San Antonio Creek Valley Groundwater Basin Water Budget

Values in acre-feet

= Component of Inflow

= Component of Outflow

Water Budget	Water Year	Rainfall		Components of Inflow								Total Inflow	Components of Outflow								Total Outflow	Change in Storage	Cumulative Change in Storage
													Groundwater Pumping					Riparian Evapotranspiration	Groundwater Discharge to Surface Water	Subsurface Outflow			
		Inches	% of Average	Subsurface Inflow	Mountain Front Recharge	Streamflow Percolation	Percolation of Direct Precipitation	LACSD WWTP Effluent	Septic Return Flows	Ag Irrigation Return Flows	Urban Irrigation Return Flows		LACSD Pumping	VAFB Pumping	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping						
Historical Water Budget	**1981**	13.3	86%	0	1,400	2,300	4,900	0	10	2,100	1	*10,700*	170	3,270	10,300	100	13,800	6,600	3,000	0	*23,400*	*-12,700*	*-12,700*
	1982	14.4	94%	0	1,600	1,600	4,600	0	10	2,100	1	*9,900*	170	3,430	10,700	100	14,400	6,400	1,500	0	*22,300*	*-12,400*	*-25,100*
	1983	35.7	232%	0	13,600	11,400	42,400	0	10	2,200	1	*69,600*	180	3,080	11,200	110	14,600	6,500	5,400	0	*26,500*	*43,100*	*18,000*
	1984	9.7	63%	0	200	500	600	0	10	2,300	1	*3,600*	190	3,230	11,600	110	15,100	6,600	1,300	0	*23,000*	*-19,400*	*-1,400*
	1985	10.4	68%	0	400	600	1,400	0	10	2,400	1	*4,800*	190	3,370	12,000	110	15,700	6,500	1,100	0	*23,300*	*-18,500*	*-19,900*
	1986	15.9	103%	0	2,700	3,900	8,500	0	10	2,500	1	*17,600*	200	3,000	12,500	120	15,800	6,500	1,500	0	*23,800*	*-6,200*	*-26,100*
	1987	11.7	76%	0	700	800	2,200	0	10	2,500	1	*6,200*	210	3,140	12,700	120	16,200	6,500	1,000	0	*23,700*	*-17,500*	*-43,600*
	1988	15.1	98%	0	1,100	1,000	3,200	0	10	2,600	1	*7,900*	210	3,250	13,000	120	16,600	6,500	1,000	0	*24,100*	*-16,200*	*-59,800*
	1989	8.2	54%	0	10	500	200	0	10	2,600	1	*3,300*	220	3,080	13,200	130	16,600	6,500	800	0	*23,900*	*-20,600*	*-80,400*
	1990	8.1	52%	0	20	500	200	0	10	2,700	1	*3,400*	220	3,410	13,400	130	17,200	6,500	600	0	*24,300*	*-20,900*	*-101,300*
	1991	16.5	107%	0	700	2,500	4,100	0	10	2,700	1	*10,000*	230	3,240	13,600	130	17,200	6,400	4,500	0	*28,100*	*-18,100*	*-119,400*
	1992	17.0	110%	0	3,800	4,600	14,000	0	10	2,800	1	*25,200*	230	3,240	13,900	130	17,500	6,600	4,000	0	*28,100*	*-2,900*	*-122,300*
	1993	24.7	160%	0	6,800	6,800	21,300	0	10	2,800	1	*37,700*	230	2,840	14,100	140	17,300	6,600	3,300	0	*27,200*	*10,500*	*-111,800*
	1994	13.4	87%	0	600	1,000	1,900	0	10	2,900	1	*6,400*	230	2,860	14,300	140	17,500	6,500	1,100	0	*25,100*	*-18,700*	*-130,500*
	1995	29.2	190%	0	7,500	11,300	32,400	0	10	2,900	1	*54,100*	240	2,690	14,600	140	17,700	6,500	1,800	0	*26,000*	*28,100*	*-102,400*
	1996	15.5	101%	0	1,300	1,900	5,100	0	10	3,000	1	*11,300*	290	3,120	14,800	140	18,400	6,600	3,000	0	*28,000*	*-16,700*	*-119,100*
	1997	13.2	85%	0	2,500	2,900	6,900	0	20	3,100	1	*15,400*	290	3,320	15,500	140	19,300	6,600	2,600	0	*28,500*	*-13,100*	*-132,200*
	1998	36.2	235%	0	7,400	12,000	38,300	0	20	3,200	1	*60,900*	260	1,130	16,200	140	17,700	6,400	300	0	*24,400*	*36,500*	*-95,700*
	1999	16.2	105%	0	2,800	3,900	8,900	0	20	3,400	1	*19,000*	300	410	16,900	140	17,800	6,300	1,600	0	*25,700*	*-6,700*	*-102,400*
	2000	17.5	114%	0	3,400	3,600	10,400	0	20	3,500	1	*20,900*	320	840	17,700	150	19,000	6,600	4,500	0	*30,100*	*-9,200*	*-111,600*
	2001	18.3	119%	0	4,400	5,500	12,400	0	20	3,700	1	*26,000*	310	640	18,400	150	19,500	6,500	4,800	0	*30,800*	*-4,800*	*-116,400*
	2002	7.7	50%	0	20	500	400	0	20	3,800	1	*4,700*	340	460	19,100	150	20,100	6,500	1,200	0	*27,800*	*-23,100*	*-139,500*
	2003	14.8	96%	0	1,100	1,200	3,400	0	20	4,000	1	*9,700*	320	410	19,800	150	20,700	6,500	1,200	0	*28,400*	*-18,700*	*-158,200*
	2004	9.4	61%	0	800	1,100	2,400	0	20	4,100	1	*8,400*	370	460	20,500	150	21,500	6,600	900	0	*29,000*	*-20,600*	*-178,800*
	2005	28.3	184%	0	7,800	6,400	22,700	0	20	4,200	1	*41,100*	350	430	21,200	150	22,100	6,500	5,100	0	*33,700*	*7,400*	*-171,400*
	2006	18.3	119%	0	3,100	3,000	8,100	0	20	4,400	1	*18,600*	350	340	21,900	150	22,700	6,500	4,400	0	*33,600*	*-15,000*	*-186,400*
	2007	6.3	41%	0	10	300	100	0	20	4,400	1	*4,800*	360	340	21,900	150	22,800	6,500	400	0	*29,700*	*-24,900*	*-211,300*
	2008	17.0	111%	0	2,200	3,200	8,600	0	20	4,400	1	*18,400*	360	1,140	22,000	160	23,700	6,500	4,200	0	*34,400*	*-16,000*	*-227,300*
	2009	10.5	68%	0	200	700	800	0	20	4,400	1	*6,100*	350	1,420	22,000	160	23,900	6,500	1,100	0	*31,500*	*-25,400*	*-252,700*
	2010	17.6	114%	0	2,900	3,800	11,600	0	20	4,400	1	*22,700*	300	1,470	22,000	160	23,900	6,400	4,300	0	*34,600*	*-11,900*	*-264,600*
	2011	21.7	141%	0	7,500	7,700	27,300	0	20	4,400	1	*46,900*	300	590	22,000	160	23,100	6,400	700	0	*30,200*	*16,700*	*-247,900*
	2012	10.6	69%	0	50	1,300	1,200	0	20	4,400	1	*7,000*	310	300	22,000	160	22,800	6,500	1,100	0	*30,400*	*-23,400*	*-271,300*
	2013	6.3	41%	0	100	400	300	0	20	4,400	1	*5,200*	320	430	22,000	160	22,900	6,600	400	0	*29,900*	*-24,700*	*-296,000*
	2014	6.2	41%	0	10	400	200	0	20	4,400	1	*5,000*	320	1,800	22,000	160	24,300	6,600	400	0	*31,300*	*-26,300*	*-322,300*
	2015	7.6	50%	0	10	400	200	0	20	4,400	1	*5,000*	250	1,720	22,000	160	24,100	6,700	600	0	*31,400*	*-26,400*	*-348,700*
	2016	11.8	77%	0	30	900	1,100	0	20	4,400	1	*6,500*	250	390	22,000	160	22,800	6,600	700	0	*30,100*	*-23,600*	*-372,300*
	2017	21.8	142%	0	2,600	5,400	14,500	0	20	4,400	1	*26,900*	250	0	22,100	170	22,500	6,600	900	0	*30,000*	*-3,100*	*-375,400*
	2018	9.1	59%	0	100	600	500	0	20	4,400	1	*5,600*	280	150	22,200	170	22,800	6,600	900	0	*30,300*	*-24,700*	*-400,100*
	Minimum	6.2	41%	0	10	300	100	0	10	2,100	1	3,300	170	0	10,300	100	13,800	6,300	300	0	22,300	-26,400	
	Maximum	36.2	235%	0	13,600	12,000	42,400	0	20	4,400	1	69,600	370	3,430	22,200	170	24,300	6,700	5,400	0	34,600	43,100	**Basin Yield**
	Average	**15.4**	**100%**	**0**	**2,400**	**3,100**	**8,600**	**0**	**20**	**3,500**	**1**	**17,500**	**270**	**1,800**	**17,300**	**140**	**19,500**	**6,500**	**2,000**	**0**	**28,100**	**-10,600**	***8,900***
			% of Total:	0%	14%	18%	49%	0%	0%	20%	0%		1%	6%	62%	0%		23%	7%	0%			
Current Water Budget	**2011**	21.7	141%	0	7,500	7,700	27,300	0	20	4,400	1	*46,900*	300	590	22,000	160	23,100	6,400	700	0	*30,200*	*16,700*	*16,700*
	2012	10.6	69%	0	50	1,300	1,200	0	20	4,400	1	*7,000*	310	300	22,000	160	22,800	6,500	1,100	0	*30,400*	*-23,400*	*-6,700*
	2013	6.3	41%	0	100	400	300	0	20	4,400	1	*5,200*	320	430	22,000	160	22,900	6,600	400	0	*29,900*	*-24,700*	*-31,400*
	2014	6.2	41%	0	10	400	200	0	20	4,400	1	*5,000*	320	1,800	22,000	160	24,300	6,600	400	0	*31,300*	*-26,300*	*-57,700*
	2015	7.6	50%	0	10	400	200	0	20	4,400	1	*5,000*	250	1,720	22,000	160	24,100	6,700	600	0	*31,400*	*-26,400*	*-84,100*
	2016	11.8	77%	0	30	900	1,100	0	20	4,400	1	*6,500*	250	390	22,000	160	22,800	6,600	700	0	*30,100*	*-23,600*	*-107,700*
	2017	21.8	142%	0	2,600	5,400	14,500	0	20	4,400	1	*26,900*	250	0	22,100	170	22,500	6,600	900	0	*30,000*	*-3,100*	*-110,800*
	2018	9.1	59%	0	100	600	500	0	20	4,400	1	*5,600*	280	150	22,200	170	22,800	6,600	900	0	*30,300*	*-24,700*	*-135,500*
	Minimum	6.2	41%	0	10	400	200	0	20	4,400	1	5,000	250	0	22,000	160	22,500	6,400	400	0	29,900	-26,400	
	Maximum	21.8	142%	0	7,500	7,700	27,300	0	20	4,400	1	46,900	320	1,800	22,200	170	24,300	6,700	1,100	0	31,400	16,700	**Basin Yield**
	Average	**11.9**	**77%**	**0**	**1,300**	**2,100**	**5,700**	**0**	**20**	**4,400**	**1**	**13,500**	**290**	**670**	**22,000**	**160**	**23,200**	**6,600**	**700**	**0**	**30,500**	**-17,000**	***6,200***
			% of Total:	0.0%	10%	16%	42%	0%	0%	33%	0%		1%	2%	72%	1%		22%	2%	0%			
																							Basin Yield
Projected Water Budget	**2042**	15.8	101%	0	2,300	4,200	8,200	0	20	5,000	1	*19,700*	340	510	24,900	220	26,000	6,900	2,100	0	*35,000*	*-15,300*	*10,700*
	2072	15.4	100%	0	2,200	4,200	8,000	0	20	5,100	1	*19,500*	340	510	25,500	220	26,600	7,000	2,100	0	*35,700*	*-16,200*	*10,400*
	Minimum	15.4	100%	0	2,200	4,200	8,000	0	20	5,000	1	19,500	340	510	24,900	220	26,000	6,900	2,100	0	35,000	-16,200	
	Maximum	15.8	101%	0	2,300	4,200	8,200	0	20	5,100	1	19,700	340	510	25,500	220	26,600	7,000	2,100	0	35,700	-15,300	**Basin Yield**
	Average	**15.6**	**101%**	**0**	**2,300**	**4,200**	**8,100**	**0**	**20**	**5,100**	**1**	**19,600**	**340**	**510**	**25,200**	**220**	**26,300**	**7,000**	**2,100**	**0**	**35,400**	**-15,800**	***10,500***
			% of Total:	0.0%	12%	21%	41%	0%	0%	26%	0%		1%	1%	71%	1%		20%	6%	0%			

Water Budget	WY	Casmalia Stream Gage (AFY)	Surface Runoff Contribution between Casmalia Gage and Slough (AFY)	D/S Crop ET [consumed water] (AFY)	Total SW Discharge from Slough (AFY)	Total SW Flow Entering Slough [BCM]	GW Discharge to Slough that contributes to SW flow[raw]	GW Discharge to Slough that contributes to SW flow [Adjusted]	Adjustment remainder	SW Flow Entering Slough [Adjusted]	Slough ET (includes capture of portion of GW discharge)	VAFB pumping (AF)
Historical Water Budget	1981	2,667	33	320	2,954	0	2,954	2,954	0	0	2,924	3,273
	1982	1,221	28	320	1,513	0	1,513	1,513	0	0	2,839	3,430
	1983	28,732	1,527	320	27,525	15,848	11,677	5,420	6,258	22,106	2,869	3,078
	1984	1,010	15	320	1,315	0	1,315	1,315	0	0	2,932	3,227
	1985	812	16	320	1,116	0	1,116	1,116	0	0	2,864	3,372
	1986	1,582	80	320	1,823	314	1,509	1,509	0	314	2,878	3,000
	1987	724	20	320	1,025	0	1,025	1,025	0	0	2,871	3,141
	1988	747	22	320	1,045	0	1,045	1,045	0	0	2,883	3,250
	1989	479	15	320	784	0	784	784	0	0	2,882	3,081
	1990	338	15	320	644	0	644	644	0	0	2,890	3,414
	1991	5,312	28	320	5,604	0	5,604	4,511	1,094	1,094	2,836	3,242
	1992	4,928	128	320	5,121	1,084	4,037	4,037	0	1,084	2,933	3,243
	1993	6,910	381	320	6,849	3,527	3,322	3,322	0	3,527	2,898	2,838
	1994	833	23	320	1,130	0	1,130	1,130	0	0	2,892	2,862
	1995	15,039	1,343	320	14,016	12,251	1,765	1,765	0	12,251	2,856	2,692
	1996	2,716	39	320	2,998	0	2,998	2,998	0	0	2,931	3,117
	1997	2,334	61	320	2,593	0	2,593	2,593	0	0	2,911	3,317
	1998	18,978	1,985	320	17,313	21,589	-4,276	300	-4,576	17,013	2,842	1,131
	1999	1,614	119	320	1,815	251	1,564	1,564	0	251	2,803	410
	2000	5,478	60	320	5,739	0	5,739	4,538	1,201	1,201	2,899	844
	2001	8,835	241	320	8,914	1,664	7,250	4,811	2,439	4,103	2,867	643
	2002	858	13	320	1,165	0	1,165	1,165	0	0	2,873	456
	2003	949	21	320	1,248	0	1,248	1,248	0	0	2,882	413
	2004	617	16	320	920	0	920	920	0	0	2,904	463
	2005	13,242	548	320	13,014	4,191	8,823	5,053	3,770	7,961	2,854	434
	2006	4,950	38	320	5,232	0	5,232	4,434	798	798	2,892	335
	2007	48	11	320	358	0	358	358	0	0	2,881	338
	2008	3,883	42	320	4,162	0	4,162	4,162	0	0	2,880	1,142
	2009	830	17	320	1,133	0	1,133	1,133	0	0	2,890	1,420
	2010	4,367	80	320	4,607	182	4,425	4,252	173	355	2,820	1,467
	2011	7,758	935	320	7,144	6,407	737	737	0	6,407	2,836	586
	2012	839	36	320	1,123	0	1,123	1,123	0	0	2,888	295
	2013	52	11	320	361	0	361	361	0	0	2,912	429
	2014	41	10	320	351	0	351	351	0	0	2,936	1,801
	2015	306	11	320	615	0	615	615	0	0	2,958	1,724
	2016	375	20	320	676	0	676	676	0	0	2,929	388
	2017	3,010	328	320	3,003	2,107	896	896	0	2,107	2,925	0
	2018	553	14	320	860	0	860	860	0	0	2,931	147
	Min	41	10	320	351	0	-4,276	300	-4,576	0	2,803	0
	Max	28,732	1,985	320	27,525	21,589	11,677	5,420	6,258	22,106	2,958	3,430
	Average	4,052	219	320	4,153	1,827	2,326	2,033	294	2,120	2,887	1,801

Water Budget: Approach to Future Projections

San Antonio Creek Basin

December 21, 2020

GSI Water Solutions, Inc.

San Antonio Creek Basin Future Projections (1/3)

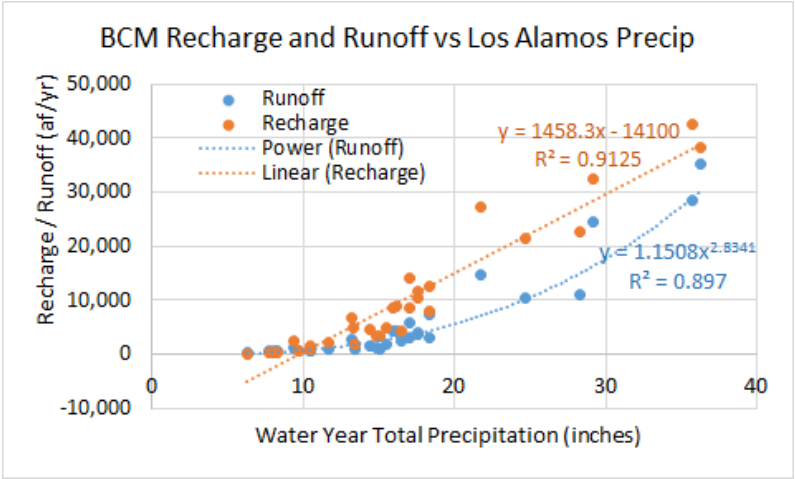
- Requirement: 50-year series based on historical climate record
- Currently readily available data and period of record
  - BCM Precip, Recharge, Runoff, and ET, Water Years 1981 – 2011
  - Los Alamos Fire Station Precip, 1918-2020
  - DWC VIC model ET and Precip Factors, 1915-2011
- Additional Constraints
  - How to utilize BCM data
    - Develop 50-yr POR recycled from existing BCM 30-yr POR
    - Use Precip – RCH and Precip – Runoff correlation to estimate BCM values for water years outside BCM 30-yr POR
  - Precip cumulative departure ~ zero for 50-yr period

§354.18 Water Budget.

(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:

(3) Projected water budgets shall be used to estimate future baseline conditions of supply, demand, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:

(A) Projected hydrology shall utilize 50 years of historical precipitation, evapotranspiration, and streamflow information as the baseline condition for estimating future hydrology. The projected hydrology information shall also be applied as the baseline condition used to evaluate future scenarios of hydrologic uncertainty associated with projections of climate change and sea level rise.



San Antonio Creek Basin, Future Projections (2/3): DWR Guidance to Account for Climate Change in Future Scenarios for GSP

4.5 Incorporating Climate Change Analysis Into Water Budgets

As described in the GSP regulations, the Water Budget BMP and earlier in this Guidance Document, the following water budgets are required as part of GSP development:

- Water budget representing historical conditions extending back a minimum of 10 years
- Water budget representing current conditions
- Water budget representing projected conditions over the 50-year SGMA planning and implementation horizon

Based on the available climate change data provided by DWR and described in this Guidance Document, projected water budget could be developed for two future conditions using a climate period analysis as follows:

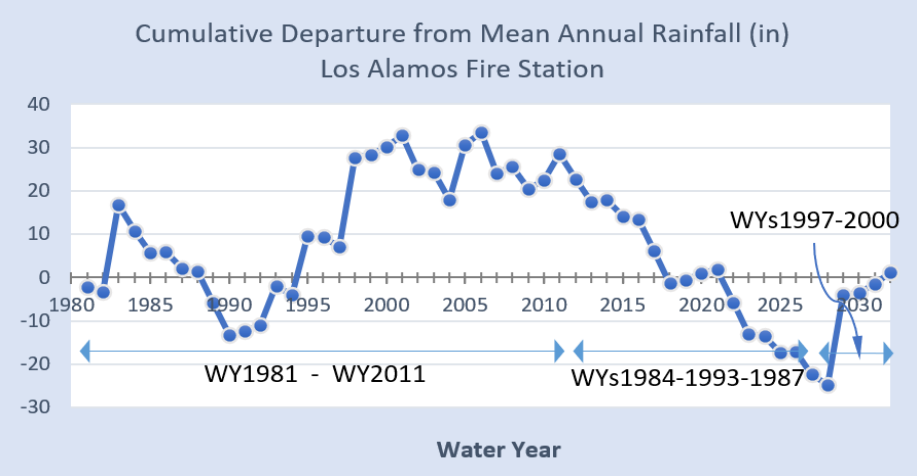
- Water budget representing conditions at 2030 with uncertainty (using 50 years of historical record representative of the range of inter-annual variability as baseline). Projected 2030 central tendency data will be useful to evaluate projects and actions to achieve sustainability in the early future.
- Water budget representing conditions at 2070 with uncertainty (using 50 years of historical record representative of the range of inter-annual variability as baseline). Projected 2070 central tendency data will be useful to show that sustainability will be maintained into the planning and implementation horizon (i.e., late future), within 50 years after GSP approval.

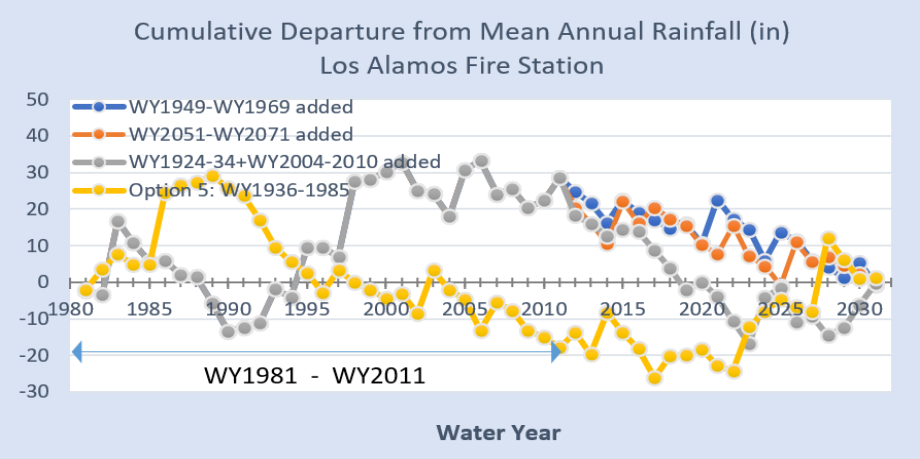
4.5.1 Projected Water Budget Development Without a Numerical Model

For projected water budgets developed without a numerical groundwater flow model, the datasets described above can be incorporated into a spreadsheet-type water budget where the monthly time series of change factors and direct flow values are used to generate projected future conditions. The 50-year baseline condition timeseries is modified using the change factors from the 2030 projections and 2070 projections, respectively. The resulting timeseries would represent a 50-year projection to understand the uncertainty of what climate and hydrologic conditions could look like in 2030 and the uncertainty of what the climate and hydrologic conditions could look like in 2070. These timeseries include a range of variability in hydrology and temperature as projected for the 2030 and 2070 conditions. The resulting projected water budgets developed for 2030 and for 2070 conditions can be reviewed and interpreted through statistical analysis using water year type averaging and describing ranges in conditions to describe uncertainties in projected water budgets, as further discussed in Section 4.6 below.

