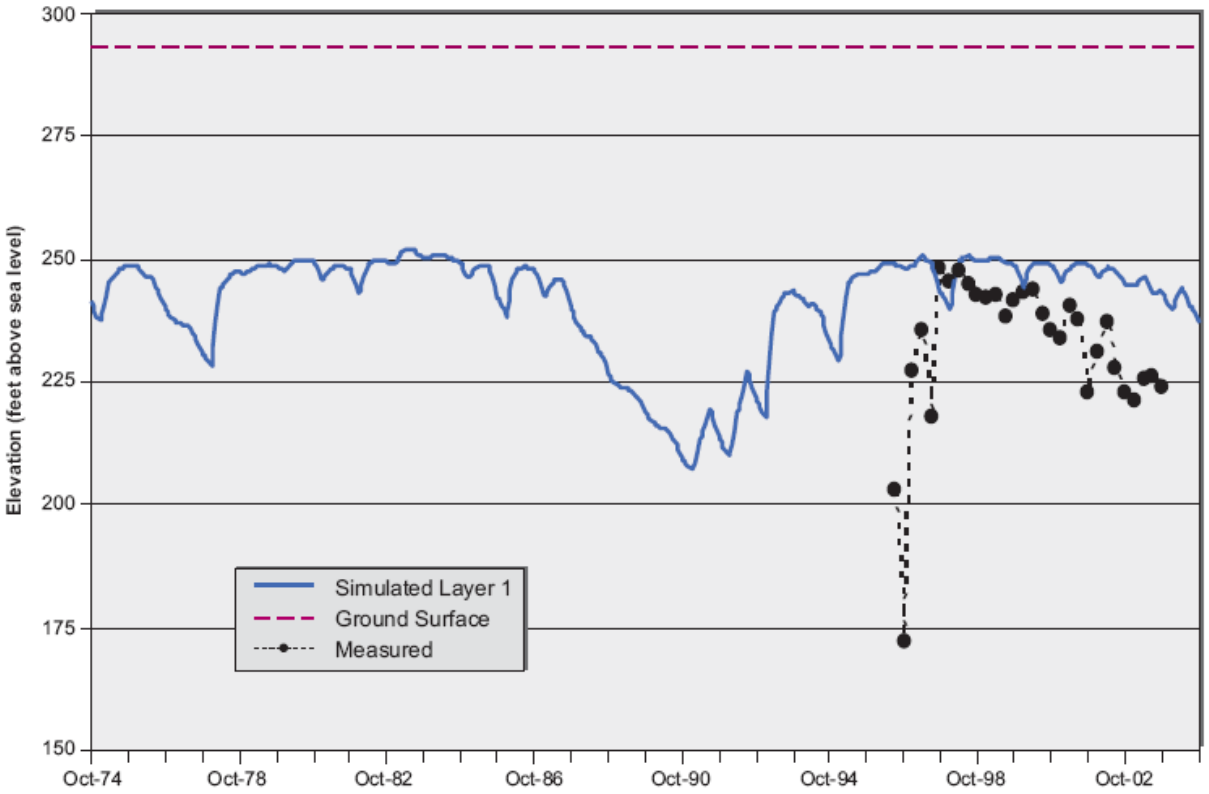

Figure 2. Hydrograph of Simulated Water Levels in Hollister. (KENNEDY/JENKS, 2006)

Table 9 provides a summary of the single dry water year reliability for the three sub basins. The analysis assumes CVP cutbacks, such that the District only receives 25% of its agricultural entitlement and 75% of its M&I entitlement, based on the 3-year historic use. This amounts to reduced deliveries of 2,728 AF/year and 2,343 AF/year for agricultural and M&I deliveries, respectively. Ground water pumping is assumed to equal the 16,000 AF/yr sustainable yields of the underlying aquifers as described in Appendix E of the 2000 UWMP by Jones and Stokes. Demands were assumed to remain the same as those developed for the normal/average water year. This is assumed to be a conservative estimate. In reality, demand may decrease for interior M&I uses, but exterior M&I and agricultural demands may in fact increase due to increased evapo-transpiration that is likely to occur during drought conditions. The effects of these changes in demand are assumed to offset each other. (KENNEDY/JENKS, 2006)