San Antonio Creek Basin Future Projections (3/3)

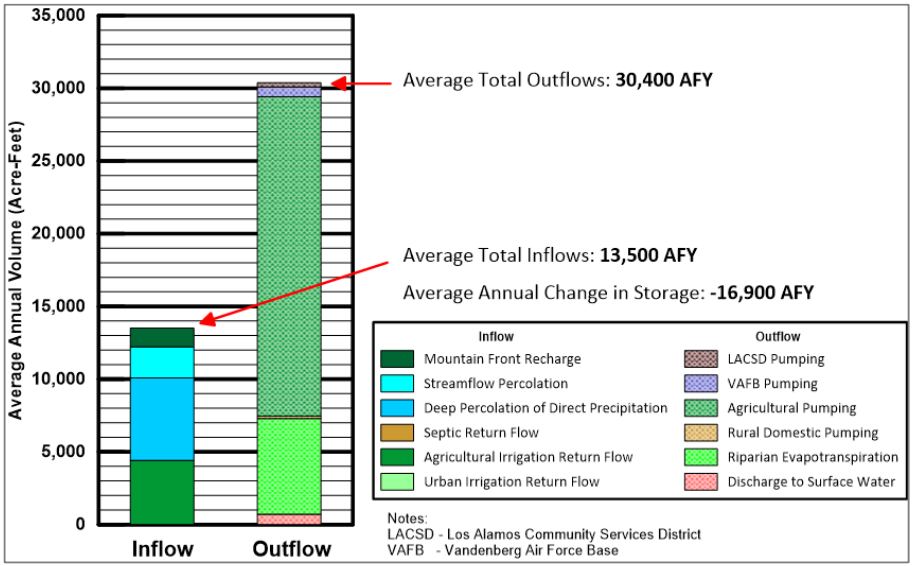
- BCM data available for 1980-2018
  - For climate change analysis, must overlap with VIC-model POR(1915-2011)
  - Overlapping POR between BCM and VIC is 1980 – 2011
- Precip cumulative departure ~ zero for 50-yr period
  - Five candidate series, four utilize the 1981- 2011 historical for first 30 years;
    - *At 30-yr (2011), the cumulative departure from avg precipitation is +28.63 inches*
    - *Objective is to close cumulative departure in final 20-yr sequence*
  - Option 1 (top) employs two sequences from BCM – VIC overlap POR to close cumulative departure
  - Three additional options were investigated the VIC POR for the final 20 years
  - One additional plotted was the "optimal" 50-year sequence from the entire POR for the Los Alamos rain gage (WY 1936 – 1985)





Next steps

1. Select 50-yr climate series
2. Run future model for three 50-yr series (Baseline current conditions, VIC-2030, VIC-2070)
3. Develop three stacked-bar charts similar to figure in top right showing average for Baseline, 2032, and 2072
4. 2032 bar chart based on VIC-2030 model, and 2072 bar chart based on VIC-2070 model



- Areal recharge, mtn recharge, streambed perc, surface flow to slough: all from BCM
- M&I pumping demand: demographics and per capita use
- Agricultural Pumping demand:
  - Irrigated lands + crop trends (Nate)
  - Crop duty factors, $Kc_{adj} = Kc_{baseline} * ET_{VIC}$
  - CIR_{adj} = Crop Irrigation Req'mnt = $CIR_{baseline} * ET_{VIC}$
- Plug all values in to WB spreadsheet, solve for storage change

ID Final Steps in WB Spreadsheet

- Select 50-yr climate series tab (Future Baseline, 2030 Climate Change, or 2070 Climate Change)
- Insert data related to M&I (columns E, F, L, M, P in spreadsheet); these should be based on demographics, and independent of future climate (i.e., will be same on all tabs)
- Agricultural Pumping demand (column O) will be calculated the same as for historical model, but updated with irrigated land trends (acreage and crop mix), AND multiply by ET factor (column N)
- Again, the Ag trends are independent of climate and so will be the same on all tabs; the only difference will be the ET factor multiplier
- Columns R through T relate to the hydrogeologic CM and water balance at Barka Slough
- Bar chart avg values for Current Condition, 2032, and 2072 "snapshots" taken from line 53

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1												OUTFLOW (Acre Feet per Year)											
2	Year Count	Water Year	Precip at LAFD (inches)	Perc Aerial Rech of Direct Precip	Perc of Waste-water	Urban Irr Return Flow	Ag Irrigation Return Flow	Streambed Infiltration	Mountain front Recharge	Other Subsurface GW Inflow?	Total Inflow	LACSD Pumping	VAFB Pumping	Future ET factor	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping	Riparian Evapo-transpiration	Discharge to SW?	Subsurface Outflow	Total Outflow	Change in Storage (AF)	Cumulative Change in Storage (AF)
3	1	2023	13.71	4,818				2,231	1,351	0	8,400			1.085					0	0	1	8,399	8,399
4	2	2024	13.85	4,249				1,414	1,477	0	7,140			1.075							1	7,139	15,538
33	31	2053	20.92	25,163				11,749	6,905	0	43,816			1.092							1	43,815	537,642
34	32	2054	8.72	485				484	198	0	1,167			1.090							1	1,166	538,808
35	33	2055	10.64	1,364				649	445	0	2,457			1.097							1	2,456	541,265
36	34	2056	16.50	8,599				4,033	2,668	0	15,299			1.081							1	15,298	556,563
37	35	2057	12.42	2,214				886	683	0	3,783			1.089							1	3,782	560,345
38	36	2058	16.64	3,406				1,073	1,188	0	5,667			1.075							1	5,666	566,011
39	37	2059	7.98	195				496	12	0	702			1.066							1	701	566,712
40	38	2060	8.24	184				497	16	0	698			1.058							1	697	567,409
41	39	2061	15.31	3,750				2,164	630	0	6,544			1.081							1	6,543	573,952
42	40	2062	15.54	12,363				4,659	3,387	0	20,409			1.078							1	20,408	594,360
43	41	2063	14.16	3,455				2,001	580	0	6,036			1.083							1	6,035	600,395
44	42	2064	8.04	180				485	16	0	681			1.088							1	680	601,075
45	43	2065	8.40	205				522	12	0	739			1.075							1	738	601,812
46	44	2066	13.67	2,780				881	970	0	4,631			1.081							1	4,630	606,443
47	45	2067	12.41	2,206				885	681	0	3,772			1.059							1	3,771	610,214
48	46	2068	16.61	8,795				4,061	2,729	0	15,585			1.068							1	15,584	625,798
49	47	2069	9.98	1,265				608	413	0	2,285			1.101							1	2,284	628,082
50	48	2070	35.51	36,078				26,148	7,014	0	69,241			1.100							1	69,240	697,322
51	49	2071	13.49	7,093				3,142	2,224	0	12,459			1.127							1	12,457	709,779
52	50	2072	15.30	8,899				2,833	2,880	0	14,612			1.064							1	14,611	724,390
53		Average	15.40	8,070	#DIV/0!	#DIV/0!	#DIV/0!	4,164	2,255	0	14,489	#DIV/0!	#DIV/0!	1.0824	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	0	1	14,488	

San Antonio Creek Valley Groundwater Basin Water Budget

Values in acre-feet

= Component of Inflow

= Component of Outflow

Water Budget	Year Count	Historical Index Year	Water Year	Rainfall		Components of Inflow								Total Inflow	Components of Outflow									Total Outflow	Change in Storage	Cumulative Change in Storage
															Groundwater Pumping					Riparian Evapotranspiration	Groundwater Discharge to Surface Water	Subsurface Outflow				
				Inches	% of Average	Subsurface Inflow	Mountain Front Recharge	Streamflow Percolation	Percolation of Direct Precipitation	LACSD WWTP Effluent	Septic Return Flows	Ag Irrigation Return Flows	Urban Irrigation Return Flows		LACSD Pumping	VAFB Pumping	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping							
Projected Water Budget 50-Year Future Baseline	1	1981	2023	13.3	85%	0	1,400	2,200	4,900	0	20	4,700	1	*13,200*	270	410	23,600	180	24,500	6,600	3,000	0	*34,100*	*-20,900*	*-20,900*
	2	1982	2024	14.4	93%	0	1,600	1,500	4,600	0	20	4,700	1	*12,400*	270	410	23,600	180	24,500	6,400	1,500	0	*32,400*	*-20,000*	*-40,900*
	3	1983	2025	35.7	229%	0	13,600	22,200	42,400	0	20	4,700	1	*82,900*	280	420	23,600	180	24,500	6,500	4,200	0	*35,200*	*47,700*	*6,800*
	4	1984	2026	9.7	62%	0	200	500	600	0	20	4,700	1	*6,000*	280	420	23,600	180	24,500	6,600	1,300	0	*32,400*	*-26,400*	*-19,600*
	5	1985	2027	10.4	67%	0	400	600	1,400	0	20	4,700	1	*7,100*	280	430	23,600	180	24,500	6,500	1,100	0	*32,100*	*-25,000*	*-44,600*
	6	1986	2028	15.9	102%	0	2,700	3,800	8,500	0	20	4,700	1	*19,700*	280	430	23,600	180	24,500	6,500	1,500	0	*32,500*	*-12,800*	*-57,400*
	7	1987	2029	11.7	75%	0	700	800	2,200	0	20	4,700	1	*8,400*	290	430	23,600	190	24,500	6,500	1,000	0	*32,000*	*-23,600*	*-81,000*
	8	1988	2030	15.1	97%	0	1,100	1,000	3,200	0	20	4,700	1	*10,000*	290	440	23,600	190	24,500	6,500	1,000	0	*32,000*	*-22,000*	*-103,000*
	9	1989	2031	8.2	53%	0	0	500	200	0	20	4,700	1	*5,400*	290	440	23,600	190	24,500	6,500	800	0	*31,800*	*-26,400*	*-129,400*
	10	1990	2032	8.1	52%	0	0	500	200	0	20	4,700	1	*5,400*	290	450	23,600	190	24,500	6,500	600	0	*31,600*	*-26,200*	*-155,600*
	11	1991	2033	16.5	106%	0	700	2,300	4,100	0	20	4,700	1	*11,800*	300	450	23,600	190	24,500	6,400	4,200	0	*35,100*	*-23,300*	*-178,900*
	12	1992	2034	17.0	109%	0	3,800	5,200	14,000	0	20	4,700	1	*27,700*	300	460	23,600	190	24,600	6,600	4,000	0	*35,200*	*-7,500*	*-186,400*
	13	1993	2035	24.7	158%	0	6,800	9,100	21,300	0	20	4,700	1	*41,900*	300	460	23,600	200	24,600	6,600	3,300	0	*34,500*	*7,400*	*-179,000*
	14	1994	2036	13.4	86%	0	600	900	1,900	0	20	4,700	1	*8,100*	310	460	23,600	200	24,600	6,500	1,100	0	*32,200*	*-24,100*	*-203,100*
	15	1995	2037	29.2	187%	0	7,500	19,700	32,400	0	20	4,700	1	*64,300*	310	470	23,600	200	24,600	6,500	1,800	0	*32,900*	*31,400*	*-171,700*
	16	1996	2038	15.5	99%	0	1,300	1,800	5,100	0	20	4,700	1	*12,900*	310	470	23,600	200	24,600	6,600	3,000	0	*34,200*	*-21,300*	*-193,000*
	17	1997	2039	13.2	84%	0	2,500	2,700	6,900	0	20	4,700	1	*16,800*	310	480	23,600	200	24,600	6,600	2,600	0	*33,800*	*-17,000*	*-210,000*
	18	1998	2040	36.2	232%	0	7,400	26,700	38,300	0	20	4,700	1	*77,100*	320	480	23,600	200	24,600	6,400	1,000	0	*32,000*	*45,100*	*-164,900*
	19	1999	2041	16.2	104%	0	2,800	3,700	8,900	0	20	4,700	1	*20,100*	320	480	23,600	210	24,600	6,300	1,600	0	*32,500*	*-12,400*	*-177,300*
	20	2000	2042	17.5	112%	0	3,400	3,300	10,400	0	20	4,700	1	*21,800*	320	490	23,600	210	24,600	6,600	4,200	0	*35,400*	*-13,600*	*-190,900*
	21	2001	2043	18.3	118%	0	4,400	6,400	12,400	0	20	4,700	1	*27,900*	320	490	23,600	210	24,600	6,500	4,200	0	*35,300*	*-7,400*	*-198,300*
	22	2002	2044	7.7	49%	0	0	500	400	0	20	4,700	1	*5,600*	330	500	23,600	210	24,600	6,500	1,200	0	*32,300*	*-26,700*	*-225,000*
	23	2003	2045	14.8	95%	0	1,100	1,100	3,400	0	20	4,700	1	*10,300*	330	500	23,600	210	24,600	6,500	1,200	0	*32,300*	*-22,000*	*-247,000*
	24	2004	2046	9.4	60%	0	800	1,100	2,400	0	20	4,700	1	*9,000*	330	500	23,600	210	24,600	6,600	900	0	*32,100*	*-23,100*	*-270,100*
	25	2005	2047	28.3	181%	0	7,800	9,200	22,700	0	20	4,700	1	*44,400*	330	510	23,600	220	24,700	6,500	4,200	0	*35,400*	*9,000*	*-261,100*
	26	2006	2048	18.3	117%	0	3,100	2,700	8,100	0	20	4,700	1	*18,600*	340	510	23,600	220	24,700	6,500	4,200	0	*35,400*	*-16,800*	*-277,900*
	27	2007	2049	6.3	40%	0	0	300	100	0	20	4,700	1	*5,100*	340	520	23,600	220	24,700	6,500	400	0	*31,600*	*-26,500*	*-304,400*
	28	2008	2050	17.0	109%	0	2,200	3,000	8,600	0	20	4,700	1	*18,500*	340	520	23,600	220	24,700	6,500	4,200	0	*35,400*	*-16,900*	*-321,300*
	29	2009	2051	10.5	67%	0	200	700	800	0	20	4,700	1	*6,400*	350	520	23,600	220	24,700	6,500	1,100	0	*32,300*	*-25,900*	*-347,200*
	30	2010	2052	17.6	113%	0	2,900	3,700	11,600	0	20	4,700	1	*22,900*	350	530	23,600	230	24,700	6,400	4,200	0	*35,300*	*-12,400*	*-359,600*
	31	2011	2053	21.7	139%	0	7,500	12,200	27,300	0	20	4,700	1	*51,700*	350	530	23,600	230	24,700	6,400	700	0	*31,800*	*19,900*	*-339,700*
	32	1984	2054	9.7	62%	0	200	500	600	0	20	4,700	1	*6,000*	350	540	23,600	230	24,700	6,600	1,300	0	*32,600*	*-26,600*	*-366,300*
	33	1985	2055	10.4	67%	0	400	600	1,400	0	20	4,700	1	*7,100*	360	540	23,600	230	24,700	6,500	1,100	0	*32,300*	*-25,200*	*-391,500*
	34	1986	2056	15.9	102%	0	2,600	3,800	8,500	0	20	4,700	1	*19,600*	360	540	23,600	230	24,700	6,500	1,500	0	*32,700*	*-13,100*	*-404,600*
	35	1987	2057	11.7	75%	0	700	800	2,200	0	20	4,700	1	*8,400*	360	550	23,600	230	24,700	6,500	1,000	0	*32,200*	*-23,800*	*-428,400*
	36	1988	2058	15.1	97%	0	1,100	1,000	3,200	0	20	4,700	1	*10,000*	360	550	23,600	240	24,800	6,500	1,000	0	*32,300*	*-22,300*	*-450,700*
	37	1989	2059	8.2	53%	0	0	500	200	0	30	4,700	1	*5,400*	370	560	23,600	240	24,800	6,500	800	0	*32,100*	*-26,700*	*-477,400*
	38	1990	2060	8.1	52%	0	0	500	200	0	30	4,700	1	*5,400*	370	560	23,600	240	24,800	6,500	600	0	*31,900*	*-26,500*	*-503,900*
	39	1991	2061	16.5	106%	0	700	2,300	4,100	0	30	4,700	1	*11,800*	370	560	23,600	240	24,800	6,400	4,200	0	*35,400*	*-23,600*	*-527,500*
	40	1992	2062	17.0	109%	0	3,800	5,100	14,000	0	30	4,700	1	*27,600*	370	570	23,600	240	24,800	6,600	4,000	0	*35,400*	*-7,800*	*-535,300*
	41	1991	2063	16.5	106%	0	700	2,300	4,100	0	30	4,700	1	*11,800*	380	570	23,600	240	24,800	6,400	4,200	0	*35,400*	*-23,600*	*-558,900*
	42	1990	2064	8.1	52%	0	0	500	200	0	30	4,700	1	*5,400*	380	580	23,600	250	24,800	6,500	600	0	*31,900*	*-26,500*	*-585,400*
	43	1989	2065	8.2	53%	0	0	500	200	0	30	4,700	1	*5,400*	380	580	23,600	250	24,800	6,500	800	0	*32,100*	*-26,700*	*-612,100*
	44	1988	2066	15.1	97%	0	1,100	1,000	3,300	0	30	4,700	1	*10,100*	390	580	23,600	250	24,800	6,500	1,000	0	*32,300*	*-22,200*	*-634,300*
	45	1987	2067	11.7	75%	0	700	800	2,200	0	30	4,700	1	*8,400*	390	590	23,600	250	24,800	6,500	1,000	0	*32,300*	*-23,900*	*-658,200*
	46	1986	2068	15.9	102%	0	2,600	3,800	8,500	0	30	4,700	1	*19,600*	390	590	23,600	250	24,800	6,500	1,500	0	*32,800*	*-13,200*	*-671,400*
	47	1985	2069	10.4	67%	0	400	600	1,400	0	30	4,700	1	*7,100*	390	600	23,600	250	24,800	6,500	1,100	0	*32,400*	*-25,300*	*-696,700*
	48	1998	2070	36.2	232%	0	7,400	26,700	38,400	0	30	4,700	1	*77,200*	400	600	23,600	260	24,900	6,400	1,000	0	*32,300*	*44,900*	*-651,800*
	49	1999	2071	16.2	104%	0	2,800	3,800	8,800	0	30	4,700	1	*20,100*	400	600	23,600	260	24,900	6,300	1,600	0	*32,800*	*-12,700*	*-664,500*
	50	2000	2072	17.5	112%	0	3,400	3,200	10,300	0	30	4,700	1	*21,600*	400	610	23,600	260	24,900	6,600	4,200	0	*35,700*	*-14,100*	*-678,600*
			Minimum	6.3	40%	0	0	300	100	0	20	4,700	1	5,100	270	410	23,600	180	24,500	6,300	400	0	31,600	-26,700	
			Maximum	36.2	232%	0	13,600	26,700	42,400	0	30	4,700	1	82,900	400	610	23,600	260	24,900	6,600	4,200	0	35,700	47,700	**Basin Yield**
			Average	**15.6**	**100%**	**0**	**2,300**	**4,200**	**8,400**	**0**	**20**	**4,700**	**1**	**19,600**	**336**	**510**	**23,600**	**220**	**24,700**	**6,500**	**2,000**	**0**	**33,200**	**-13,600**	***11,100***
					% of Total:	0%	12%	21%	43%	0%	0%	24%	0%		1%	2%	71%	1%		20%	6%	0%			

San Antonio Creek Valley Groundwater Basin Water Budget

Values in acre-feet

= Component of Inflow

= Component of Outflow

Water Budget	Year Count	Historical Index Year	Water Year	Rainfall				Components of Inflow								Total Inflow	2030 DWR ET Factor	Components of Outflow								Total Outflow	Change in Storage	Cumulative Change in Storage
																		Groundwater Pumping					Riparian Evapotranspiration	Groundwater Discharge to Surface Water	Subsurface Outflow			
				Inches	% of Average	2030 DWR Precip Factors	2030 Inches	Subsurface Inflow	Mountain Front Recharge	Streamflow Percolation	Percolation of Direct Precipitation	LACSD WWTP Effluent	Septic Return Flows	Ag Irrigation Return Flows	Urban Irrigation Return Flows			LACSD Pumping	VAFB Pumping	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping						
Projected Water Budget 2030	1	1981	2023	13.3	85%	1.029	14.03	0	1,400	2,200	4,800	0	20	4,900	1	*13,300*	1.034	270	410	24,400	180	25,300	6,800	2,900	0	*35,000*	*-21,700*	*-21,700*
	2	1982	2024	14.4	93%	0.967	13.50	0	1,500	1,400	4,300	0	20	4,900	1	*12,100*	1.044	270	410	24,600	180	25,500	6,700	1,500	0	*33,700*	*-21,600*	*-43,300*
	3	1983	2025	35.7	229%	1.020	36.30	0	13,400	22,600	41,800	0	20	4,900	1	*82,700*	1.035	280	420	24,400	180	25,300	6,700	5,500	0	*37,500*	*45,200*	*1,900*
	4	1984	2026	9.7	62%	0.998	9.63	0	200	500	600	0	20	4,900	1	*6,200*	1.033	280	420	24,400	180	25,300	6,800	1,300	0	*33,400*	*-27,200*	*-25,300*
	5	1985	2027	10.4	67%	1.119	12.87	0	500	700	1,500	0	20	4,900	1	*7,600*	1.033	280	430	24,400	180	25,300	6,700	1,100	0	*33,100*	*-25,500*	*-50,800*
	6	1986	2028	15.9	102%	1.025	16.62	0	2,600	3,900	8,400	0	20	4,900	1	*19,800*	1.036	280	430	24,400	180	25,300	6,700	1,400	0	*33,400*	*-13,600*	*-64,400*
	7	1987	2029	11.7	75%	1.070	12.29	0	700	900	2,300	0	20	4,900	1	*8,800*	1.038	290	430	24,500	190	25,400	6,700	1,000	0	*33,100*	*-24,300*	*-88,700*
	8	1988	2030	15.1	97%	1.040	15.71	0	1,100	1,000	3,300	0	20	4,900	1	*10,300*	1.029	290	440	24,300	190	25,200	6,700	1,100	0	*33,000*	*-22,700*	*-111,400*
	9	1989	2031	8.2	53%	1.076	9.37	0	0	600	200	0	20	4,900	1	*5,700*	1.040	290	440	24,500	190	25,400	6,800	800	0	*33,000*	*-27,300*	*-138,700*
	10	1990	2032	8.1	52%	1.051	8.79	0	0	500	200	0	20	4,900	1	*5,600*	1.032	290	450	24,300	190	25,200	6,700	700	0	*32,600*	*-27,000*	*-165,700*
	11	1991	2033	16.5	106%	1.036	17.01	0	700	2,400	4,200	0	20	4,900	1	*12,200*	1.035	300	450	24,400	190	25,300	6,600	4,600	0	*36,500*	*-24,300*	*-190,000*
	12	1992	2034	17.0	109%	1.054	18.89	0	3,900	5,400	14,200	0	20	4,900	1	*28,400*	1.037	300	460	24,400	190	25,400	6,900	4,300	0	*36,600*	*-8,200*	*-198,200*
	13	1993	2035	24.7	158%	1.149	30.80	0	7,600	10,400	23,700	0	20	4,900	1	*46,600*	1.034	300	460	24,400	200	25,400	6,800	3,200	0	*35,400*	*11,200*	*-187,000*
	14	1994	2036	13.4	86%	1.047	14.66	0	600	1,000	1,900	0	20	4,900	1	*8,400*	1.037	310	460	24,500	200	25,500	6,800	1,200	0	*33,500*	*-25,100*	*-212,100*
	15	1995	2037	29.2	187%	1.013	28.63	0	7,400	20,000	31,700	0	20	4,900	1	*64,000*	1.034	310	470	24,400	200	25,400	6,700	1,800	0	*33,900*	*30,100*	*-182,000*
	16	1996	2038	15.5	99%	1.044	16.57	0	1,300	1,900	5,100	0	20	4,900	1	*13,200*	1.042	310	470	24,600	200	25,600	6,900	3,200	0	*35,700*	*-22,500*	*-204,500*
	17	1997	2039	13.2	84%	0.971	12.40	0	2,400	2,600	6,400	0	20	4,900	1	*16,300*	1.034	310	480	24,400	200	25,400	6,800	2,600	0	*34,800*	*-18,500*	*-223,000*
	18	1998	2040	36.2	232%	1.035	37.97	0	7,400	27,700	38,200	0	20	4,900	1	*78,200*	1.039	320	480	24,500	200	25,500	6,700	300	0	*32,500*	*45,700*	*-177,300*
	19	1999	2041	16.2	104%	0.999	15.80	0	2,700	3,700	8,600	0	20	4,900	1	*19,900*	1.035	320	480	24,400	210	25,400	6,600	1,500	0	*33,500*	*-13,600*	*-190,900*
	20	2000	2042	17.5	112%	1.014	16.98	0	3,300	3,300	10,200	0	20	4,900	1	*21,700*	1.041	320	490	24,500	210	25,500	6,800	4,600	0	*36,900*	*-15,200*	*-206,100*
	21	2001	2043	18.3	118%	0.975	17.15	0	4,200	6,300	11,700	0	20	4,900	1	*27,100*	1.037	320	490	24,500	210	25,500	6,700	4,800	0	*37,000*	*-9,900*	*-216,000*
	22	2002	2044	7.7	49%	1.065	8.66	0	0	500	400	0	20	4,900	1	*5,800*	1.039	330	500	24,500	210	25,500	6,700	1,200	0	*33,400*	*-27,600*	*-243,600*
	23	2003	2045	14.8	95%	1.006	14.86	0	1,100	1,100	3,300	0	20	4,900	1	*10,400*	1.032	330	500	24,300	210	25,300	6,700	1,300	0	*33,300*	*-22,900*	*-266,500*
	24	2004	2046	9.4	60%	1.011	9.55	0	800	1,100	2,300	0	20	4,900	1	*9,100*	1.035	330	500	24,400	210	25,400	6,800	900	0	*33,100*	*-24,000*	*-290,500*
	25	2005	2047	28.3	181%	1.033	28.23	0	7,700	9,500	22,600	0	20	4,900	1	*44,700*	1.039	330	510	24,500	220	25,600	6,700	5,200	0	*37,500*	*7,200*	*-283,300*
	26	2006	2048	18.3	117%	0.942	16.20	0	2,800	2,600	7,300	0	20	4,900	1	*17,600*	1.035	340	510	24,400	220	25,500	6,800	4,400	0	*36,700*	*-19,100*	*-302,400*
	27	2007	2049	6.3	40%	1.027	6.48	0	0	400	100	0	20	4,900	1	*5,400*	1.045	340	520	24,700	220	25,800	6,800	400	0	*33,000*	*-27,600*	*-330,000*
	28	2008	2050	17.0	109%	1.195	22.53	0	2,500	3,500	9,900	0	20	4,900	1	*20,800*	1.039	340	520	24,500	220	25,600	6,800	4,300	0	*36,700*	*-15,900*	*-345,900*
	29	2009	2051	10.5	67%	1.079	11.72	0	200	800	800	0	20	4,900	1	*6,700*	1.036	350	520	24,400	220	25,500	6,800	1,200	0	*33,500*	*-26,800*	*-372,700*
	30	2010	2052	17.6	113%	1.182	23.62	0	3,400	4,300	13,100	0	20	4,900	1	*25,700*	1.040	350	530	24,500	230	25,600	6,600	4,300	0	*36,500*	*-10,800*	*-383,500*
	31	2011	2053	21.7	139%	1.049	22.55	0	7,500	12,800	27,400	0	20	4,900	1	*52,600*	1.042	350	530	24,600	230	25,700	6,700	600	0	*33,000*	*19,600*	*-363,900*
	32	1984	2054	9.7	62%	1.057	10.19	0	200	500	600	0	20	4,900	1	*6,200*	1.030	350	540	24,300	230	25,400	6,800	1,300	0	*33,500*	*-27,300*	*-391,200*
	33	1985	2055	10.4	67%	1.006	11.69	0	400	800	1,300	0	20	4,900	1	*7,400*	1.039	360	540	24,500	230	25,600	6,700	1,100	0	*33,400*	*-26,000*	*-417,200*
	34	1986	2056	15.9	102%	1.063	17.40	0	2,700	4,100	8,700	0	20	4,900	1	*20,400*	1.043	360	540	24,600	230	25,700	6,800	1,400	0	*33,900*	*-13,500*	*-430,700*
	35	1987	2057	11.7	75%	1.105	12.56	0	700	1,000	2,300	0	20	4,900	1	*8,900*	1.040	360	550	24,500	230	25,600	6,700	1,000	0	*33,300*	*-24,400*	*-455,100*
	36	1988	2058	15.1	97%	0.998	14.92	0	1,100	1,000	3,100	0	20	4,800	1	*10,000*	1.026	360	550	24,200	240	25,400	6,700	1,100	0	*33,200*	*-23,200*	*-478,300*
	37	1989	2059	8.2	53%	1.018	8.78	0	0	600	200	0	30	4,900	1	*5,700*	1.035	370	560	24,400	240	25,600	6,700	800	0	*33,100*	*-27,400*	*-505,700*
	38	1990	2060	8.1	52%	1.078	8.92	0	0	500	200	0	30	4,800	1	*5,500*	1.027	370	560	24,200	240	25,400	6,700	700	0	*32,800*	*-27,300*	*-533,000*
	39	1991	2061	16.5	106%	1.054	17.14	0	700	2,300	4,300	0	30	4,800	1	*12,100*	1.027	370	560	24,200	240	25,400	6,600	4,600	0	*36,600*	*-24,500*	*-557,500*
	40	1992	2062	17.0	109%	1.102	19.55	0	4,100	5,700	14,800	0	30	4,900	1	*29,500*	1.038	370	570	24,500	240	25,700	6,900	4,300	0	*36,900*	*-7,400*	*-564,900*
	41	1991	2063	16.5	106%	1.080	17.73	0	700	2,600	4,400	0	30	4,800	1	*12,500*	1.027	380	570	24,200	240	25,400	6,600	4,600	0	*36,600*	*-24,100*	*-589,000*
	42	1990	2064	8.1	52%	1.058	8.75	0	0	500	200	0	30	4,900	1	*5,600*	1.030	380	580	24,300	250	25,500	6,700	700	0	*32,900*	*-27,300*	*-616,300*
	43	1989	2065	8.2	53%	1.133	9.87	0	0	600	200	0	30	4,900	1	*5,700*	1.042	380	580	24,600	250	25,800	6,800	800	0	*33,400*	*-27,700*	*-644,000*
	44	1988	2066	15.1	97%	0.994	14.86	0	1,100	1,000	3,200	0	30	4,800	1	*10,100*	1.025	390	580	24,200	250	25,400	6,700	1,100	0	*33,200*	*-23,100*	*-667,100*
	45	1987	2067	11.7	75%	1.035	11.65	0	700	1,000	2,200	0	30	4,900	1	*8,800*	1.036	390	590	24,400	250	25,600	6,700	1,000	0	*33,300*	*-24,500*	*-691,600*
	46	1986	2068	15.9	102%	1.049	17.35	0	2,700	4,000	8,600	0	30	4,900	1	*20,200*	1.040	390	590	24,500	250	25,700	6,800	1,400	0	*33,900*	*-13,700*	*-705,300*
	47	1985	2069	10.4	67%	1.191	13.97	0	500	700	1,600	0	30	4,900	1	*7,700*	1.038	390	600	24,500	250	25,700	6,700	1,100	0	*33,500*	*-25,800*	*-731,100*
	48	1998	2070	36.2	232%	0.992	36.74	0	7,200	28,500	37,000	0	30	4,900	1	*77,600*	1.029	400	600	24,300	260	25,600	6,600	300	0	*32,500*	*45,100*	*-686,000*
	49	1999	2071	16.2	104%	1.075	16.83	0	2,900	3,700	9,300	0	30	4,800	1	*20,700*	1.023	400	600	24,100	260	25,400	6,500	1,500	0	*33,400*	*-12,700*	*-698,700*
	50	2000	2072	17.5	112%	0.897	15.01	0	3,000	3,100	9,000	0	30	4,800	1	*19,900*	1.028	400	610	24,200	260	25,500	6,700	4,600	0	*36,800*	*-16,900*	*-715,600*
			Minimum	6.3	40%	0.897	6.48	0	0	400	100	0	20	4,800	1	5,400	1.023	270	410	24,100	180	25,200	6,500	300	0	32,500	-27,700	
			Maximum	36.2	232%	1.195	37.97	0	13,400	28,500	41,800	0	30	4,900	1	82,700	1.045	400	610	24,700	260	25,800	6,900	5,500	0	37,500	45,700	**Basin Yield**
			Average	**15.6**	**100%**	**1.046**	**16.49**	**0**	**2,400**	**4,400**	**8,400**	**0**	**20**	**4,900**	**1**	**20,000**	**1.035**	**336**	**510**	**24,400**	**220**	**25,500**	**6,700**	**2,100**	**0**	**34,300**	**-14,300**	***11,200***
							% of Total:	0%	12%	22%	42%	0%	0%	25%	0%			1%	1%	71%	1%		20%	6%	0%			

Water Budget	Year Count	Index WY	WY	DWR Streamflow Factors 2030	Casmalia Stream Gage (AFY)	Proj. Casmalia Stream Gage (AFY)	Surface Runoff Contribution between Casmalia Gage and Slough (AFY)	D/S Crop ET [consumed water] (AFY)	Total SW Discharge from Slough (AFY)	Total SW Flow Entering Slough [BCM]	GW Discharge to Slough that contributes to SW flow[raw]	GW Discharge to Slough that contributes to SW flow [Adjusted]	Adjustment remainder	SW Flow Entering Slough [Adjusted]	Slough ET (includes capture of portion of GW discharge)	VAFB pumping (AF)
Projected Water Budget 2030	1	1981	2023	0.9839	2,667	2,624	34	331	2,921	0	2,921	2,921	0	0	6,834	411
	2	1982	2024	0.9657	1,221	1,179	27	334	1,486	0	1,486	1,486	0	0	6,702	415
	3	1983	2025	1.0273	28,732	29,516	1,557	331	28,291	16,281	12,010	5,501	6,509	22,790	6,712	419
	4	1984	2026	1.0091	1,010	1,019	15	331	1,335	0	1,335	1,335	0	0	6,849	423
	5	1985	2027	1.0195	812	828	18	331	1,141	0	1,141	1,141	0	0	6,689	427
	6	1986	2028	0.9435	1,582	1,493	82	332	1,743	296	1,447	1,447	0	296	6,740	431
	7	1987	2029	0.9837	724	712	21	332	1,024	0	1,024	1,024	0	0	6,739	435
	8	1988	2030	1.0512	747	785	23	329	1,091	0	1,091	1,091	0	0	6,706	439
	9	1989	2031	1.0350	479	496	16	333	812	0	812	812	0	0	6,774	443
	10	1990	2032	1.0541	338	356	15	331	672	0	672	672	0	0	6,745	447
	11	1991	2033	1.0614	5,312	5,639	29	331	5,941	0	5,941	4,613	1,328	1,328	6,634	451
	12	1992	2034	1.1228	4,928	5,534	135	332	5,731	1,217	4,514	4,307	207	1,424	6,875	455
	13	1993	2035	0.9918	6,910	6,854	438	331	6,747	3,498	3,249	3,249	0	3,498	6,775	459
	14	1994	2036	1.0576	833	881	24	332	1,189	0	1,189	1,189	0	0	6,782	463
	15	1995	2037	1.0258	15,039	15,427	1,361	331	14,397	12,567	1,830	1,830	0	12,567	6,679	467
	16	1996	2038	1.0555	2,716	2,867	41	334	3,160	0	3,160	3,160	0	0	6,906	471
	17	1997	2039	0.9835	2,334	2,295	59	331	2,567	0	2,567	2,567	0	0	6,807	475
	18	1998	2040	1.1199	18,978	21,254	2,055	333	19,531	24,178	-4,647	300	-4,947	19,231	6,677	479
	19	1999	2041	0.9567	1,614	1,544	119	331	1,756	240	1,516	1,516	0	240	6,557	483
	20	2000	2042	1.0648	5,478	5,833	61	333	6,106	0	6,106	4,645	1,461	1,461	6,823	487
	21	2001	2043	0.9204	8,835	8,131	235	332	8,228	1,532	6,697	4,753	1,944	3,475	6,721	491
	22	2002	2044	0.9869	858	847	13	333	1,166	0	1,166	1,166	0	0	6,749	495
	23	2003	2045	1.0285	949	976	21	331	1,285	0	1,285	1,285	0	0	6,727	499
	24	2004	2046	1.0201	617	629	17	331	944	0	944	944	0	0	6,793	503
	25	2005	2047	1.0688	13,242	14,153	566	333	13,919	4,479	9,440	5,179	4,260	8,740	6,702	507
	26	2006	2048	0.9143	4,950	4,526	36	331	4,821	0	4,821	4,378	443	443	6,765	511
	27	2007	2049	1.0044	48	48	11	335	372	0	372	372	0	0	6,808	516
	28	2008	2050	1.0590	3,883	4,112	50	333	4,395	0	4,395	4,278	117	117	6,765	520
	29	2009	2051	1.0245	830	850	18	332	1,164	0	1,164	1,164	0	0	6,770	524
	30	2010	2052	0.9893	4,367	4,320	94	333	4,559	180	4,379	4,274	105	285	6,631	528
	31	2011	2053	0.9322	7,758	7,232	980	334	6,585	5,973	613	613	0	5,973	6,681	532
	32	1984	2054	1.0091	1,010	1,019	15	331	1,335	0	1,335	1,335	0	0	6,831	536
	33	1985	2055	1.0195	812	828	18	331	1,141	0	1,141	1,141	0	0	6,728	540
	34	1986	2056	0.9435	1,582	1,493	82	332	1,743	296	1,447	1,447	0	296	6,785	544
	35	1987	2057	0.9837	724	712	21	332	1,024	0	1,024	1,024	0	0	6,750	548
	36	1988	2058	1.0512	747	785	23	329	1,091	0	1,091	1,091	0	0	6,689	552
	37	1989	2059	1.0350	479	496	16	333	812	0	812	812	0	0	6,741	556
	38	1990	2060	1.0541	338	356	15	331	672	0	672	672	0	0	6,713	560
	39	1991	2061	1.0614	5,312	5,639	29	331	5,941	0	5,941	4,613	1,328	1,328	6,586	564
	40	1992	2062	1.1228	4,928	5,534	135	332	5,731	1,217	4,514	4,307	207	1,424	6,883	568
	41	1991	2063	1.0614	5,312	5,639	29	331	5,941	0	5,941	4,613	1,328	1,328	6,586	572
	42	1990	2064	1.0541	338	356	15	331	672	0	672	672	0	0	6,730	576
	43	1989	2065	1.0350	479	496	16	333	812	0	812	812	0	0	6,791	580
	44	1988	2066	1.0512	747	785	23	329	1,091	0	1,091	1,091	0	0	6,680	584
	45	1987	2067	0.9837	724	712	21	332	1,024	0	1,024	1,024	0	0	6,725	588
	46	1986	2068	0.9435	1,582	1,493	82	332	1,743	296	1,447	1,447	0	296	6,766	592
	47	1985	2069	1.0195	812	828	18	331	1,141	0	1,141	1,141	0	0	6,720	596
	48	1998	2070	1.1199	18,978	21,254	2,055	333	19,531	24,178	-4,647	300	-4,947	19,231	6,612	600
	49	1999	2071	0.9567	1,614	1,544	119	331	1,756	240	1,516	1,516	0	240	6,485	604
	50	2000	2072	1.0648	5,478	5,833	61	333	6,106	0	6,106	4,645	1,461	1,461	6,739	608
			Average	1.0206	4,016	4,175	219	332	4,288	1,933	2,354	2,138	216	2,150	6,733	509
			Min	0.9143	48	48	11	329	372	0	-4,647	300	-4,947	0	6,485	411
			Max	1.1228	28,732	29,516	2,055	335	28,291	24,178	12,010	5,501	6,509	22,790	6,906	608