Table 9. Supply Reliability During a Single Dry Water Year For Entire Region (KENNEDY/JENKS, 2006)

	% of Normal	2005	2010	2015	2020	2025	2030
Water Demands							
M&I for City[(a)]	100	6,174	6,880	7,752	8,624	9,445	10,265
M&I for Sunnyslope's unincorporated areas[(a)]	100	1,261	1,330	1,399	1,472	1,544	1,621
M&I for County's unincorporated areas[(b)]	100	1,632	1,715	1,799	1,886	1,973	2,065
M&I Demand Sub-total		9,067	9,925	10,950	11,982	12,962	13,951
Agricultural[(c)]	100	12,761	11,812	10,011	7,096	6,559	5,583
Demand Total		**21,828**	**21,737**	**20,961**	**19,078**	**19,521**	**19,534**
Available Water Supplies							
CVP Ag Deliveries[(d)]	25	2,728	2,728	2,728	2,728	2,728	2,728
CVP M&I Deliveries[(d)]	75	2,343	2,343	2,343	2,343	2,343	2,343
Groundwater [(e)]	100	16,000	16,000	16,000	16,000	16,000	16,000
Recycled Water[(f)]	100	0	0	0	0	0	90
Supply Total		**21,071**	**21,071**	**21,071**	**21,071**	**21,071**	**21,071**
Difference (Supply minus Demand)		**-757**	**-666**	**111**	**1,993**	**1,550**	**1,537**
Difference as % of Supply		-3.59%	-3.16%	0.53%	9.46%	7.36%	7.29%
Difference as % of Demand		-3.47%	-3.06%	0.53%	10.45%	7.94%	7.87%

(a) M&I water demand for City and Sunnyslope were estimated using the service connection method as described in Section 4.4.

(b) M&I water demand for unincorporated County were estimated using annual groundwater reports and increased at 1% per year as described in Section 4-6.

(c) Agricultural demand data was extracted from Annual Ground water Reports and reduced for conversion to M&I within the HSA as described in Appendix F.

(d) The values shown for CVP agricultural and M&I deliveries are the average proportion of full USBR contract entitlements (35,500 and 8,250 AFY, respectively) for the entire Zone 6 that are delivered to the three sub basins of interest. These values represent the average volume of water allocated to the three sub basins between 2000 and 2004. The M&I values may change pending the outcome of USBR contract negotiations.

(e) See above in Section 3.4 for discussion of groundwater allocation to M&I and agricultural purposes.

(f) All recycled water is proposed for reuse in the San Juan Groundwater Basin and is therefore not used in the Hollister Service Area.

Table 9 shows that available supplies may be insufficient to meet demands during a single dry water year in the near future. Increased ground water pumping could be used to supplement the lack of available M&I and agricultural supplies during single dry years. It is assumed that pumping in excess of the sustainable yield of the aquifer is acceptable in single dry years as this excess pumping will be restored in years with above normal rainfall. Additionally, ground water levels in the Hollister East, Hollister West, and Tres Pinos groundwater sub basins are currently at near record levels indicating significant water in storage. (KENNEDY/JENKS, 2006)

Sunnyslope will have additional well pumping capacities to pump enough ground water to make up for significant supply deficiencies with the addition of well #11 and well #12. Sunnyslope total well production capacity of 3,450 gallons per minute (gpm) would be increased to 6850 gpm, a 98% increase in production capacity. The addition of well #11 and well #12 additional supplies would easily be able to meet the 33% increase the existing water demand of 3409 acre-feet per year to meet 2010 water demand of 4550 acre-feet per year demand.

Supply Reliability Multiple Dry Water Year Assessment (Entire Region)

A multiple-year drought occurred in the basin between WY 1987 and 1990. During these four years the average annual precipitation was 8.7 inches, 63 percent of normal rainfall. Although imported water was brought to the basin in 1987, deliveries were small for the first few years. The drought effects were more noticeable in the Hollister West sub basin than in the eastern portion of the HSA. As shown in Figure 3, water levels in Hollister West were already declining slightly before the drought and continued to drop another 40 feet during the multiple year drought. Water levels in the basin did not recover until WY 1997. (KENNEDY/JENKS, 2006)

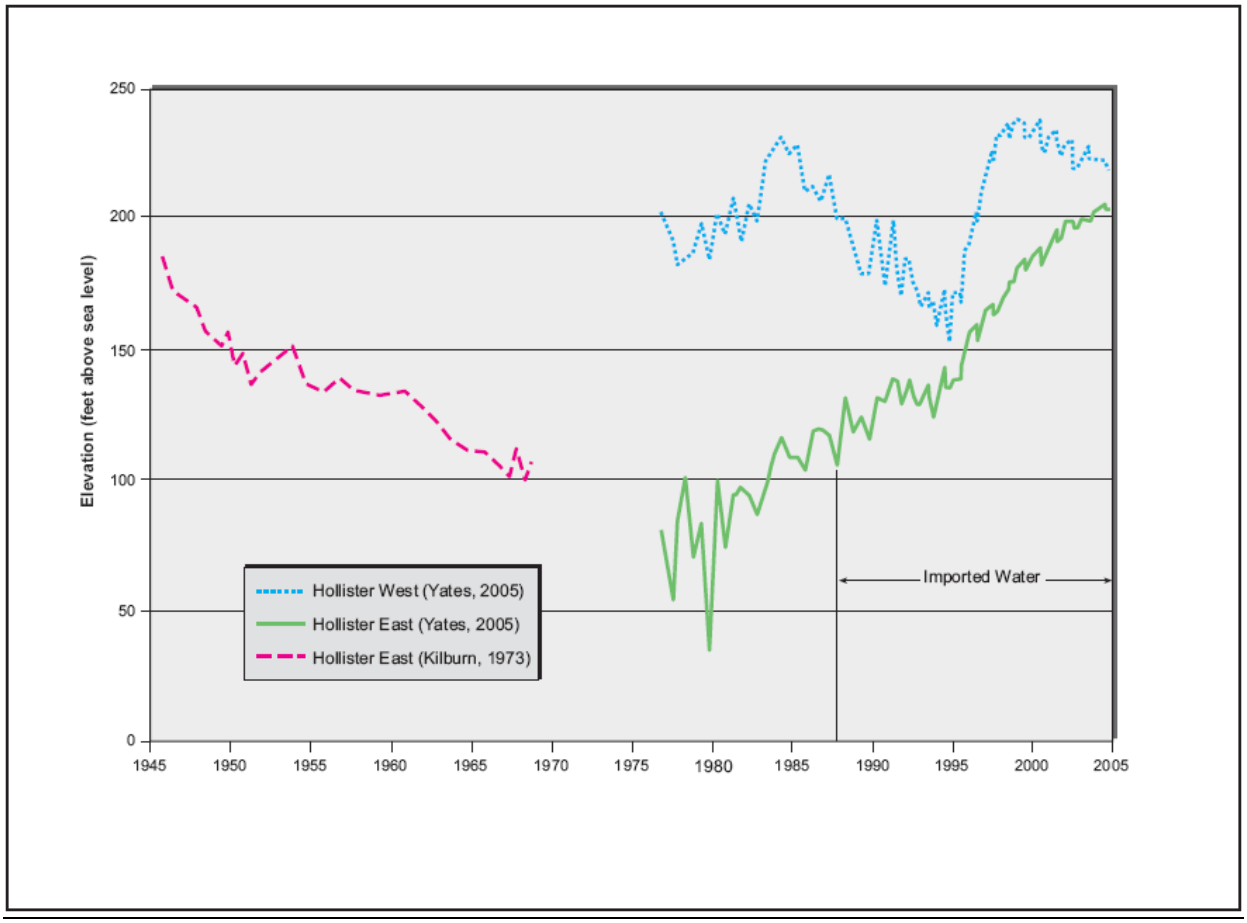

Figure 3. Hydrographs of Average Ground water Elevations, Hollister. (KENNEDY/JENKS, 2006)