San Antonio Creek Valley Groundwater Basin Water Budget

Values in acre-feet

= Component of Inflow

= Component of Outflow

Water Budget	Year Count	Historical Index Year	Water Year	Rainfall				Components of Inflow								Total Inflow	2042 DWR ET Factor	Components of Outflow								Total Outflow	Change in Storage	Cumulative Change in Storage
																		Groundwater Pumping					Riparian Evapotranspiration	Groundwater Discharge to Surface Water	Subsurface Outflow			
				Inches	% of Average	2042 DWR Precip Factors	2042 Inches	Subsurface Inflow	Mountain Front Recharge	Streamflow Percolation	Percolation of Direct Precipitation	LACSD WWTP Effluent	Septic Return Flows	Ag Irrigation Return Flows	Urban Irrigation Return Flows			LACSD Pumping	VAFB Pumping	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping						
Projected Water Budget 2042	1	1981	2023	13.3	85%	1.029	13.69	0	1,400	2,200	4,800	0	20	4,900	1	*13,300*	1.034	270	410	24,400	180	25,300	6,800	2,900	0	*35,000*	*-21,700*	*-21,700*
	2	1982	2024	14.4	93%	0.967	13.96	0	1,500	1,400	4,300	0	20	4,900	1	*12,100*	1.044	270	410	24,600	180	25,500	6,700	1,500	0	*33,700*	*-21,600*	*-43,300*
	3	1983	2025	35.7	229%	1.020	36.40	0	13,400	22,600	41,800	0	20	4,900	1	*82,700*	1.035	280	420	24,400	180	25,300	6,700	5,300	0	*37,300*	*45,400*	*2,100*
	4	1984	2026	9.7	62%	0.998	9.64	0	200	500	600	0	20	4,900	1	*6,200*	1.033	280	420	24,400	180	25,300	6,800	1,300	0	*33,400*	*-27,200*	*-25,100*
	5	1985	2027	10.4	67%	1.119	11.68	0	500	700	1,500	0	20	4,900	1	*7,600*	1.033	280	430	24,400	180	25,300	6,700	1,100	0	*33,100*	*-25,500*	*-50,600*
	6	1986	2028	15.9	102%	1.025	16.27	0	2,600	3,900	8,400	0	20	4,900	1	*19,800*	1.036	280	430	24,400	180	25,300	6,700	1,400	0	*33,400*	*-13,600*	*-64,200*
	7	1987	2029	11.7	75%	1.070	12.53	0	700	900	2,300	0	20	4,900	1	*8,800*	1.038	290	430	24,500	190	25,400	6,700	1,000	0	*33,100*	*-24,300*	*-88,500*
	8	1988	2030	15.1	97%	1.040	15.67	0	1,100	1,000	3,300	0	20	4,900	1	*10,300*	1.029	290	440	24,300	190	25,200	6,700	1,100	0	*33,000*	*-22,700*	*-111,200*
	9	1989	2031	8.2	53%	1.073	8.84	0	0	500	200	0	20	4,900	1	*5,600*	1.040	290	440	24,500	190	25,400	6,800	800	0	*33,000*	*-27,400*	*-138,600*
	10	1990	2032	8.1	52%	1.047	8.45	0	0	500	200	0	20	4,900	1	*5,600*	1.034	290	450	24,400	190	25,300	6,800	700	0	*32,800*	*-27,200*	*-165,800*
	11	1991	2033	16.5	106%	1.027	16.93	0	700	2,400	4,100	0	20	4,900	1	*12,100*	1.038	300	450	24,500	190	25,400	6,700	4,500	0	*36,600*	*-24,500*	*-190,300*
	12	1992	2034	17.0	109%	1.051	17.86	0	3,800	5,400	14,100	0	20	4,900	1	*28,200*	1.041	300	460	24,500	190	25,500	6,900	4,200	0	*36,600*	*-8,400*	*-198,700*
	13	1993	2035	24.7	158%	1.140	28.18	0	7,500	10,300	23,400	0	20	4,900	1	*46,100*	1.040	300	460	24,500	200	25,500	6,800	3,300	0	*35,600*	*10,500*	*-188,200*
	14	1994	2036	13.4	86%	1.041	13.92	0	600	1,000	1,800	0	20	4,900	1	*8,300*	1.045	310	460	24,600	200	25,600	6,800	1,200	0	*33,600*	*-25,300*	*-213,500*
	15	1995	2037	29.2	187%	1.008	29.42	0	7,300	19,900	31,300	0	20	4,900	1	*63,400*	1.042	310	470	24,600	200	25,600	6,700	1,900	0	*34,200*	*29,200*	*-184,300*
	16	1996	2038	15.5	99%	1.037	16.07	0	1,300	1,900	5,000	0	20	5,000	1	*13,200*	1.050	310	470	24,800	200	25,800	7,000	3,200	0	*36,000*	*-22,800*	*-207,100*
	17	1997	2039	13.2	84%	0.969	12.75	0	2,300	2,600	6,400	0	20	4,900	1	*16,200*	1.044	310	480	24,600	200	25,600	6,900	2,600	0	*35,100*	*-18,900*	*-226,000*
	18	1998	2040	36.2	232%	1.038	37.62	0	7,300	27,800	37,800	0	20	5,000	1	*77,900*	1.051	320	480	24,800	200	25,800	6,800	300	0	*32,900*	*45,000*	*-181,000*
	19	1999	2041	16.2	104%	0.996	16.08	0	2,600	3,700	8,400	0	20	5,000	1	*19,700*	1.052	320	480	24,800	210	25,800	6,700	1,500	0	*34,000*	*-14,300*	*-195,300*
	20	2000	2042	17.5	112%	1.002	17.55	0	3,200	3,300	9,900	0	20	5,000	1	*21,400*	1.056	320	490	24,900	210	25,900	6,900	4,500	0	*37,300*	*-15,900*	*-211,200*
	21	2001	2043	18.3	118%	0.979	17.95	0	4,100	6,300	11,600	0	20	5,000	1	*27,000*	1.050	320	490	24,800	210	25,800	6,800	4,700	0	*37,300*	*-10,300*	*-221,500*
	22	2002	2044	7.7	49%	1.031	7.92	0	0	500	300	0	20	5,000	1	*5,800*	1.054	330	500	24,900	210	25,900	6,800	1,200	0	*33,900*	*-28,100*	*-249,600*
	23	2003	2045	14.8	95%	0.984	14.59	0	1,100	1,100	3,100	0	20	5,000	1	*10,300*	1.055	330	500	24,900	210	25,900	6,900	1,300	0	*34,100*	*-23,800*	*-273,400*
	24	2004	2046	9.4	60%	1.007	9.42	0	800	1,100	2,300	0	20	5,000	1	*9,200*	1.052	330	500	24,800	210	25,800	6,900	1,000	0	*33,700*	*-24,500*	*-297,900*
	25	2005	2047	28.3	181%	1.014	28.67	0	7,400	9,300	21,700	0	20	5,000	1	*43,400*	1.062	330	510	25,000	220	26,100	6,800	5,100	0	*38,000*	*5,400*	*-292,500*
	26	2006	2048	18.3	117%	0.937	17.15	0	2,800	2,600	7,100	0	20	5,000	1	*17,500*	1.057	340	510	24,900	220	26,000	6,900	4,300	0	*37,200*	*-19,700*	*-312,200*
	27	2007	2049	6.3	40%	0.984	6.19	0	0	300	100	0	20	5,000	1	*5,400*	1.063	340	520	25,100	220	26,200	6,900	400	0	*33,500*	*-28,100*	*-340,300*
	28	2008	2050	17.0	109%	1.114	18.98	0	2,300	3,300	9,000	0	20	5,000	1	*19,600*	1.060	340	520	25,000	220	26,100	6,900	4,200	0	*37,200*	*-17,600*	*-357,900*
	29	2009	2051	10.5	67%	1.038	10.91	0	200	700	800	0	20	5,000	1	*6,700*	1.060	350	520	25,000	220	26,100	6,900	1,200	0	*34,200*	*-27,500*	*-385,400*
	30	2010	2052	17.6	113%	1.139	20.06	0	3,100	4,200	12,300	0	20	5,000	1	*24,600*	1.066	350	530	25,100	230	26,200	6,800	4,200	0	*37,200*	*-12,600*	*-398,000*
	31	2011	2053	21.7	139%	1.001	21.70	0	7,000	12,200	25,500	0	20	5,100	1	*49,800*	1.071	350	530	25,300	230	26,400	6,900	700	0	*34,000*	*15,800*	*-382,200*
	32	1984	2054	9.7	62%	0.966	9.33	0	200	500	500	0	20	5,000	1	*6,200*	1.066	350	540	25,100	230	26,200	7,100	1,300	0	*34,600*	*-28,400*	*-410,600*
	33	1985	2055	10.4	67%	0.993	10.36	0	400	700	1,300	0	20	5,100	1	*7,500*	1.075	360	540	25,400	230	26,500	7,000	1,100	0	*34,600*	*-27,100*	*-437,700*
	34	1986	2056	15.9	102%	1.012	16.06	0	2,500	4,000	8,100	0	20	5,000	1	*19,600*	1.068	360	540	25,200	230	26,300	6,900	1,500	0	*34,700*	*-15,100*	*-452,800*
	35	1987	2057	11.7	75%	1.018	11.92	0	600	900	2,100	0	20	5,100	1	*8,700*	1.073	360	550	25,300	230	26,400	7,000	1,000	0	*34,400*	*-25,700*	*-478,500*
	36	1988	2058	15.1	97%	0.979	14.74	0	1,000	1,000	3,000	0	20	5,000	1	*10,000*	1.060	360	550	25,000	240	26,200	6,900	1,100	0	*34,200*	*-24,200*	*-502,700*
	37	1989	2059	8.2	53%	0.905	7.46	0	0	500	200	0	30	5,000	1	*5,700*	1.057	370	560	24,900	240	26,100	6,900	800	0	*33,800*	*-28,100*	*-530,800*
	38	1990	2060	8.1	52%	0.991	8.00	0	0	500	200	0	30	5,000	1	*5,700*	1.051	370	560	24,800	240	26,000	6,900	700	0	*33,600*	*-27,900*	*-558,700*
	39	1991	2061	16.5	106%	0.997	16.43	0	700	2,200	3,900	0	30	5,000	1	*11,800*	1.069	370	560	25,200	240	26,400	6,900	4,500	0	*37,800*	*-26,000*	*-584,700*
	40	1992	2062	17.0	109%	1.048	17.82	0	3,800	4,900	13,700	0	30	5,000	1	*27,400*	1.070	370	570	25,200	240	26,400	7,100	4,200	0	*37,700*	*-10,300*	*-595,000*
	41	1991	2063	16.5	106%	0.935	15.41	0	600	2,100	3,600	0	30	5,100	1	*11,400*	1.073	380	570	25,300	240	26,500	6,900	4,500	0	*37,900*	*-26,500*	*-621,500*
	42	1990	2064	8.1	52%	1.057	8.53	0	0	500	200	0	30	5,100	1	*5,800*	1.080	380	580	25,500	250	26,700	7,100	700	0	*34,500*	*-28,700*	*-650,200*
	43	1989	2065	8.2	53%	1.029	8.48	0	0	500	200	0	30	5,100	1	*5,800*	1.071	380	580	25,300	250	26,500	7,000	800	0	*34,300*	*-28,500*	*-678,700*
	44	1988	2066	15.1	97%	0.988	14.88	0	1,000	900	3,000	0	30	5,100	1	*10,000*	1.076	390	580	25,400	250	26,600	7,000	1,100	0	*34,700*	*-24,700*	*-703,400*
	45	1987	2067	11.7	75%	0.941	11.02	0	600	900	1,900	0	30	5,000	1	*8,400*	1.057	390	590	24,900	250	26,100	6,900	1,100	0	*34,100*	*-25,700*	*-729,100*
	46	1986	2068	15.9	102%	1.029	16.33	0	2,600	4,000	8,200	0	30	5,000	1	*19,800*	1.067	390	590	25,200	250	26,400	6,900	1,500	0	*34,800*	*-15,000*	*-744,100*
	47	1985	2069	10.4	67%	1.054	11.00	0	400	600	1,300	0	30	5,200	1	*7,500*	1.100	390	600	25,900	250	27,100	7,100	1,100	0	*35,300*	*-27,800*	*-771,900*
	48	1998	2070	36.2	232%	1.060	38.41	0	7,200	26,200	37,000	0	30	5,200	1	*75,600*	1.100	400	600	25,900	260	27,200	7,100	300	0	*34,600*	*41,000*	*-730,900*
	49	1999	2071	16.2	104%	1.028	16.60	0	2,500	3,200	8,100	0	30	5,300	1	*19,100*	1.127	400	600	26,600	260	27,900	7,100	1,500	0	*36,500*	*-17,400*	*-748,300*
	50	2000	2072	17.5	112%	1.172	20.53	0	3,800	2,800	11,400	0	30	5,000	1	*23,000*	1.064	400	610	25,100	260	26,400	7,000	4,500	0	*37,900*	*-14,900*	*-763,200*
			Minimum	6.3	40%	0.905	6.19	0	0	300	100	0	20	4,900	1	*5,400*	1.029	270	410	24,300	180	25,200	6,700	300	0	*32,800*	-28,700	
			Maximum	36.2	232%	1.172	38.41	0	13,400	27,800	41,800	0	30	5,300	1	*82,700*	1.127	400	610	26,600	260	27,900	7,100	5,300	0	*38,000*	45,400	**Basin Yield**
			Average	**15.6**	**100%**	**1.023**	**16.01**	**0**	**2,300**	**4,200**	**8,200**	**0**	**20**	**5,000**	**1**	**19,700**	**1.057**	**336**	**510**	**24,900**	**220**	**26,000**	**6,900**	**2,100**	**0**	**35,000**	**-15,300**	***10,700***
							% of Total:	0%	12%	21%	42%	0%	0%	25%	0%			1%	1%	71%	1%		20%	6%	0%			

Water Budget	Year Count	Index WY	WY	DWR Streamflow Factors [Adjusted]	Casmalia Stream Gage (AFY)	Proj. Casmalia Stream Gage (AFY)	Surface Runoff Contribution between Casmalia Gage and Slough (AFY)	D/S Crop ET [consumed water] (AFY)	Total SW Discharge from Slough (AFY)	Total SW Flow Entering Slough [BCM]	GW Discharge to Slough that contributes to SW flow[raw]	GW Discharge to Slough that contributes to SW flow [Adjusted]	Adjustment remainder	SW Flow Entering Slough [Adjusted]	Slough ET (includes capture of portion of GW discharage)	VAFB pumping (AF)
Projected Water Budget 2042	1	1981	2023	0.9839	2,667	2,624	34	331	2,921	0	2,921	2,921	0	0	6,834	411
	2	1982	2024	0.9657	1,221	1,179	27	334	1,486	0	1,486	1,486	0	0	6,702	415
	3	1983	2025	1.0273	28,732	29,516	1,557	331	28,291	16,281	12,010	5,322	6,688	22,968	6,712	419
	4	1984	2026	1.0091	1,010	1,019	15	331	1,335	0	1,335	1,335	0	0	6,849	423
	5	1985	2027	1.0195	812	828	18	331	1,141	0	1,141	1,141	0	0	6,689	427
	6	1986	2028	0.9435	1,582	1,493	82	332	1,743	296	1,447	1,447	0	296	6,740	431
	7	1987	2029	0.9837	724	712	21	332	1,024	0	1,024	1,024	0	0	6,739	435
	8	1988	2030	1.0512	747	785	23	329	1,091	0	1,091	1,091	0	0	6,706	439
	9	1989	2031	1.0338	479	496	16	333	812	0	812	812	0	0	6,780	443
	10	1990	2032	1.0561	338	357	15	331	673	0	673	673	0	0	6,758	447
	11	1991	2033	1.0680	5,312	5,673	29	332	5,977	0	5,977	4,470	1,507	1,507	6,655	451
	12	1992	2034	1.1319	4,928	5,578	134	333	5,777	1,227	4,550	4,176	375	1,602	6,902	455
	13	1993	2035	1.0083	6,910	6,967	435	333	6,865	3,556	3,309	3,309	0	3,556	6,812	459
	14	1994	2036	1.0639	833	887	24	335	1,197	0	1,197	1,197	0	0	6,831	463
	15	1995	2037	1.0623	15,039	15,976	1,354	334	14,956	13,014	1,942	1,942	0	13,014	6,728	467
	16	1996	2038	1.0656	2,716	2,895	40	336	3,190	0	3,190	3,190	0	0	6,958	471
	17	1997	2039	0.9847	2,334	2,298	59	334	2,573	0	2,573	2,573	0	0	6,871	475
	18	1998	2040	1.1328	18,978	21,499	2,061	337	19,774	24,457	-4,682	300	-4,982	19,474	6,753	479
	19	1999	2041	0.9522	1,614	1,536	118	337	1,755	239	1,516	1,516	0	239	6,667	483
	20	2000	2042	1.0717	5,478	5,871	60	338	6,149	0	6,149	4,502	1,647	1,647	6,923	487
	21	2001	2043	0.9767	8,835	8,629	236	336	8,729	1,625	7,104	4,668	2,436	4,062	6,807	491
	22	2002	2044	0.9654	858	828	13	337	1,153	0	1,153	1,153	0	0	6,845	495
	23	2003	2045	1.0003	949	949	21	338	1,266	0	1,266	1,266	0	0	6,877	499
	24	2004	2046	1.0305	617	635	17	337	956	0	956	956	0	0	6,906	503
	25	2005	2047	1.1064	13,242	14,651	556	340	14,435	4,637	9,798	5,058	4,740	9,377	6,850	507
	26	2006	2048	0.9375	4,950	4,641	36	338	4,943	0	4,943	4,263	680	680	6,912	511
	27	2007	2049	0.9986	48	48	10	340	378	0	378	378	0	0	6,924	516
	28	2008	2050	1.1371	3,883	4,416	47	339	4,709	0	4,709	4,212	497	497	6,903	520
	29	2009	2051	1.0211	830	847	17	339	1,169	0	1,169	1,169	0	0	6,923	524
	30	2010	2052	1.0262	4,367	4,481	91	341	4,732	187	4,545	4,174	371	558	6,796	528
	31	2011	2053	0.9809	7,758	7,610	935	343	7,018	6,285	733	733	0	6,285	6,866	532
	32	1984	2054	0.9509	1,010	960	15	331	1,276	0	1,276	1,276	0	0	7,070	536
	33	1985	2055	0.9736	812	791	18	331	1,103	0	1,103	1,103	0	0	6,962	540
	34	1986	2056	0.9870	1,582	1,562	82	332	1,811	310	1,502	1,502	0	310	6,947	544
	35	1987	2057	1.0194	724	738	21	332	1,049	0	1,049	1,049	0	0	6,967	548
	36	1988	2058	1.0120	747	755	23	329	1,062	0	1,062	1,062	0	0	6,911	552
	37	1989	2059	1.0014	479	480	16	333	797	0	797	797	0	0	6,888	556
	38	1990	2060	1.0841	338	367	15	331	683	0	683	683	0	0	6,865	560
	39	1991	2061	1.1290	5,312	5,997	29	332	6,301	0	6,301	4,530	1,771	1,771	6,851	564
	40	1992	2062	1.1954	4,928	5,891	134	333	6,090	1,296	4,794	4,231	564	1,860	7,094	568
	41	1991	2063	1.1333	5,312	6,020	29	332	6,324	0	6,324	4,534	1,790	1,790	6,881	572
	42	1990	2064	1.0881	338	368	15	331	684	0	684	684	0	0	7,054	576
	43	1989	2065	0.9944	479	477	16	333	793	0	793	793	0	0	6,981	580
	44	1988	2066	1.0008	747	747	23	329	1,054	0	1,054	1,054	0	0	7,012	584
	45	1987	2067	1.0326	724	748	21	332	1,059	0	1,059	1,059	0	0	6,861	588
	46	1986	2068	1.0071	1,582	1,594	82	332	1,843	316	1,527	1,527	0	316	6,942	592
	47	1985	2069	0.9479	812	770	18	331	1,083	0	1,083	1,083	0	0	7,121	596
	48	1998	2070	1.1716	18,978	22,234	2,061	337	20,510	25,293	-4,784	300	-5,084	20,210	7,070	600
	49	1999	2071	0.9404	1,614	1,517	118	337	1,736	236	1,500	1,500	0	236	7,140	604
	50	2000	2072	1.0879	5,478	5,960	60	338	6,238	0	6,238	4,518	1,720	1,720	6,972	608
			Average	1.0311	4,016	4,278	218	334	4,394	1,985	2,409	2,115	294	2,279	6,876	509
			Min	0.9375	48	48	10	329	378	0	-4,784	300	-5,084	0	6,655	411
			Max	1.1954	28,732	29,516	2,061	343	28,291	25,293	12,010	5,322	6,688	22,968	7,140	608

San Antonio Creek Valley Groundwater Basin Water Budget

Values in acre-feet

= Component of Inflow

= Component of Outflow

Water Budget	Year Count	Historical Index Year	Water Year	Rainfall				Components of Inflow								Total Inflow	2070 DWR ET Factor	Components of Outflow								Total Outflow	Change in Storage	Cumulative Change in Storage
																		Groundwater Pumping					Riparian Evapotranspiration	Groundwater Discharge to Surface Water	Subsurface Outflow			
				Inches	% of Average	2070 DWR Precip Factors	2070 Inches	Subsurface Inflow	Mountain Front Recharge	Streamflow Percolation	Percolation of Direct Precipitation	LACSD WWTP Effluent	Septic Return Flows	Ag Irrigation Return Flows	Urban Irrigation Return Flows			LACSD Pumping	VAFB Pumping	Ag Irrigation Pumping	Rural Domestic Pumping	Total Pumping						
Projected Water Budget 2072	1	1981	2023	13.3	85%	1.031	13.71	0	1,300	2,200	4,600	0	20	5,100	1	*13,200*	1.085	270	410	25,600	180	26,500	7,200	3,200	0	*36,900*	*-23,700*	*-23,700*
	2	1982	2024	14.4	93%	0.959	13.85	0	1,400	1,400	4,100	0	20	5,100	1	*12,000*	1.075	270	410	25,400	180	26,300	6,900	1,500	0	*34,700*	*-22,700*	*-46,400*
	3	1983	2025	35.7	229%	1.038	37.06	0	13,000	23,100	39,700	0	20	5,100	1	*80,900*	1.089	280	420	25,700	180	26,600	7,100	5,200	0	*38,900*	*42,000*	*-4,400*
	4	1984	2026	9.7	62%	0.854	8.25	0	200	500	500	0	20	5,100	1	*6,300*	1.088	280	420	25,600	180	26,500	7,200	1,300	0	*35,000*	*-28,700*	*-33,100*
	5	1985	2027	10.4	67%	0.998	10.42	0	400	600	1,400	0	20	5,100	1	*7,500*	1.081	280	430	25,500	180	26,400	7,000	1,100	0	*34,500*	*-27,000*	*-60,100*
	6	1986	2028	15.9	102%	1.008	15.99	0	2,600	3,900	8,300	0	20	5,000	1	*19,800*	1.052	280	430	24,800	180	25,700	6,800	1,500	0	*34,000*	*-14,200*	*-74,300*
	7	1987	2029	11.7	75%	0.984	11.52	0	600	800	2,200	0	20	5,100	1	*8,700*	1.088	290	430	25,600	190	26,500	7,100	1,100	0	*34,700*	*-26,000*	*-100,300*
	8	1988	2030	15.1	97%	1.005	15.13	0	1,000	1,000	3,100	0	20	5,100	1	*10,200*	1.083	290	440	25,500	190	26,400	7,100	1,100	0	*34,600*	*-24,400*	*-124,700*
	9	1989	2031	8.2	53%	0.943	7.77	0	0	500	200	0	20	5,100	1	*5,800*	1.076	290	440	25,400	190	26,300	7,000	800	0	*34,100*	*-28,300*	*-153,000*
	10	1990	2032	8.1	52%	0.963	7.77	0	0	500	200	0	20	5,100	1	*5,800*	1.074	290	450	25,300	190	26,200	7,000	700	0	*33,900*	*-28,100*	*-181,100*
	11	1991	2033	16.5	106%	0.922	15.20	0	600	2,100	4,000	0	20	5,100	1	*11,800*	1.078	300	450	25,400	190	26,300	6,900	4,400	0	*37,600*	*-25,800*	*-206,900*
	12	1992	2034	17.0	109%	1.020	17.33	0	3,600	5,300	13,700	0	20	5,100	1	*27,700*	1.076	300	460	25,400	190	26,400	7,100	4,100	0	*37,600*	*-9,900*	*-216,800*
	13	1993	2035	24.7	158%	1.082	26.74	0	6,900	9,800	22,700	0	20	5,100	1	*44,500*	1.080	300	460	25,500	200	26,500	7,100	3,700	0	*37,300*	*7,200*	*-209,600*
	14	1994	2036	13.4	86%	1.007	13.46	0	500	1,000	1,800	0	20	5,100	1	*8,400*	1.088	310	460	25,600	200	26,600	7,100	1,200	0	*34,900*	*-26,500*	*-236,100*
	15	1995	2037	29.2	187%	0.981	28.65	0	6,900	19,400	30,400	0	20	5,100	1	*61,800*	1.078	310	470	25,400	200	26,400	7,000	2,500	0	*35,900*	*25,900*	*-210,200*
	16	1996	2038	15.5	99%	1.007	15.61	0	1,200	1,800	4,900	0	20	5,100	1	*13,000*	1.082	310	470	25,500	200	26,500	7,200	3,300	0	*37,000*	*-24,000*	*-234,200*
	17	1997	2039	13.2	84%	0.962	12.66	0	2,200	2,600	6,200	0	20	5,100	1	*16,100*	1.077	310	480	25,400	200	26,400	7,100	2,600	0	*36,100*	*-20,000*	*-254,200*
	18	1998	2040	36.2	232%	1.047	37.95	0	7,200	28,000	36,500	0	20	5,100	1	*76,800*	1.086	320	480	25,600	200	26,600	7,000	300	0	*33,900*	*42,900*	*-211,300*
	19	1999	2041	16.2	104%	0.988	15.96	0	2,500	3,700	8,100	0	20	5,200	1	*19,500*	1.098	320	480	25,900	210	26,900	7,000	1,500	0	*35,400*	*-15,900*	*-227,200*
	20	2000	2042	17.5	112%	0.974	17.05	0	3,000	3,200	9,700	0	20	5,200	1	*21,100*	1.092	320	490	25,800	210	26,800	7,200	4,300	0	*38,300*	*-17,200*	*-244,400*
	21	2001	2043	18.3	118%	0.989	18.13	0	4,100	6,400	11,200	0	20	5,100	1	*26,800*	1.078	320	490	25,400	210	26,400	7,000	4,600	0	*38,000*	*-11,200*	*-255,600*
	22	2002	2044	7.7	49%	0.968	7.43	0	0	500	400	0	20	5,100	1	*6,000*	1.082	330	500	25,500	210	26,500	7,000	1,100	0	*34,600*	*-28,600*	*-284,200*
	23	2003	2045	14.8	95%	0.947	14.05	0	1,000	1,100	3,100	0	20	5,200	1	*10,400*	1.094	330	500	25,800	210	26,800	7,100	1,200	0	*35,100*	*-24,700*	*-308,900*
	24	2004	2046	9.4	60%	1.001	9.37	0	800	1,100	2,300	0	20	5,100	1	*9,300*	1.078	330	500	25,400	210	26,400	7,100	1,000	0	*34,500*	*-25,200*	*-334,100*
	25	2005	2047	28.3	181%	0.989	27.95	0	7,000	9,100	21,500	0	20	5,200	1	*42,800*	1.092	330	510	25,800	220	26,900	7,000	4,900	0	*38,800*	*4,000*	*-330,100*
	26	2006	2048	18.3	117%	0.930	17.03	0	2,700	2,500	7,000	0	20	5,100	1	*17,300*	1.085	340	510	25,600	220	26,700	7,100	4,100	0	*37,900*	*-20,600*	*-350,700*
	27	2007	2049	6.3	40%	0.936	5.89	0	0	300	100	0	20	5,100	1	*5,500*	1.083	340	520	25,500	220	26,600	7,100	400	0	*34,100*	*-28,600*	*-379,300*
	28	2008	2050	17.0	109%	1.033	17.60	0	2,100	3,100	9,500	0	20	5,100	1	*19,800*	1.081	340	520	25,500	220	26,600	7,000	4,100	0	*37,700*	*-17,900*	*-397,200*
	29	2009	2051	10.5	67%	1.002	10.53	0	200	700	800	0	20	5,100	1	*6,800*	1.081	350	520	25,500	220	26,600	7,100	1,200	0	*34,900*	*-28,100*	*-425,300*
	30	2010	2052	17.6	113%	1.104	19.43	0	3,000	4,100	12,600	0	20	5,100	1	*24,800*	1.087	350	530	25,600	230	26,700	6,900	4,000	0	*37,600*	*-12,800*	*-438,100*
	31	2011	2053	21.7	139%	0.965	20.92	0	6,600	11,700	26,200	0	20	5,200	1	*49,700*	1.092	350	530	25,800	230	26,900	7,000	800	0	*34,700*	*15,000*	*-423,100*
	32	1984	2054	9.7	62%	0.904	8.74	0	200	500	600	0	20	5,100	1	*6,400*	1.090	350	540	25,700	230	26,800	7,200	1,300	0	*35,300*	*-28,900*	*-452,000*
	33	1985	2055	10.4	67%	0.985	10.28	0	400	600	1,300	0	20	5,200	1	*7,500*	1.097	360	540	25,900	230	27,000	7,100	1,100	0	*35,200*	*-27,700*	*-479,700*
	34	1986	2056	15.9	102%	0.985	15.63	0	2,400	4,000	8,400	0	20	5,100	1	*19,900*	1.081	360	540	25,500	230	26,600	7,000	1,500	0	*35,100*	*-15,200*	*-494,900*
	35	1987	2057	11.7	75%	0.976	11.43	0	600	900	2,200	0	20	5,100	1	*8,800*	1.089	360	550	25,700	230	26,800	7,100	1,100	0	*35,000*	*-26,200*	*-521,100*
	36	1988	2058	15.1	97%	0.970	14.61	0	1,000	1,100	3,000	0	20	5,100	1	*10,200*	1.075	360	550	25,300	240	26,500	7,000	1,100	0	*34,600*	*-24,400*	*-545,500*
	37	1989	2059	8.2	53%	0.862	7.10	0	0	500	200	0	30	5,000	1	*5,700*	1.066	370	560	25,100	240	26,300	6,900	800	0	*34,000*	*-28,300*	*-573,800*
	38	1990	2060	8.1	52%	0.963	7.77	0	0	500	200	0	30	5,000	1	*5,700*	1.058	370	560	25,000	240	26,200	6,900	700	0	*33,800*	*-28,100*	*-601,900*
	39	1991	2061	16.5	106%	0.980	16.15	0	600	2,100	4,000	0	30	5,100	1	*11,800*	1.081	370	560	25,500	240	26,700	6,900	4,400	0	*38,000*	*-26,200*	*-628,100*
	40	1992	2062	17.0	109%	1.035	17.60	0	3,700	4,700	14,300	0	30	5,100	1	*27,800*	1.078	370	570	25,400	240	26,600	7,100	4,100	0	*37,800*	*-10,000*	*-638,100*
	41	1991	2063	16.5	106%	0.904	14.90	0	600	2,000	4,100	0	30	5,100	1	*11,800*	1.083	380	570	25,500	240	26,700	6,900	4,400	0	*38,000*	*-26,200*	*-664,300*
	42	1990	2064	8.1	52%	1.056	8.53	0	0	500	200	0	30	5,100	1	*5,800*	1.088	380	580	25,700	250	26,900	7,100	700	0	*34,700*	*-28,900*	*-693,200*
	43	1989	2065	8.2	53%	1.014	8.35	0	0	500	200	0	30	5,100	1	*5,800*	1.075	380	580	25,400	250	26,600	7,000	800	0	*34,400*	*-28,600*	*-721,800*
	44	1988	2066	15.1	97%	0.988	14.87	0	1,000	900	3,000	0	30	5,100	1	*10,000*	1.081	390	580	25,500	250	26,700	7,000	1,100	0	*34,800*	*-24,800*	*-746,600*
	45	1987	2067	11.7	75%	0.934	10.93	0	600	900	2,100	0	30	5,000	1	*8,600*	1.059	390	590	25,000	250	26,200	6,900	1,100	0	*34,200*	*-25,600*	*-772,200*
	46	1986	2068	15.9	102%	1.028	16.32	0	2,500	4,000	8,400	0	30	5,000	1	*19,900*	1.068	390	590	25,200	250	26,400	7,000	1,500	0	*34,900*	*-15,000*	*-787,200*
	47	1985	2069	10.4	67%	1.050	10.97	0	400	600	1,500	0	30	5,200	1	*7,700*	1.101	390	600	26,000	250	27,200	7,100	1,100	0	*35,400*	*-27,700*	*-814,900*
	48	1998	2070	36.2	232%	1.060	38.41	0	7,200	26,200	34,600	0	30	5,200	1	*73,200*	1.100	400	600	25,900	260	27,200	7,100	300	0	*34,600*	*38,600*	*-776,300*
	49	1999	2071	16.2	104%	1.028	16.60	0	2,500	3,200	8,400	0	30	5,300	1	*19,400*	1.127	400	600	26,600	260	27,900	7,100	1,500	0	*36,500*	*-17,100*	*-793,400*
	50	2000	2072	17.5	112%	1.172	20.53	0	3,800	2,800	8,700	0	30	5,000	1	*20,300*	1.064	400	610	25,100	260	26,400	7,000	4,300	0	*37,700*	*-17,400*	*-810,800*
			Minimum	6.3	40%	0.854	5.89	0	0	300	100	0	20	5,000	1	5,500	1.052	270	410	24,800	180	25,700	6,800	300	0	33,800	-28,900	
			Maximum	36.2	232%	1.172	38.41	0	13,000	28,000	39,700	0	30	5,300	1	80,900	1.127	400	610	26,600	260	27,900	7,200	5,200	0	38,900	42,900	**Basin Yield**
			Average	**15.6**	**100%**	**0.991**	**15.60**	**0**	**2,200**	**4,200**	**8,000**	**0**	**20**	**5,100**	**1**	**19,500**	**1.082**	**336**	**510**	**25,500**	**220**	**26,600**	**7,000**	**2,100**	**0**	**35,700**	**-16,200**	***10,400***
							% of Total:	0%	11%	22%	41%	0%	0%	26%	0%			1%	1%	71%	1%		20%	6%	0%			