Actual declines in water levels in the Sunnyslope County Water District's portion of Hollister West are shown in figure 4. Existing wells #1 & #2, shown in the orange line near the bottom of the graph in figure 4, are in the same aquifer as the proposed wells #11 and #12. Wells #1 and #2 declined 90 feet from the 240 foot elevation to the 150 foot elevation from 1987 to 1994. Wells #1 and #2 then staged a dramatic recovery after simultaneous end of the drought and the beginning of recharge of the ground water basin by the importation of CVP water.

The 90 foot decline in the groundwater basin over a seven year period represents the worst historical decline for Sunnyslope's wells, which were not only experiencing the effects of a prolonged 3 year drought, but were also suffering from the effects of previous decades of groundwater overdraft. Actual recovery of the aquifer was began in 1994 from the 150 foot elevation and ended at the 260 foot elevation in 2001 resulting in a 110 foot recovery of the groundwater basin. This equilibrium in the groundwater aquifer has been maintained since 2001.

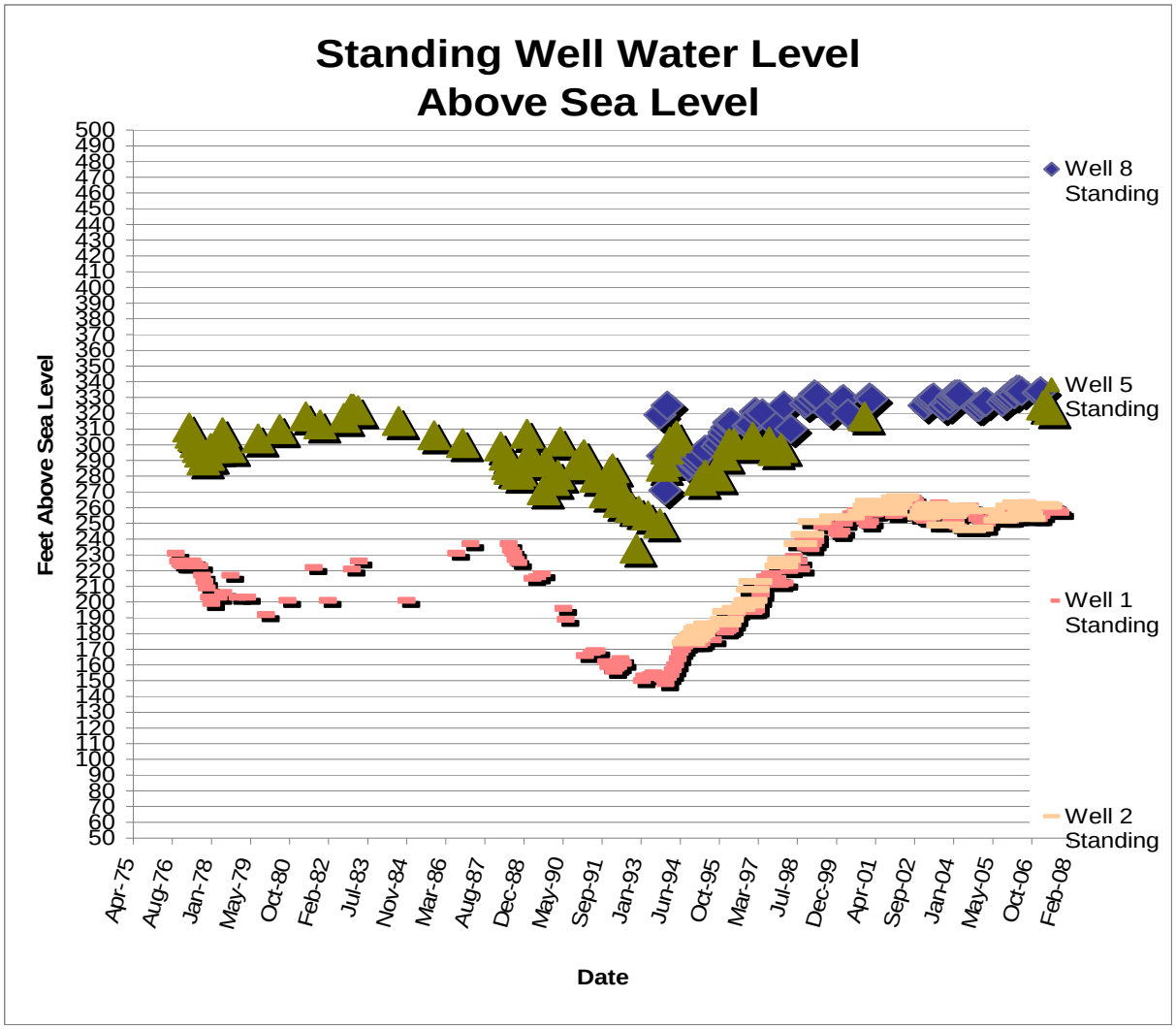

Figure 4. Hydrograph of Water Levels In Sunnyslope County Water District's Wells (Kennedy/Jenks, 2006)

Hollister East water levels did not show a decline during the drought; but continued to recover from the overdraft of the 1970's. Like the single year drought, water levels did not drop sufficiently to impact the municipal wells, and if the drought occurred today, groundwater levels would respond differently. The numerical mode l output in Figure 5 indicates that ground water levels would decline up to 30 feet during the multiple year droughts, but would recover quickly. Again the current increased storage in the basin allows for a faster recovery from droughts. (KENNEDY/JENKS, 2006)

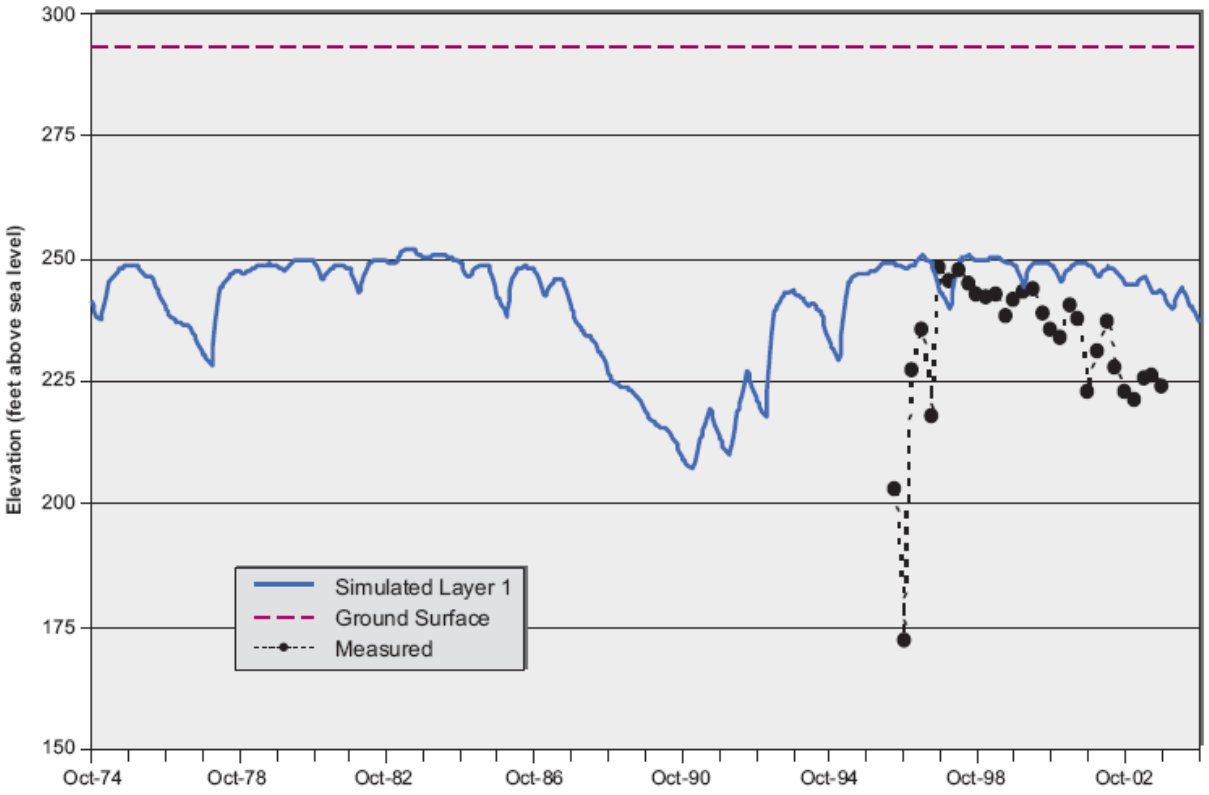

Figure 5. Hydrograph of Simulated Water Levels in Hollister East.

(KENNEDY/JENKS, 2006)

An analysis was performed to determine the supply reliability during a period of prolonged drought. A series of three consecutive years of low imported water deliveries is evaluated. The first series analyzed occurs within the next three years, 2006 – 2008. The second series looks at a three year drought occurring at the end of the time horizon between 2028 and 2030.

There have been significant changes to the USBR's M&I Water Shortage Policy since the last major consecutive year drought occurred in California in the late '80s and early '90s. During this drought, water cutbacks were not initiated until 1990. Table 10 lists South of Delta CVP cutbacks to agricultural and M&I users under the old policy.

Table 10. Summary of USBR Deliveries during Last Major California Drought (KENNEDY/JENKS, 2006)

Year	Water Deliveries (% of contract entitlements)	
	Agricultural	M&I
1990	50	50-75
1991	25	25-50
1992	25	75

However, these cutbacks might have been different under the 2001 M&I Shortage Policy as adopted by the USBR. Due to the uncertainty surrounding the level of cutbacks that would have been realized under the current policy, a set of conservative assumptions were made for the purposes of the Urban Water Management Plan. During the first year of the consecutive year drought, agricultural and M&I deliveries were assumed to be 25% and 75% of contract entitlements, respectively. During the second and third years of the consecutive year drought, agricultural and M&I deliveries are assumed to be further reduced to 15% and 65% of contract entitlements, respectively. These