Water Budget	Year Count	Index WY	WY	DWR Streamflow Factors 2070	Casmalia Stream Gage (AFY)	Proj. Casmalia Stream Gage (AFY)	Surface Runoff Contribution between Casmalia Gage and Slough (AFY)	D/S Crop ET [consumed water] (AFY)	Total SW Discharge from Slough (AFY)	Total SW Flow Entering Slough [BCM]	GW Discharge to Slough that contributes to SW flow[raw]	GW Discharge to Slough that contributes to SW flow [Adjusted]	Adjustment remainder	SW Flow Entering Slough [Adjusted]	Slough ET (includes capture of portion of GW discharage)	VAFB pumping (AF)
Projected Water Budget 2072	1	1981	2023	1.0647	2,667	2,840	34	347	3,153	0	3,153	3,153	0	0	7,171	411
	2	1982	2024	1.0049	1,221	1,227	27	344	1,544	0	1,544	1,544	0	0	6,903	415
	3	1983	2025	1.0949	28,732	31,458	1,585	349	30,221	17,352	12,870	5,196	7,674	25,025	7,062	419
	4	1984	2026	0.9121	1,010	921	13	348	1,257	0	1,257	1,257	0	0	7,212	423
	5	1985	2027	0.9460	812	768	16	346	1,098	0	1,098	1,098	0	0	7,000	427
	6	1986	2028	1.0104	1,582	1,599	81	337	1,855	317	1,538	1,538	0	317	6,845	431
	7	1987	2029	1.0365	724	751	19	348	1,079	0	1,079	1,079	0	0	7,060	435
	8	1988	2030	0.9952	747	743	22	347	1,068	0	1,068	1,068	0	0	7,060	439
	9	1989	2031	0.9886	479	474	14	345	804	0	804	804	0	0	7,011	443
	10	1990	2032	1.0941	338	370	14	344	700	0	700	700	0	0	7,016	447
	11	1991	2033	1.1486	5,312	6,101	26	345	6,421	0	6,421	4,367	2,054	2,054	6,912	451
	12	1992	2034	1.2135	4,928	5,980	130	345	6,195	1,315	4,879	4,077	802	2,118	7,136	455
	13	1993	2035	1.1233	6,910	7,762	413	346	7,695	3,961	3,734	3,734	0	3,961	7,076	459
	14	1994	2036	1.0996	833	916	23	348	1,241	0	1,241	1,241	0	0	7,112	463
	15	1995	2037	1.2346	15,039	18,568	1,318	345	17,594	15,125	2,469	2,469	0	15,125	6,960	467
	16	1996	2038	1.1061	2,716	3,004	39	346	3,312	0	3,312	3,312	0	0	7,168	471
	17	1997	2039	0.9886	2,334	2,307	58	345	2,593	0	2,593	2,593	0	0	7,089	475
	18	1998	2040	1.1716	18,978	22,234	2,079	348	20,503	25,293	-4,790	300	-5,090	20,203	6,981	479
	19	1999	2041	0.9404	1,614	1,517	118	352	1,752	236	1,516	1,516	0	236	6,958	483
	20	2000	2042	1.0879	5,478	5,960	58	350	6,251	0	6,251	4,338	1,913	1,913	7,156	487
	21	2001	2043	1.0938	8,835	9,663	238	345	9,770	1,820	7,950	4,606	3,343	5,164	6,986	491
	22	2002	2044	0.9254	858	794	12	346	1,128	0	1,128	1,128	0	0	7,025	495
	23	2003	2045	0.9533	949	904	20	350	1,234	0	1,234	1,234	0	0	7,128	499
	24	2004	2046	1.0462	617	645	16	345	974	0	974	974	0	0	7,075	503
	25	2005	2047	1.1573	13,242	15,325	542	350	15,133	4,850	10,282	4,912	5,370	10,220	7,049	507
	26	2006	2048	0.9659	4,950	4,781	36	347	5,093	0	5,093	4,121	972	972	7,091	511
	27	2007	2049	0.9922	48	48	10	347	385	0	385	385	0	0	7,052	516
	28	2008	2050	1.2152	3,883	4,719	43	346	5,022	0	5,022	4,107	916	916	7,040	520
	29	2009	2051	1.0181	830	845	17	346	1,174	0	1,174	1,174	0	0	7,062	524
	30	2010	2052	1.0565	4,367	4,613	88	348	4,874	192	4,681	4,035	646	839	6,932	528
	31	2011	2053	1.0169	7,758	7,889	902	350	7,337	6,515	822	822	0	6,515	7,004	532
	32	1984	2054	0.9121	1,010	921	13	348	1,257	0	1,257	1,257	0	0	7,230	536
	33	1985	2055	0.9460	812	768	16	346	1,098	0	1,098	1,098	0	0	7,103	540
	34	1986	2056	1.0104	1,582	1,599	81	337	1,855	317	1,538	1,538	0	317	7,034	544
	35	1987	2057	1.0365	724	751	19	348	1,079	0	1,079	1,079	0	0	7,072	548
	36	1988	2058	0.9952	747	743	22	347	1,068	0	1,068	1,068	0	0	7,006	552
	37	1989	2059	0.9886	479	474	14	345	804	0	804	804	0	0	6,944	556
	38	1990	2060	1.0941	338	370	14	344	700	0	700	700	0	0	6,916	560
	39	1991	2061	1.1486	5,312	6,101	26	345	6,421	0	6,421	4,367	2,054	2,054	6,928	564
	40	1992	2062	1.2135	4,928	5,980	130	345	6,195	1,315	4,879	4,077	802	2,118	7,147	568
	41	1991	2063	1.1486	5,312	6,101	26	345	6,421	0	6,421	4,367	2,054	2,054	6,943	572
	42	1990	2064	1.0941	338	370	14	344	700	0	700	700	0	0	7,111	576
	43	1989	2065	0.9886	479	474	14	345	804	0	804	804	0	0	7,008	580
	44	1988	2066	0.9952	747	743	22	347	1,068	0	1,068	1,068	0	0	7,049	584
	45	1987	2067	1.0365	724	751	19	348	1,079	0	1,079	1,079	0	0	6,872	588
	46	1986	2068	1.0104	1,582	1,599	81	337	1,855	317	1,538	1,538	0	317	6,952	592
	47	1985	2069	0.9460	812	768	16	346	1,098	0	1,098	1,098	0	0	7,132	596
	48	1998	2070	1.1716	18,978	22,234	2,079	348	20,503	25,293	-4,790	300	-5,090	20,203	7,070	600
	49	1999	2071	0.9404	1,614	1,517	118	352	1,752	236	1,516	1,516	0	236	7,140	604
	50	2000	2072	1.0879	5,478	5,960	58	350	6,251	0	6,251	4,338	1,913	1,913	6,972	608
			Average	1.0493	4,016	4,479	216	346	4,609	2,089	2,520	2,114	407	2,496	7,039	509
			Min	0.9121	48	48	10	337	385	0	-4,790	300	-5,090	0	6,845	411
			Max	1.2346	28,732	31,458	2,079	352	30,221	25,293	12,870	5,196	7,674	25,025	7,230	608

Land Use - 1959

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuaslul Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Truck and Berry Crops

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse1959.mxd, abarry

Land Use - 1968

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

BARKA SLOUGH

San Antonio Creek

Cuaslul Creek

LOMPOC

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse1968.mxd, abarry

Land Use - 1977

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuaslul Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse1977.mxd, abarry

Land Use - 1986

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuyama Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse1986.mxd, abarry

Land Use - 1996

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuyama Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse1996.mxd, abarry

Land Use - 2006

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuyama Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse2006.mxd, abarry

Land Use - 2016

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuasiul Creek

1

135

101

176

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b, 2020e), ESRI, DWR (2018a), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse2016.mxd, abarry

Land Use - 2020

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

SANTA MARIA

SANTA BARBARA COUNTY

LOMPOC

BARKA SLOUGH

San Antonio Creek

Cuyama Creek

1

135

176

101

154

246

LEGEND

Crop Type

- Field Crops
- Pasture
- Cannabis/Hemp
- Tree Crops
- Truck and Berry Crops
- Vineyards

All Other Features

- Barka Slough
- San Antonio Creek Valley Groundwater Basin
- County Boundary
- City Boundary
- Major Road
- San Antonio Creek or Adjacent Tributary

NOTE
San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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Feet

Date: November 19, 2021
Data Sources: USGS (2020b), ESRI, DWR (2018a), Maxar imagery (2020), SB County (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\AppendixE\LandUse2020.mxd, abarry

APPENDIX F

Map and Hydrographs of Wells in the San Antonio Creek Valley Groundwater Basin with Minimum Thresholds and Measurable Objectives

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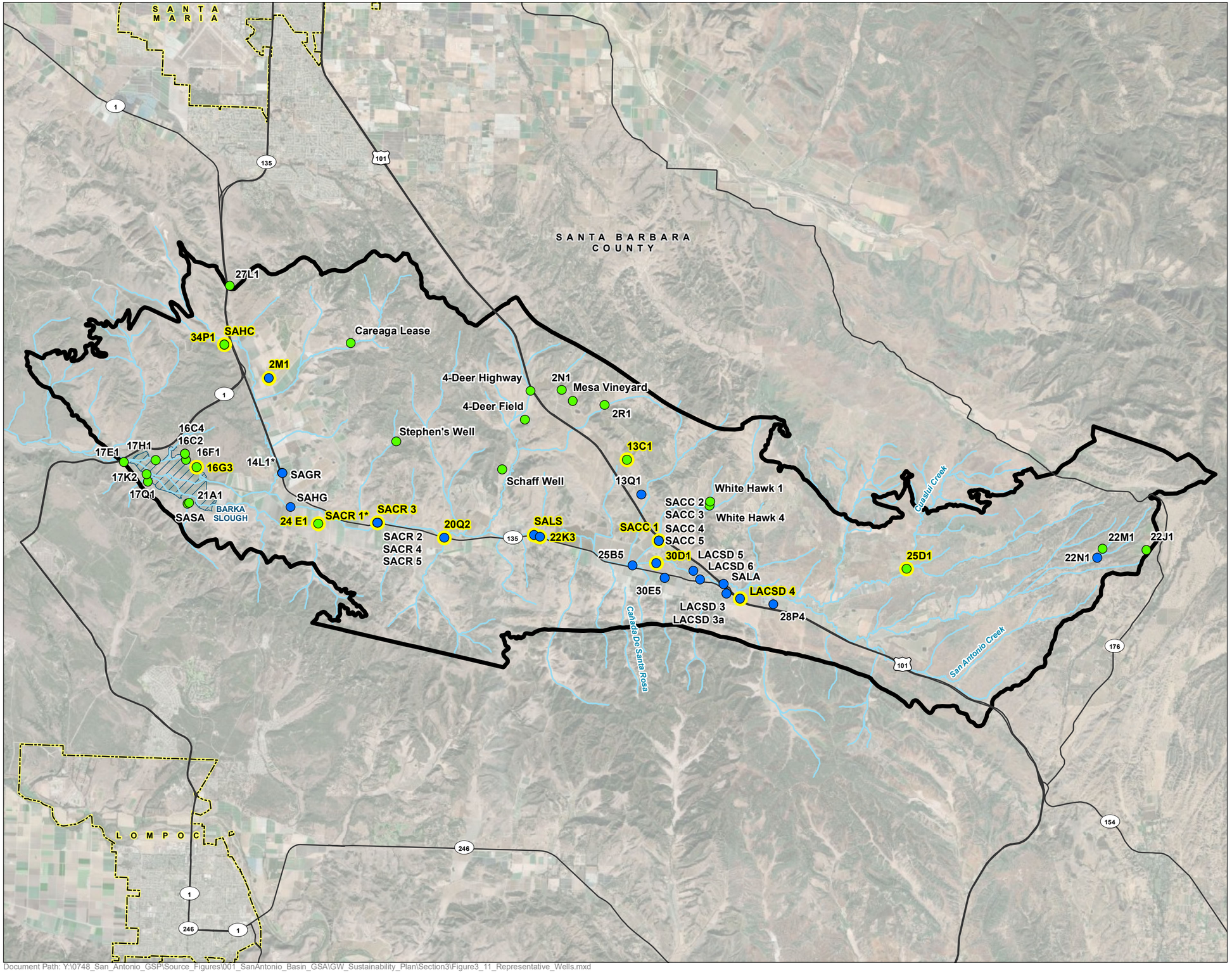
Wells Included in the San Antonio Creek Valley Groundwater Basin Groundwater Monitoring Network

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin



LEGEND

- Representative Well

Wells (by screened aquifer)

- Paso Robles Formation
- Careaga Sand

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary

NOTES

*SACR 1 and 14L1 are screened in the Careaga Sand.

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

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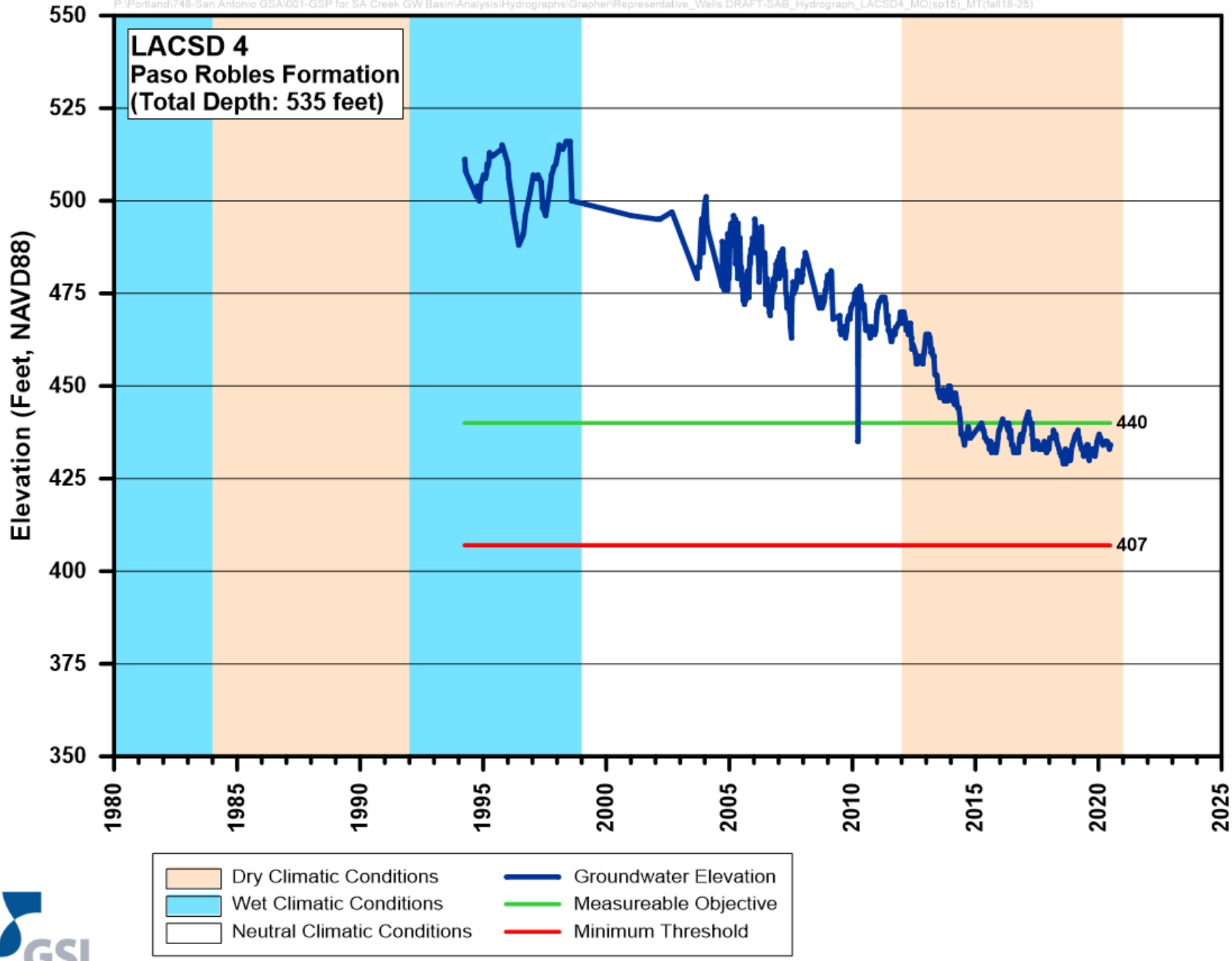
Feet

Date: September 16, 2021
Data Sources: USGS (2020b), ESRI, DWR (2019a), Maxar imagery (2020)