cutbacks are realistic under the adopted 2001 M&I Shortage Policy. Demands were assumed to remain the same as those developed for the normal/average water year. Again, the effects of indoor changes in demand are assumed to be offset by increased agricultural and outdoor demands. Table 11 provides a summary of the multiple dry water year reliability for the study area for the two time periods analyzed. (KENNEDY/JENKS, 2006)

Table 11. Supply Reliability during Multiple Dry Water Years For Entire Region (KENNEDY/JENKS, 2006)

	% of Normal	2006	2007	2008	2028	2029	2030
Water Demands							
M&I for City[(a)]	100	6,249	6,324	6,509	9,937	10,101	10,265
M&I for Sunnyslope's unincorporated areas[(a)]	100	1,274	1,288	1,302	1,590	1,605	1,621
M&I for County's unincorporated areas[(b)]	100	1,648	1,665	1,682	2,028	2,046	2,065
M&I Demand Sub-total		9,171	9,277	9,493	13,555	13,752	13,951
Agricultural[(c)]	100	12,571	12,381	12,191	5,973	5,778	5,583
Demand Total		**21,743**	**21,658**	**21,684**	**19,528**	**19,530**	**19,534**
Available Water Supplies							
CVP Ag Deliveries[(d)]	25;15	2,728	1,637	1,637	2,728	1,637	1,637
CVP M&I Deliveries[(e)]	75; 65	2,343	2,031	2,031	2,343	2,031	2,031
Groundwater[(f)]	100	16,000	16,000	16,000	16,000	16,000	16,000
Recycled Water[(g)]	100	0	0	0	0	0	0
Supply Total		**21,071**	**19,668**	**19,668**	**21,071**	**19,668**	**19,668**
Difference (Supply minus Demand)		**-672**	**-1,990**	**-2,016**	**1,543**	**138**	**134**
Difference as % of Supply		-3.19%	-10.12%	-10.25%	7.32%	0.70%	0.68%
Difference as % of Demand		-3.09%	-9.19%	-9.30%	7.90%	0.70%	0.69%

(a) M&I water demand for City and Sunnyslope were estimated using the service connection method as described in Section 4.4.

(b) M&I water demand for unincorporated County were estimated using annual groundwater reports and increased at 1% per year as described in Section 4-6.

(c) Agricultural demand data was extracted from Annual Groundwater Reports and reduced for conversion to M&I within the HSA as described in Appendix F.

(d) CVP agricultural deliveries are 25% of the average proportion received by the three sub basins of interest during the 1st year and are reduced to 15% during the 2nd and 3rd years of the drought.

(e) CVP M&I deliveries are 75% of the average proportion received by the three sub basins of interest during the 1st year and are reduced to 65% during the 2nd and 3rd years of the drought.

(f) See above in Section 3.4 for discussion of groundwater allocation to M&I and agricultural purposes.

(g) All recycled water is proposed for reuse in the San Juan Groundwater Basin and is therefore not used in the Hollister Service Area.

As shown by the comparison, the districts will face water shortages under the first three year drought scenario occurring between 2006 and 2008. Under the second scenario from 2028 to 2030, no water shortages occur mainly due to projected conversions of agricultural to urban land uses and associated reductions in overall demand within the planning area. (KENNEDY/JENKS, 2006)

Historically the City, the District, and Sunnyslope have used additional groundwater during the dry years to make up for the reductions in CVP deliveries. As discussed earlier, Sunnyslope will be increasing its well pumping capacity from the current 3,450 gallons per

minute (gpm) to 6850 gpm by the addition of well #11 and well #12 which will allow Sunnyslope to meet the shortfall between supply and demand during consecutive dry water years by utilizing groundwater storage during an extended drought, and replenishing the aquifer during normal rainfall periods after the drought. During a prolonged drought with a probable 30 foot drawdown in the aquifer well production capacity would be reduced by approximately 6% if the existing pumps and motors were left in the wells. In the unlikely case, that Sunnyslope were to repeat the 90 foot drawdown in the aquifer during a 3 year drought when there was zero CVP water to import well production capacity would be reduced by approximately 18% if the existing pumps and motors were left in the wells. With an 18% reduction in capacity, Sunnyslope would still have well pumping capacity of 5617 gpm, which still represents a 63% increase from the 1987 capacity of 3450 gpm, with the addition of wells #11 and #12. A 63% increase in well pumping capacity from the current 3450 gpm to 5617 gpm, during a three year drought, would be sufficient to meet the 33% increase in demand from the current 3409 acre-feet per year supply to meet the 2010 demand of 4550 acre-feet needed to meet the combined demands from new customers, Gavilan College, and Santana Ranch.

The maximum combined 33% increase in demand from new customers, Gavilan College, and Santana Ranch would more than adequately be met by a 63% increase in well production capacity provided by wells #11 and #12, during a three year drought, if Gavilan College and Santana Ranch were built in approximately 2010. The future use of recycled water should also provide an additional supplemental supply when this water becomes available.

8. Conclusion

Sunnyslope County Water District will be able to meet the immediate demands of new customers, Gavilan College and Fairview Corners Residential Development in the year 2010 by the anticipated construction of well #11 which will add 1300 gpm to the existing capacity of 3450 gpm. The additional construction of well #12, with a capacity of approximately 2100 gpm, subsequent to the construction of well #11, will insure that Sunnyslope has sufficient well capacity sufficiently to reliably meet the additional capacity requirements needed during an extended drought when surface water capacity is curtailed, and each ground water well produces up to 18% less water due to draw down of the aquifer.

In general, the ground water basin operates as a ground water bank where Central Valley Project water is recharged during wet and normal years, and water is withdrawn during dry years. Since the introduction of the CVP surface water recharge to the Hollister area, the groundwater basin has been restored to equilibrium and is a reliable source of groundwater when surface water is curtailed during droughts.

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