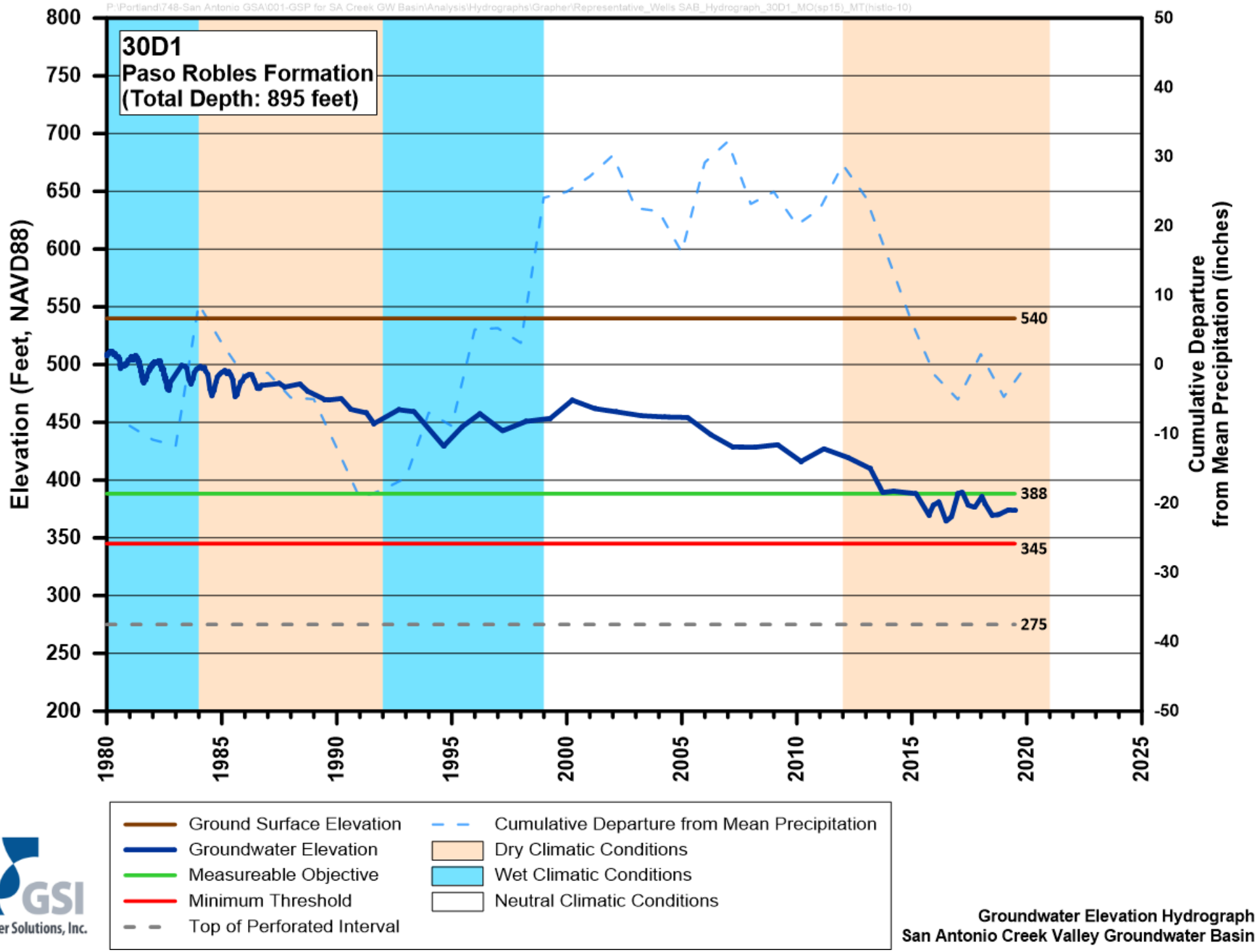
GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\Section3\Figure3_11_Representative_Wells.mxd



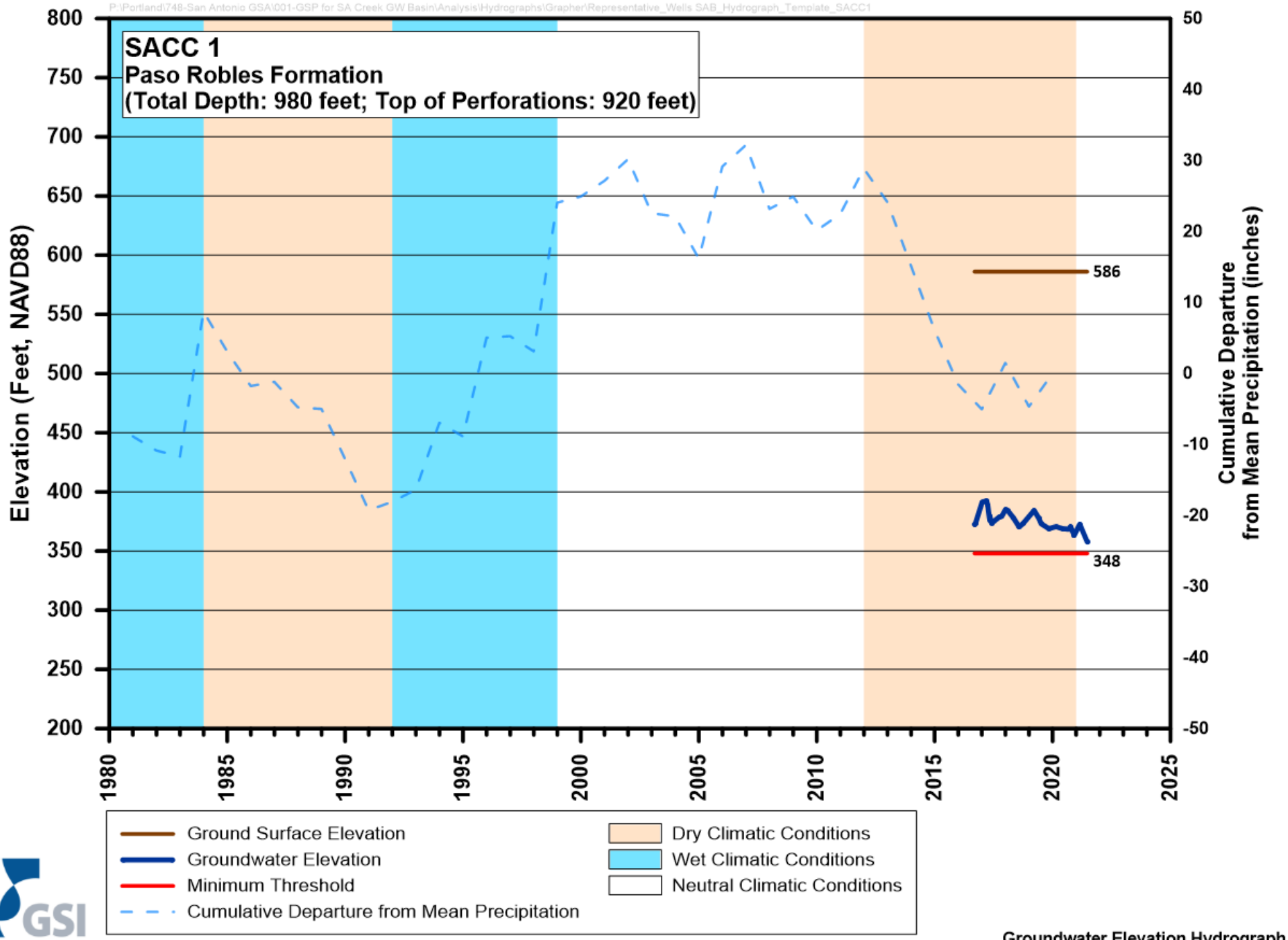
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



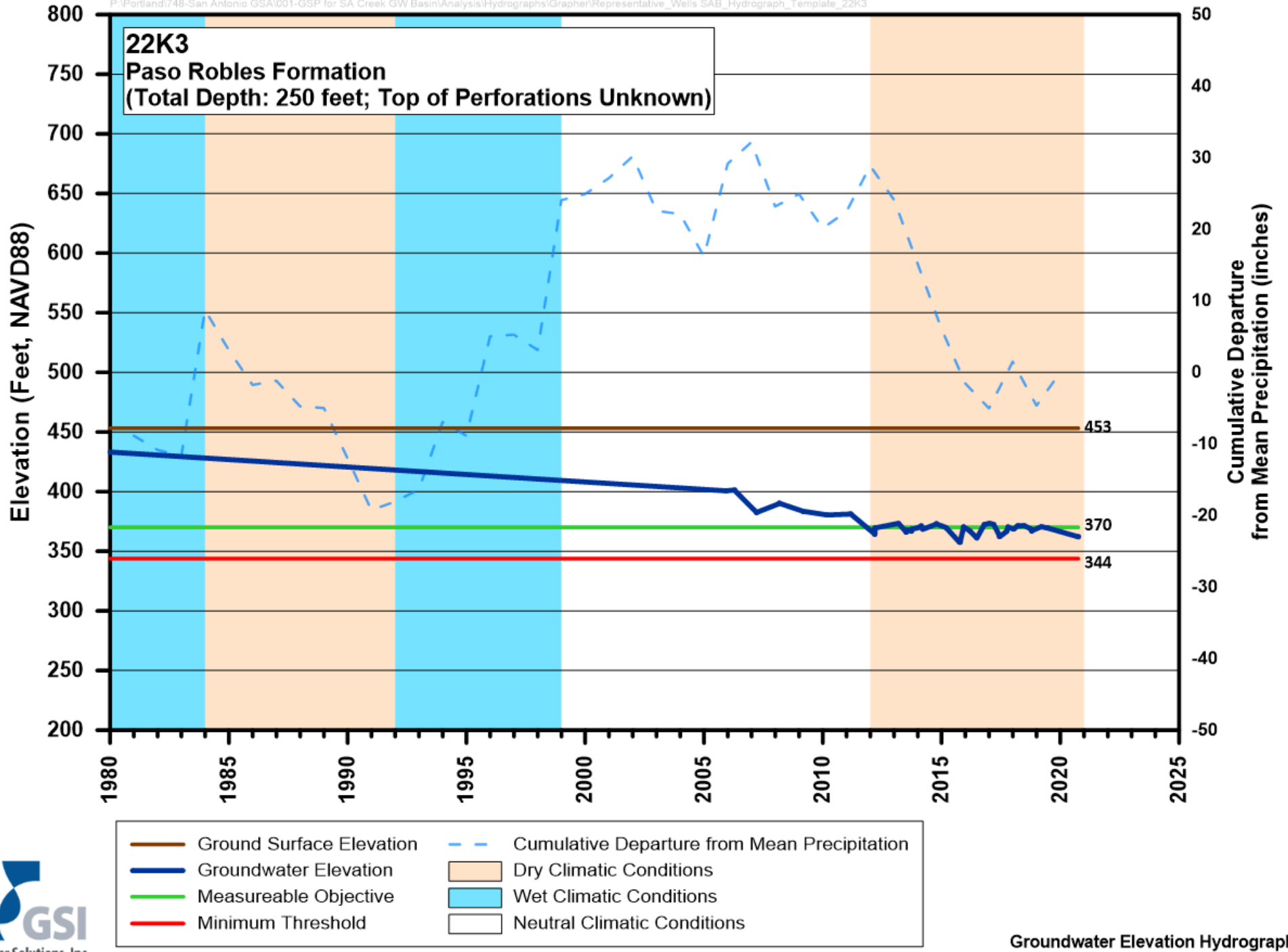
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



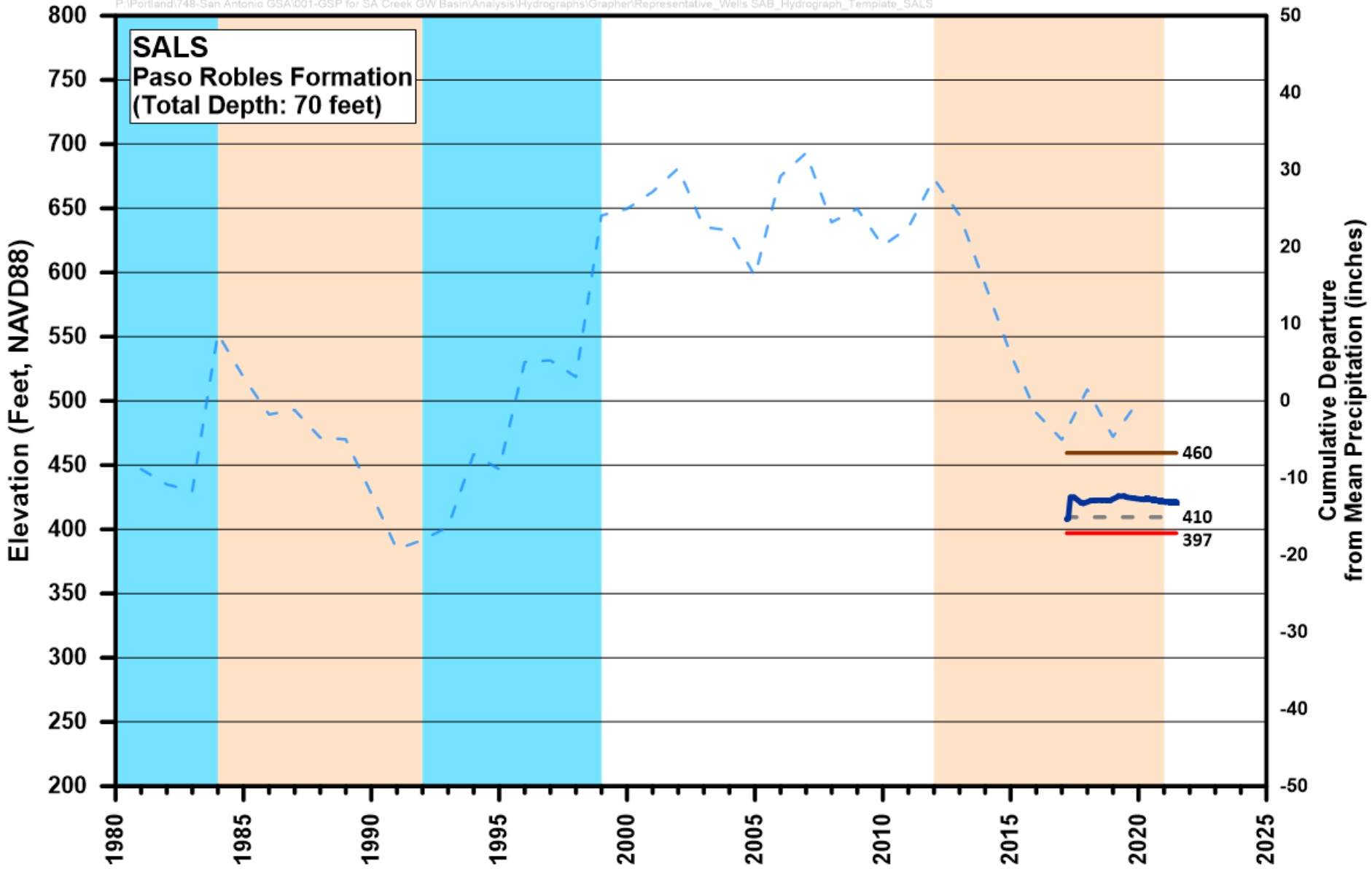
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



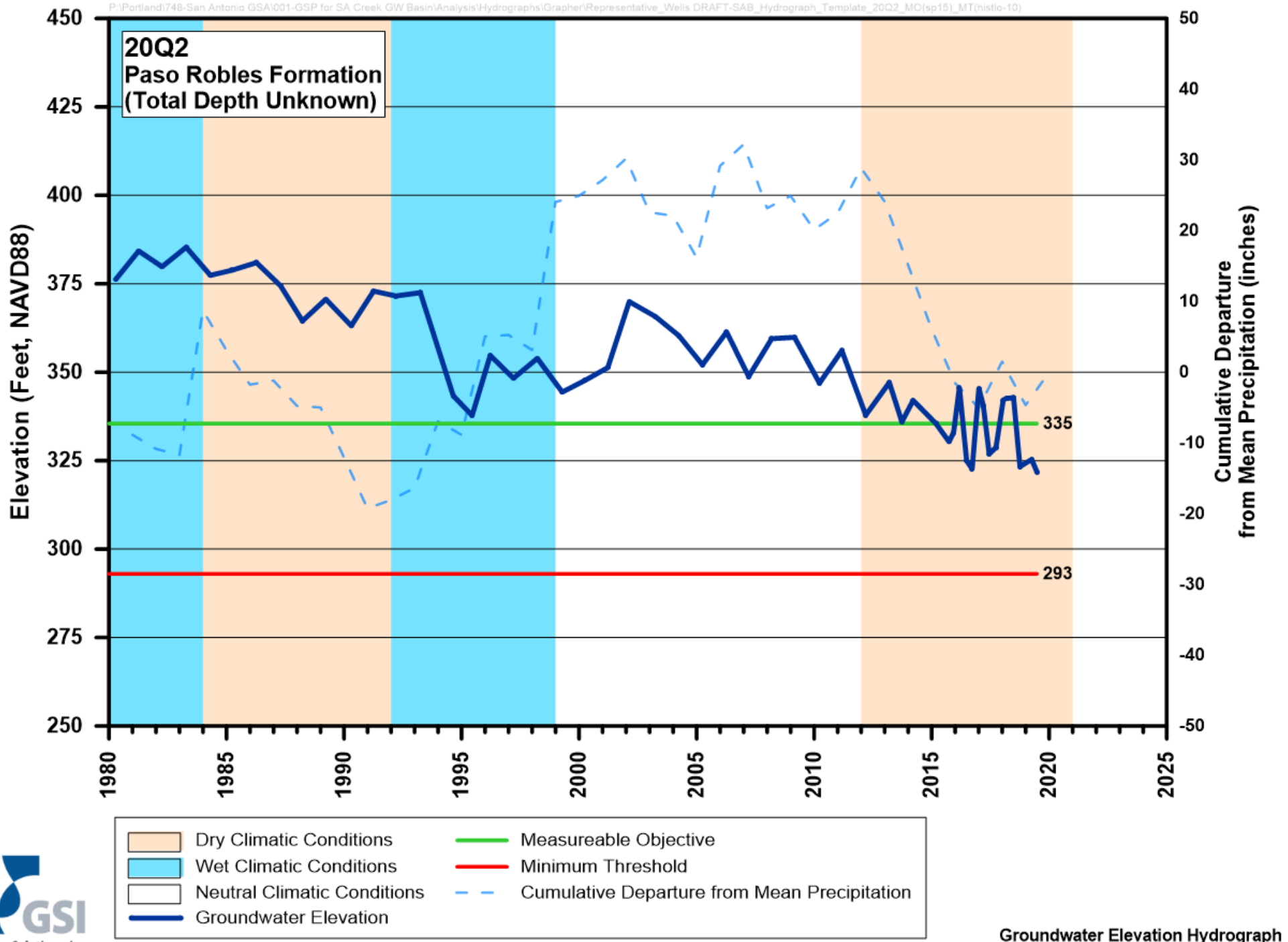
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



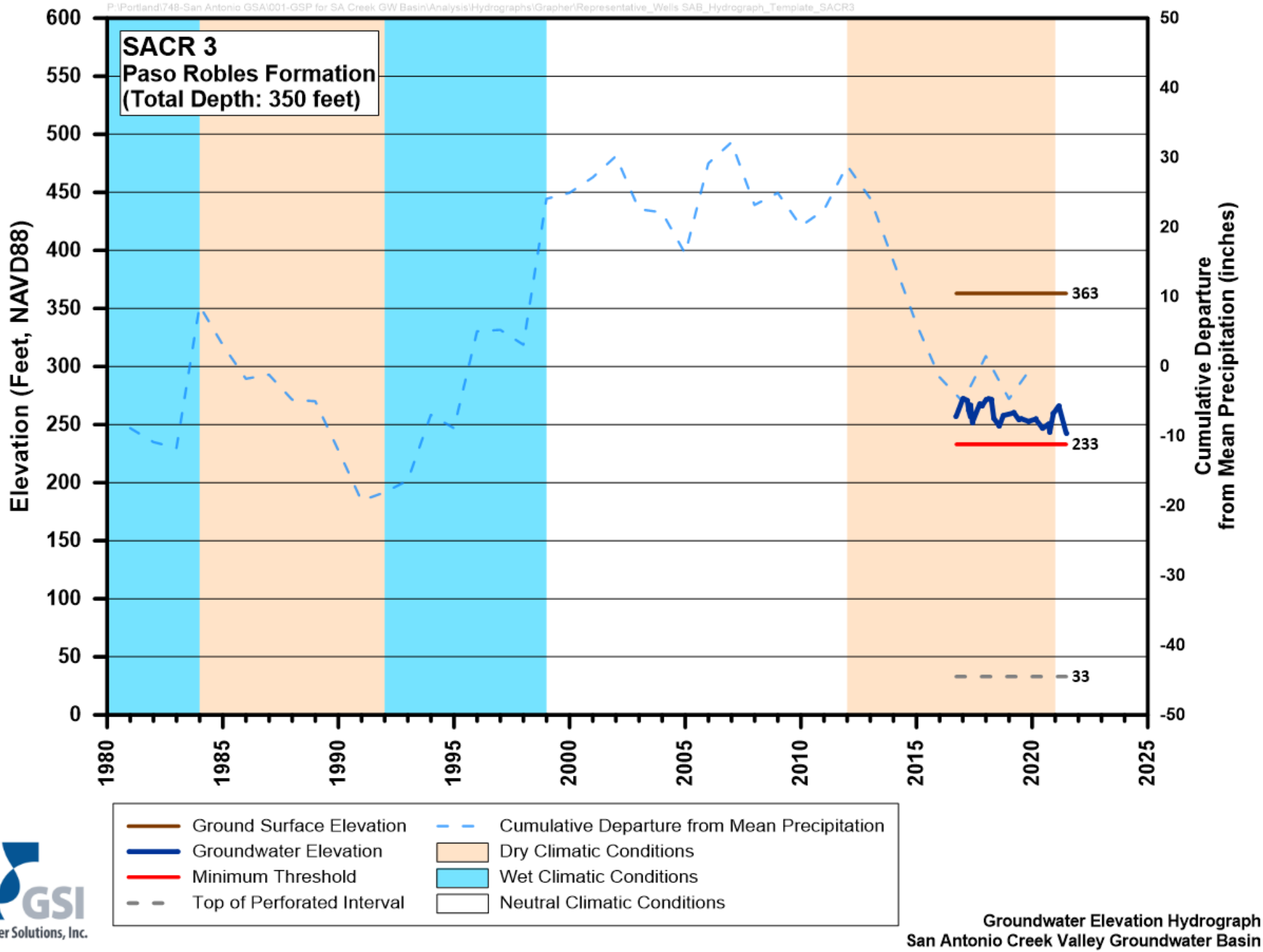
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



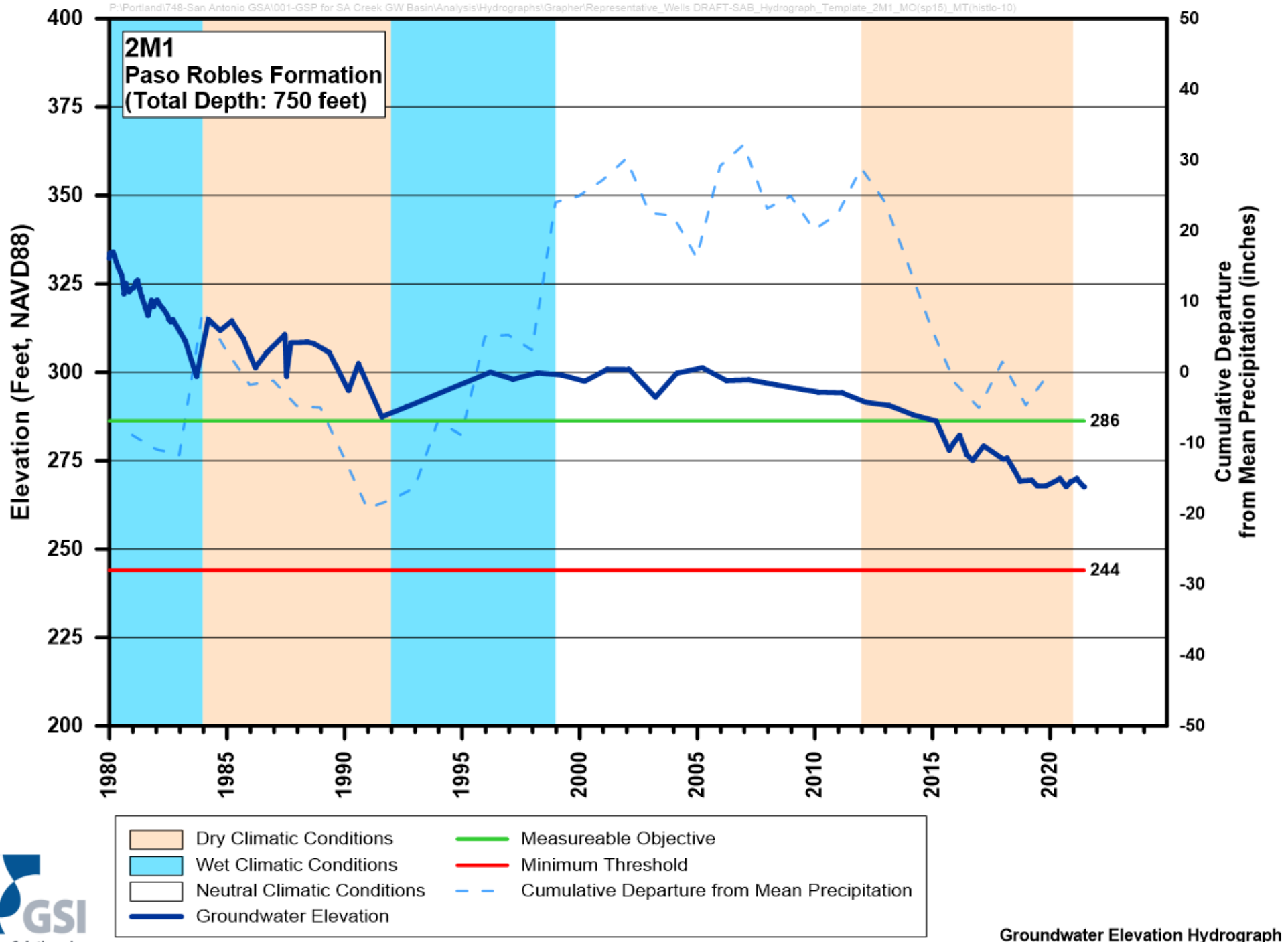
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



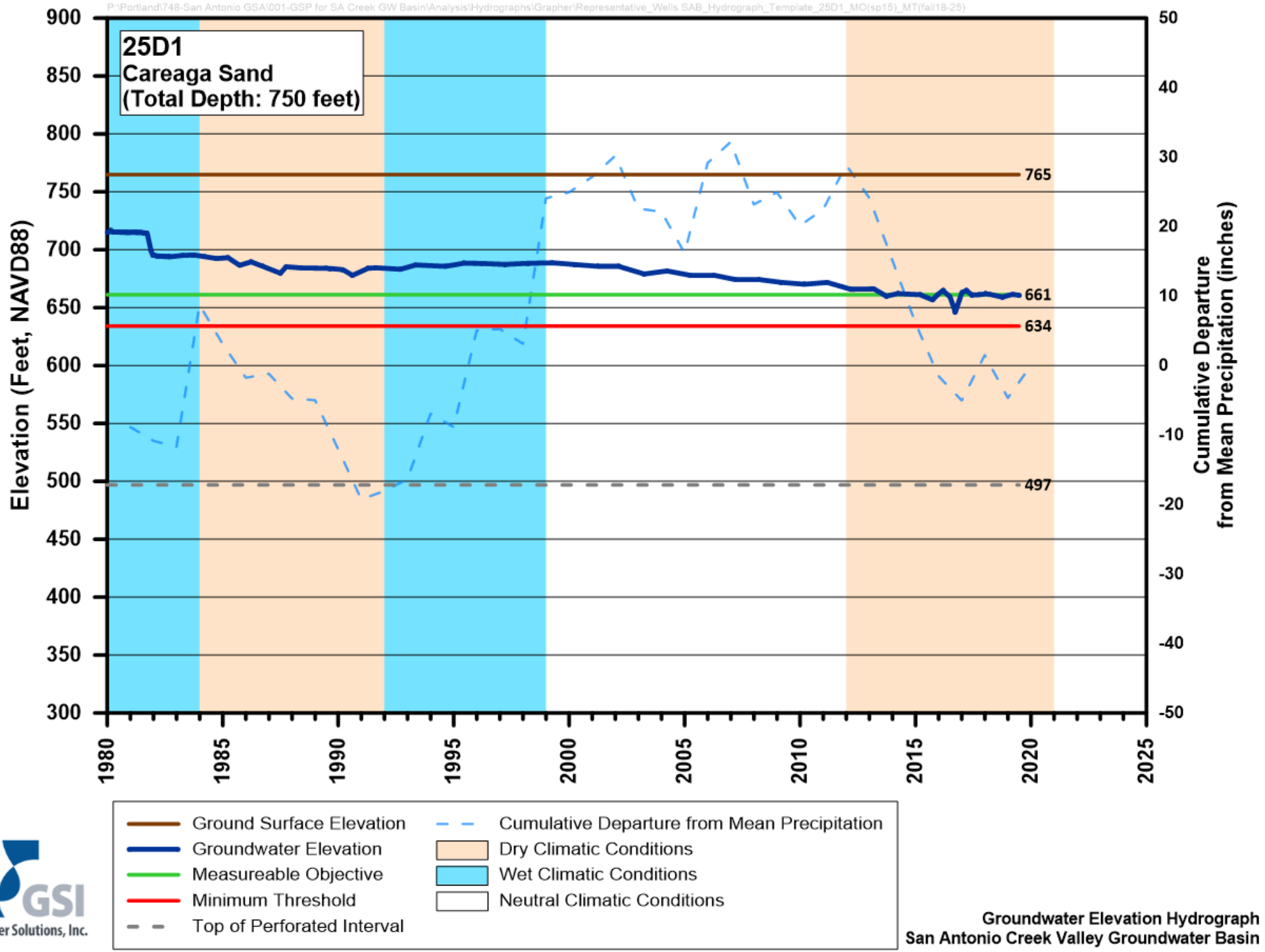
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



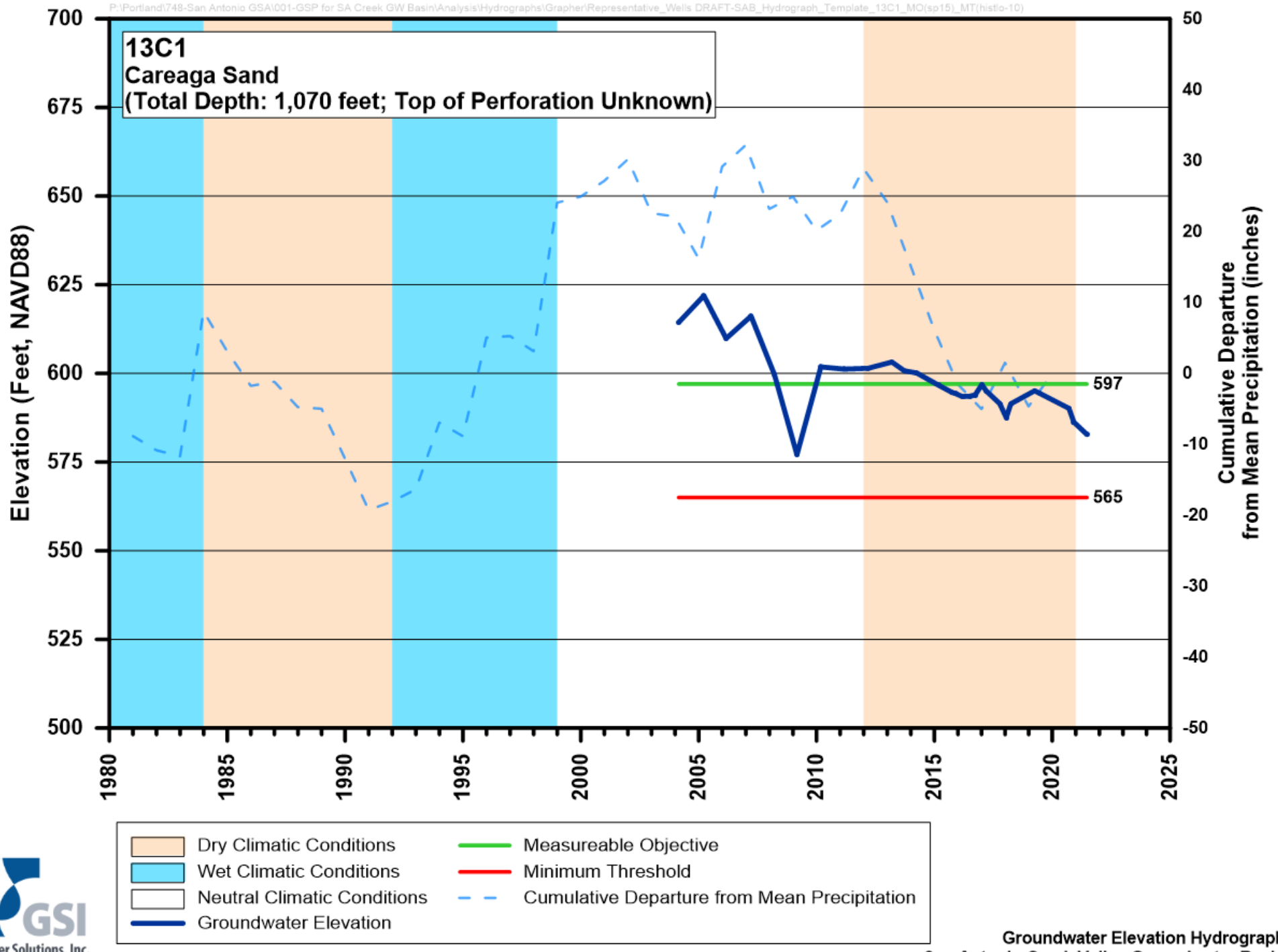
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



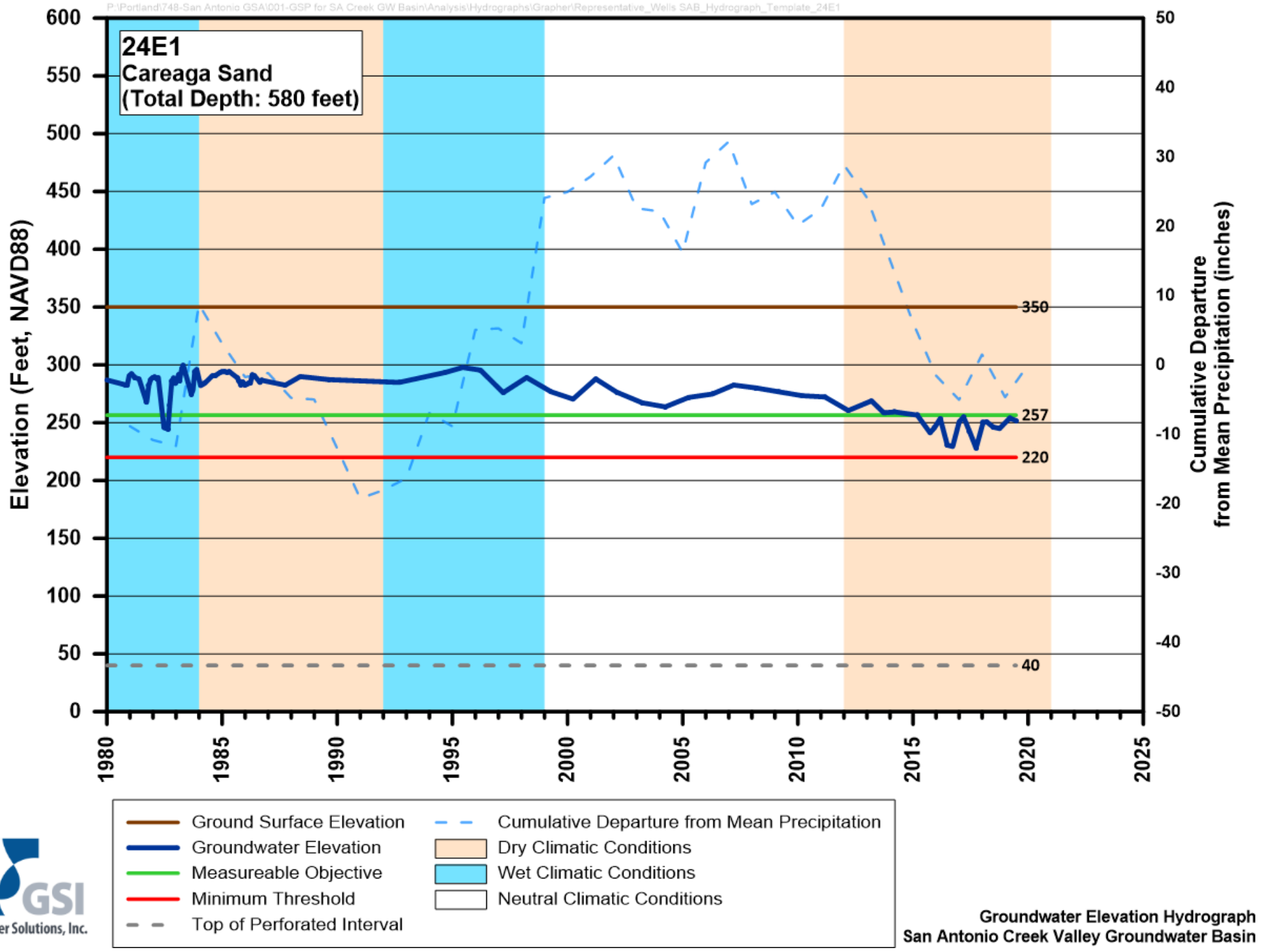
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



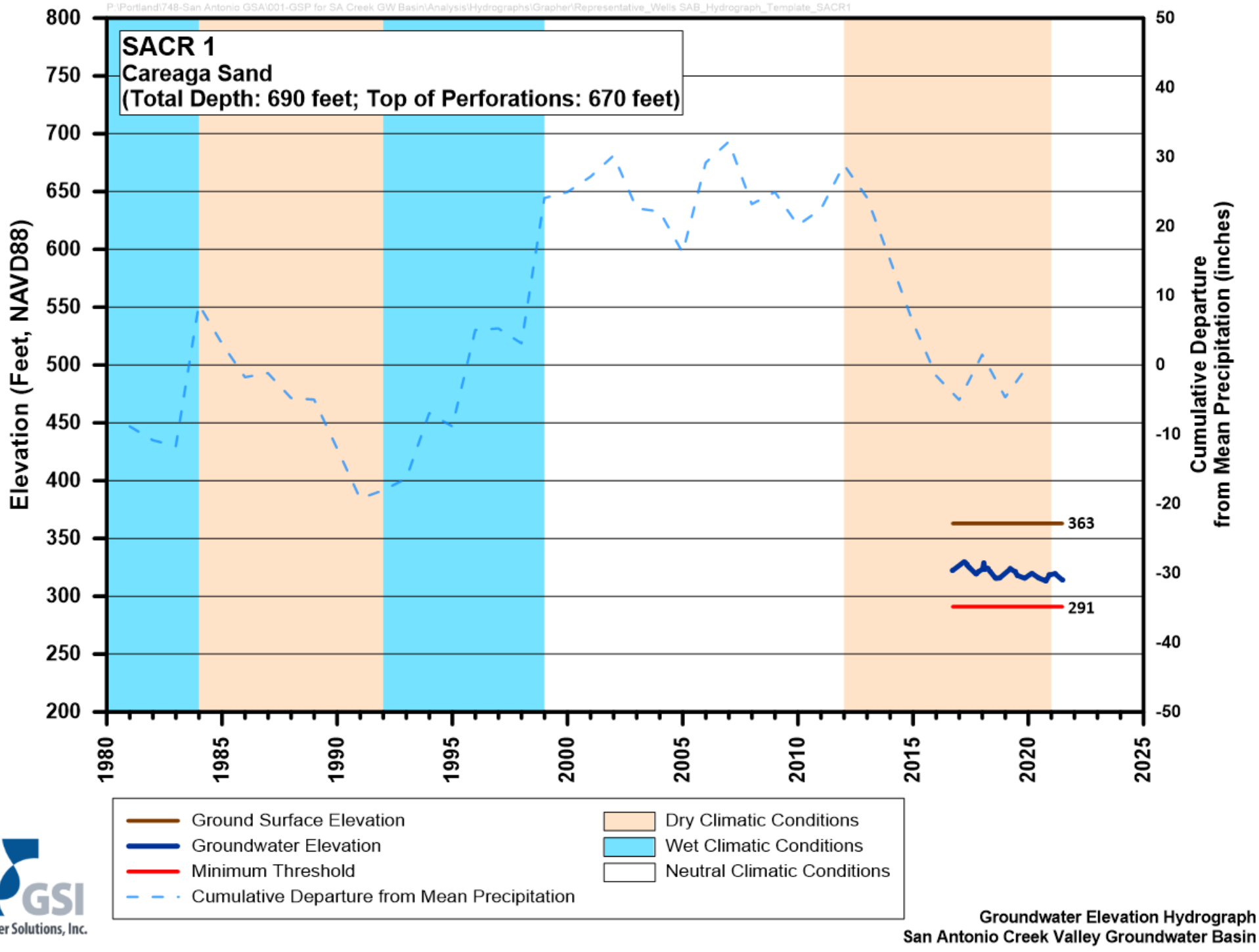
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



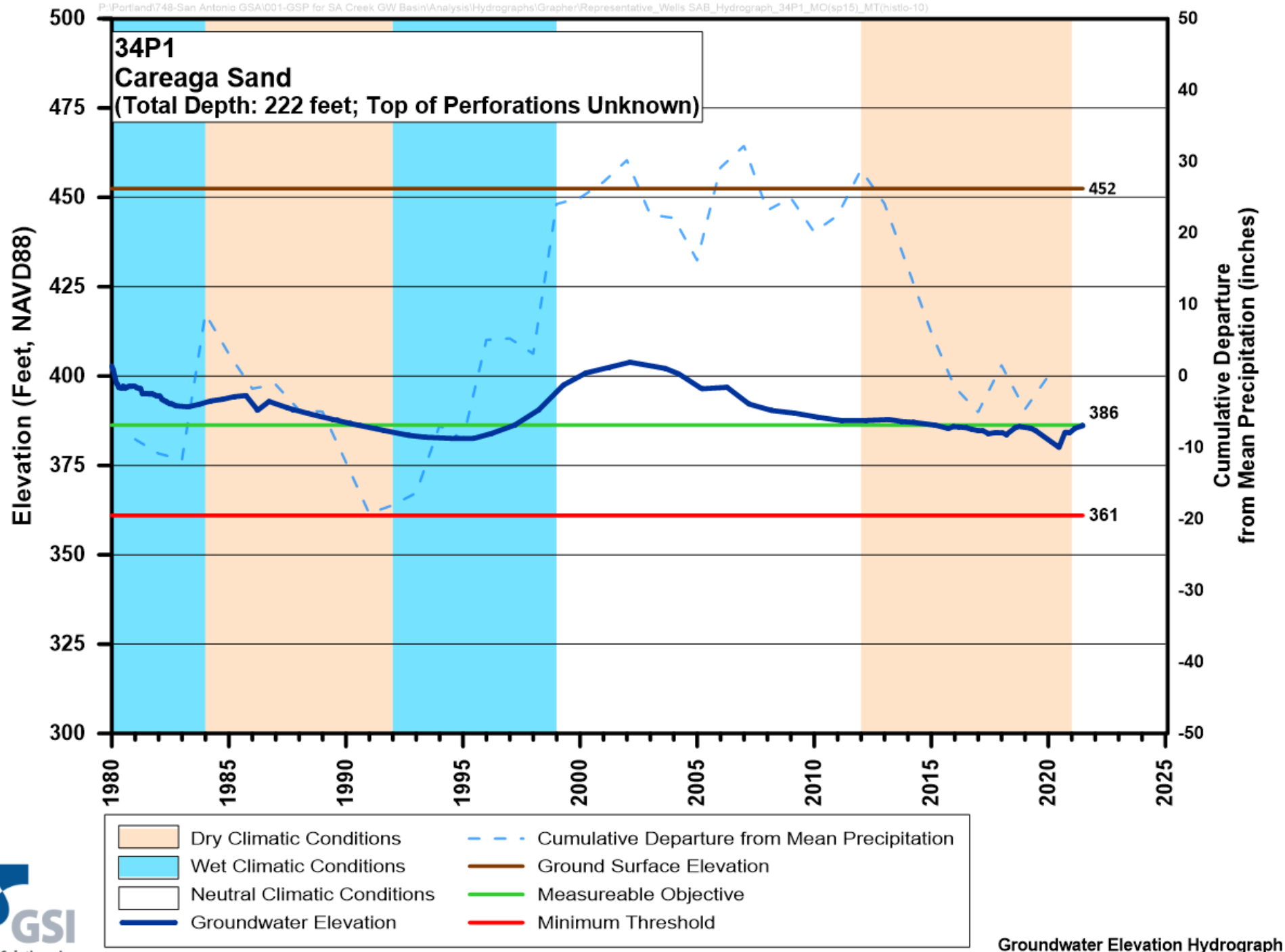
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



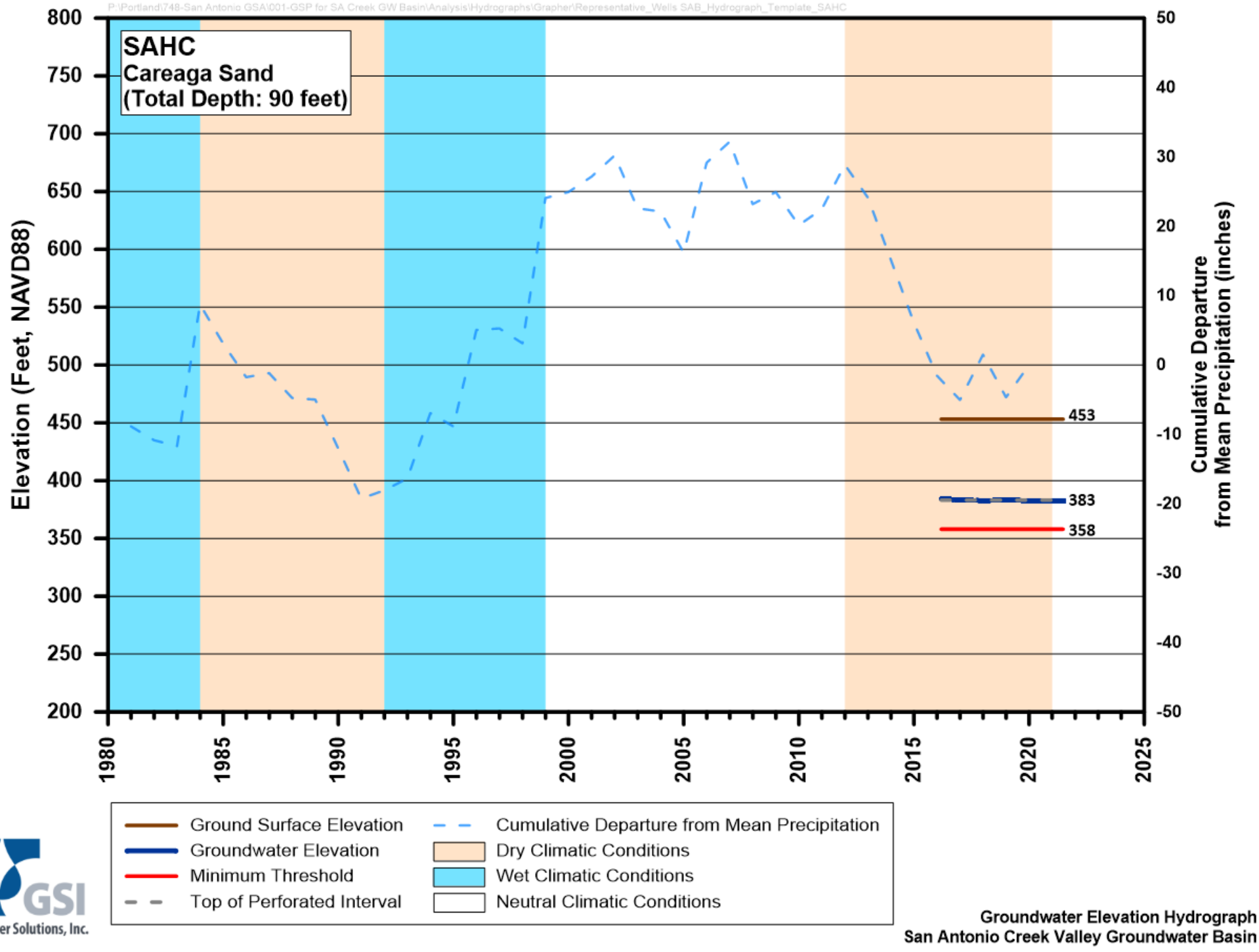
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



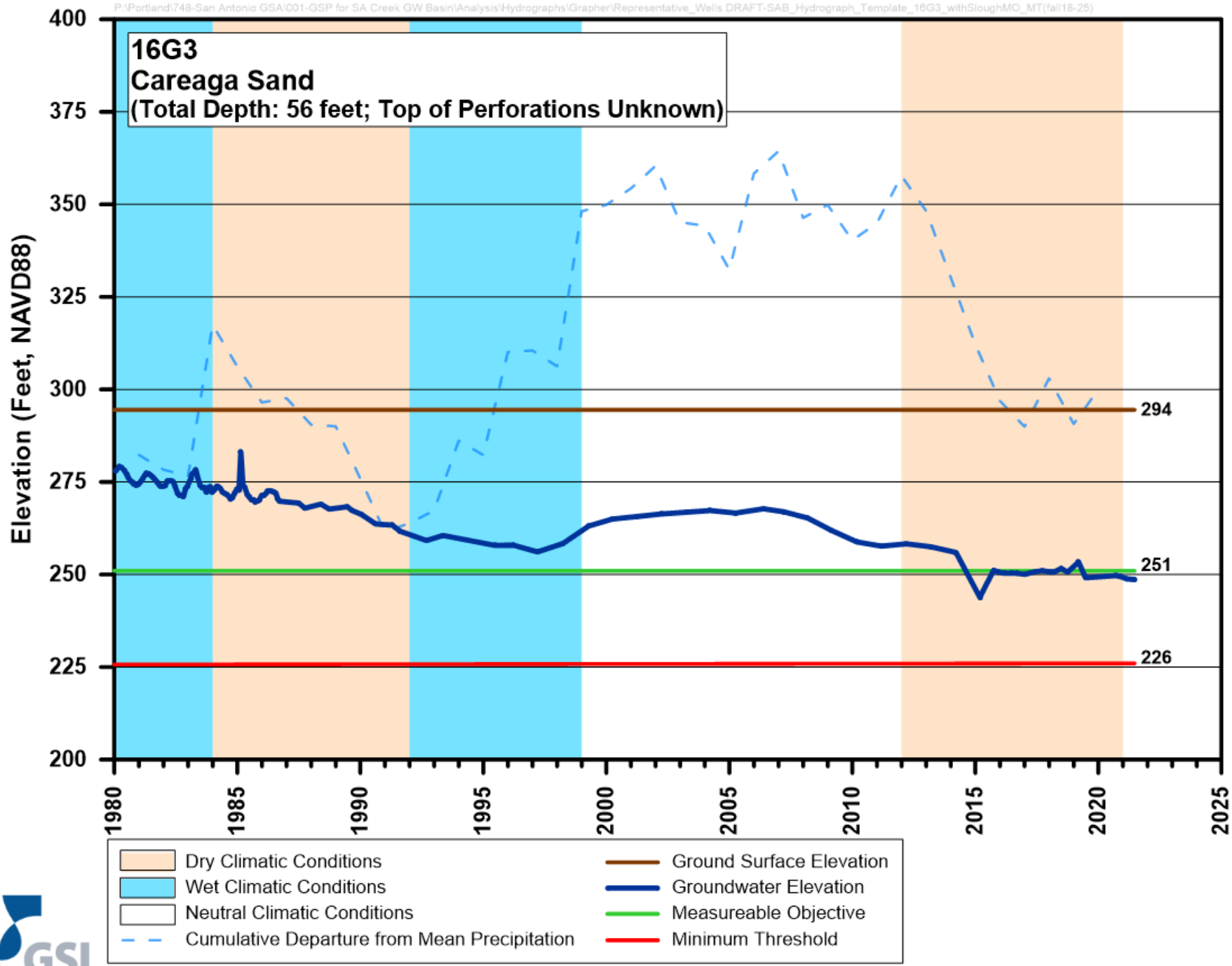
GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin



GSI Water Solutions, Inc.

Groundwater Elevation Hydrograph
San Antonio Creek Valley Groundwater Basin

APPENDIX G-1

Standard Operating Procedures:
Monitoring Protocols, Standards, and Sites Best Management Practice; Van Essen Instruments Diver Product Manual;
Van Essen Instruments Diver Barometric Compensation Quick Reference Guide

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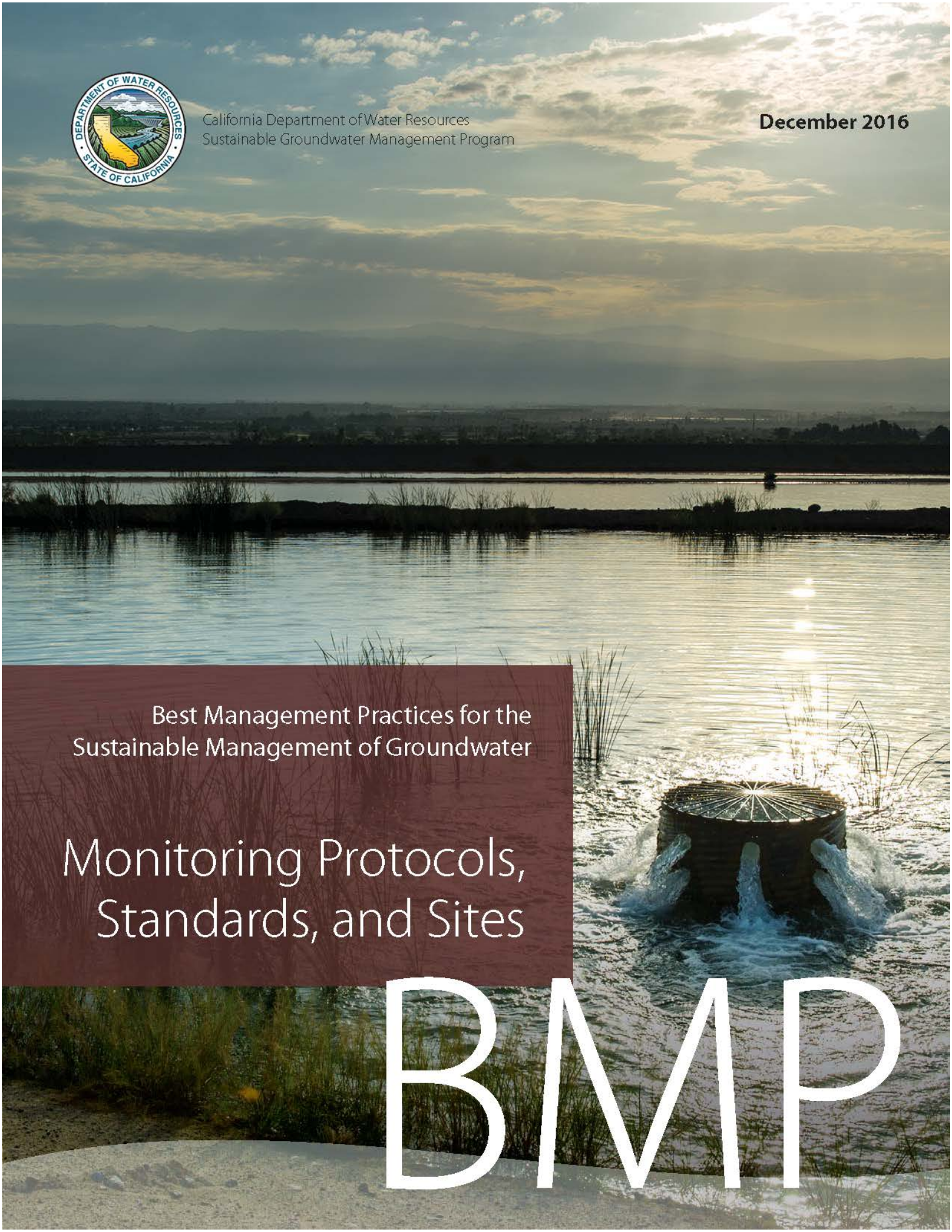

California Department of Water Resources
Sustainable Groundwater Management Program

December 2016

Best Management Practices for the Sustainable Management of Groundwater

Monitoring Protocols, Standards, and Sites

BMP

State of California
Edmund G. Brown Jr., Governor

California Natural Resources Agency
John Laird, Secretary for Natural Resources

Department of Water Resources
Mark W. Cowin, Director

Carl A. Torgersen, Chief Deputy Director

Office of the Chief Counsel Spencer Kenner	Public Affairs Office Ed Wilson	Government and Community Liaison Anecita S. Agustinez
Office of Workforce Equality Stephanie Varrelman	Policy Advisor Waiman Yip	Legislative Affairs Office Kasey Schimke, Ass't Dir.

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Division of Integrated Regional Water Management

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With assistance from:

DWR Region Office Staff

Groundwater Monitoring Protocols, Standards, and Sites Best Management Practice

1. OBJECTIVE

The objective of this *Best Management Practice* (BMP) is to assist in the development of Monitoring Protocols. The California Department of Water Resources (the Department or DWR) has developed this document as part of the obligation in the Technical Assistance chapter (Chapter 7) of the Sustainable Groundwater Management Act (SGMA) to support the long-term sustainability of California's groundwater *basins*. Information provided in this BMP provides technical assistance to Groundwater Sustainability Agencies (GSAs) and other stakeholders to aid in the establishment of consistent data collection processes and procedures. In addition, this BMP can be used by GSAs to adopt a set of sampling and measuring procedures that will yield similar data regardless of the monitoring personnel. Finally, this BMP identifies available resources to support the development of monitoring protocols.

This BMP includes the following sections:

1. Objective. A brief description of how and where monitoring protocols are required under SGMA and the overall objective of this BMP.
2. Use and Limitations. A brief description of the use and limitations of this BMP.
3. Monitoring Protocol Fundamentals. A description of the general approach and background of groundwater monitoring protocols.
4. Relationship of Monitoring Protocols to other BMPs. A description of how this BMP is connected with other BMPS.
5. Technical Assistance. Technical content providing guidance for regulatory sections.
6. Key Definitions. Descriptions of definitions identified in the GSP Regulations or SGMA.
7. Related Materials. References and other materials that provide supporting information related to the development of Groundwater Monitoring Protocols.

2. USE AND LIMITATIONS

BMPs developed by the Department provide technical guidance to GSAs and other stakeholders. Practices described in these BMPs do not replace the GSP Regulations, nor do they create new requirements or obligations for GSAs or other stakeholders. In addition, using this BMP to develop a GSP does not equate to an approval determination by the Department. All references to GSP Regulations relate to Title 23 of the California Code of Regulations (CCR), Division 2, Chapter 1.5, and Subchapter 2. All references to SGMA relate to California Water Code sections in Division 6, Part 2.74.

3. MONITORING PROTOCOL FUNDAMENTALS

Establishing data collection protocols that are based on best available scientific methods is essential. Protocols that can be applied consistently across all basins will likely yield comparable data. Consistency of data collection methods reduces uncertainty in the comparison of data and facilitates more accurate communication within basins as well as between basins.

Basic minimum technical standards of accuracy lead to quality data that will better support implementation of GSPs.

4. RELATIONSHIP OF MONITORING PROTOCOL TO OTHER BMPS

Groundwater monitoring is a fundamental component of SGMA, as each GSP must include a sufficient network of data that demonstrates measured progress toward the achievement of the sustainability goal for each basin. For this reason, a standard set of protocols need to be developed and utilized.

It is important that data is developed in a manner consistent with the basin setting, planning, and projects/management actions steps identified on **Figure 1** and the GSP Regulations. The inclusion of monitoring protocols in the GSP Regulations also emphasizes the importance of quality empirical data to support GSPs and provide comparable information from basin to basin.

Figure 1 provides a logical progression for the development of a GSP and illustrates how monitoring protocols are linked to other related BMPs. This figure also shows the context of the BMPs as they relate to various steps to sustainability as outlined in the GSP Regulations. The monitoring protocol BMP is part of the Monitoring step identified in **Figure 1**.

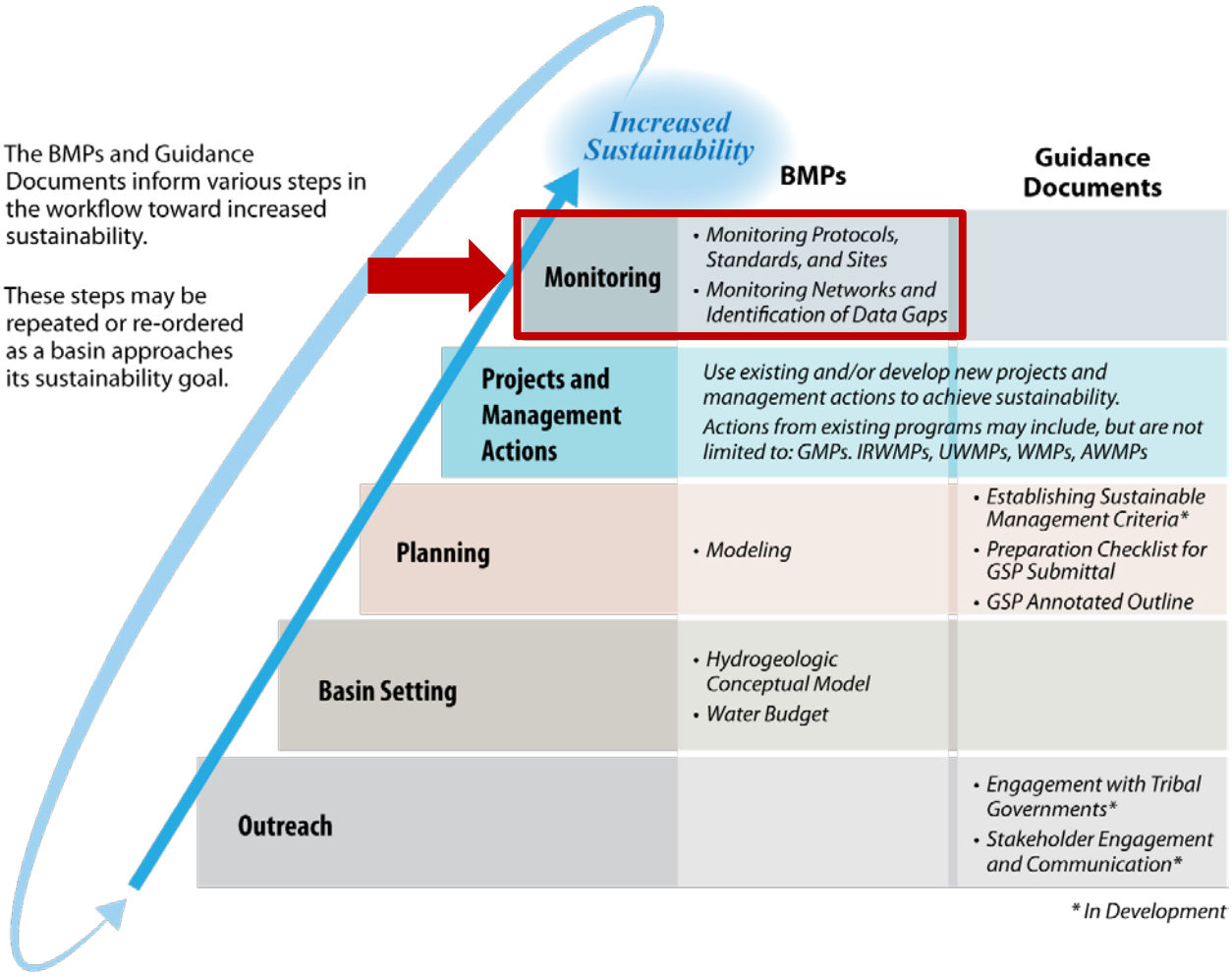


Figure 1 – Logical Progression of Basin Activities Needed to Increase Basin Sustainability

5. TECHNICAL ASSISTANCE

23 CCR §352.2. Monitoring Protocols. Each Plan shall include monitoring protocols adopted by the Agency for data collection and management, as follows:
(a) Monitoring protocols shall be developed according to best management practices.
(b) The Agency may rely on monitoring protocols included as part of the best management practices developed by the Department, or may adopt similar monitoring protocols that will yield comparable data.
(c) Monitoring protocols shall be reviewed at least every five years as part of the periodic evaluation of the Plan, and modified as necessary.

The GSP Regulations specifically call out the need to utilize protocols identified in this BMP, or develop similar protocols. The following technical protocols provide guidance based upon existing professional standards and are commonly adopted in various groundwater-related programs. They provide clear techniques that yield quality data for use in the various components of the GSP. They can be further elaborated on by individual GSAs in the form of standard operating procedures which reflect specific local requirements and conditions. While many methodologies are suggested in this BMP, it should be understood that qualified professional judgment should be used to meet the specific monitoring needs.

The following BMPs may be incorporated into a GSP's monitoring protocols section for collecting groundwater elevation data. A GSP that adopts protocols that deviate from these BMPs must demonstrate that they will yield comparable data.

PROTOCOLS FOR ESTABLISHING A MONITORING PROGRAM

The protocol for establishment of a monitoring program should be evaluated in conjunction with the *Monitoring Network and Identification of Data Gaps* BMP and other BMPs. Monitoring protocols must take into consideration the *Hydrogeologic Conceptual Model, Water Budget, and Modeling* BMPs when considering the data needs to meet GSP objectives and the sustainability goal.

It is suggested that each GSP incorporate the Data Quality Objective (DQO) process following the U.S. EPA *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006). Although strict adherence to this method is not required, it does provide a robust approach to consider and assures that data is collected with a specific purpose in mind, and efforts for monitoring are as efficient as possible to achieve the objectives of the GSP and compliance with the GSP Regulations.

The DQO process presents a method that can be applied directly to the sustainability criteria quantitative requirements through the following steps.

1. State the problem – Define sustainability indicators and planning considerations of the GSP and sustainability goal.
2. Identify the goal – Describe the quantitative measurable objectives and minimum thresholds for each of the sustainability indicators.
3. Identify the inputs – Describe the data necessary to evaluate the sustainability indicators and other GSP requirements (i.e. water budget).
4. Define the boundaries of the study – This is commonly the extent of the Bulletin 118 groundwater basin or subbasin, unless multiple GSPs are prepared for a given basin. In that case, evaluation of the coordination plan and specifically how the monitoring will be comparable and meet the sustainability goals for the entire basin.
5. Develop an analytical approach – Determine how the quantitative sustainability indicators will be evaluated (i.e. are special analytical methods required that have specific data needs).
6. Specify performance or acceptance criteria – Determine what quality the data must have to achieve the objective and provide some assurance that the analysis is accurate and reliable.
7. Develop a plan for obtaining data – Once the objectives are known determine how these data should be collected. Existing data sources should be used to the greatest extent possible.

These steps of the DQO process should be used to guide GSAs to develop the most efficient monitoring process to meet the measurable objectives of the GSP and the sustainability goal. The DQO process is an iterative process and should be evaluated regularly to improve monitoring efficiencies and meet changing planning and project needs. Following the DQO process, GSAs should also include a data quality control and quality assurance plan to guide the collection of data.

Many monitoring programs already exist as part of ongoing groundwater management or other programs. To the extent possible, the use of existing monitoring data and programs should be utilized to meet the needs for characterization, historical record documentation, and continued monitoring for the SGMA program. However, an evaluation of the existing monitoring data should be performed to assure the data being collected meets the DQOs, regulatory requirements, and data collection protocol described in this BMP. While this BMP provides guidance for collection of various

regulatory based requirements, there is flexibility among the various methodologies available to meet the DQOs based upon professional judgment (local conditions or project needs).

At a minimum, for each monitoring site, the following information or procedure should be collected and documented:

- Long-term access agreements. Access agreements should include year-round site access to allow for increased monitoring frequency.
- A unique identifier that includes a general written description of the site location, date established, access instructions and point of contact (if necessary), type of information to be collected, latitude, longitude, and elevation. Each monitoring location should also track all modifications to the site in a modification log.

PROTOCOLS FOR MEASURING GROUNDWATER LEVELS

This section presents considerations for the methodology of collection of groundwater level data such that it meets the requirements of the GSP Regulations and the DQOs of the specific GSP. Groundwater levels are a fundamental measure of the status of groundwater conditions within a basin. In many cases, relationships of the sustainability indicators may be able to be correlated with groundwater levels. The quality of this data must consider the specific aquifer being monitored and the methodology for collecting these levels.

The following considerations for groundwater level measuring protocols should ensure the following:

- Groundwater level data are taken from the correct location, well ID, and screen interval depth
- Groundwater level data are accurate and reproducible
- Groundwater level data represent conditions that inform appropriate basin management DQOs
- All salient information is recorded to correct, if necessary, and compare data
- Data are handled in a way that ensures data integrity

General Well Monitoring Information

The following presents considerations for collection of water level data that include regulatory required components as well as those which are recommended.

- Groundwater elevation data will form the basis of basin-wide water-table and piezometric maps, and should approximate conditions at a discrete period in time. Therefore, all groundwater levels in a basin should be collected within as short a time as possible, preferably within a 1 to 2 week period.
- Depth to groundwater must be measured relative to an established Reference Point (RP) on the well casing. The RP is usually identified with a permanent marker, paint spot, or a notch in the lip of the well casing. By convention in open casing monitoring wells, the RP reference point is located on the north side of the well casing. If no mark is apparent, the person performing the measurement should measure the depth to groundwater from the north side of the top of the well casing.
- The elevation of the RP of each well must be surveyed to the North American Vertical Datum of 1988 (NAVD88), or a local datum that can be converted to NAVD88. The elevation of the RP must be accurate to within 0.5 foot. It is preferable for the RP elevation to be accurate to 0.1 foot or less. Survey grade global navigation satellite system (GNSS) global positioning system (GPS) equipment can achieve similar vertical accuracy when corrected. Guidance for use of GPS can be found at USGS http://water.usgs.gov/osw/gps/. Hand-held GPS units likely will not produce reliable vertical elevation measurement accurate enough for the casing elevation consistent with the DQOs and regulatory requirements.
- The sampler should remove the appropriate cap, lid, or plug that covers the monitoring access point listening for pressure release. If a release is observed, the measurement should follow a period of time to allow the water level to equilibrate.
- Depth to groundwater must be measured to an accuracy of 0.1 foot below the RP. It is preferable to measure depth to groundwater to an accuracy of 0.01 foot. Air lines and acoustic sounders may not provide the required accuracy of 0.1 foot.
- The water level meter should be decontaminated after measuring each well.

Where existing wells do not meet the base standard as described in the GSP Regulations or the considerations provided above, new monitoring wells may need to be constructed to meet the DQOs of the GSP. The design, installation, and documentation of new monitoring wells must consider the following:

- Construction consistent with California Well Standards as described in Bulletins 74-81 and 74-90, and local permitting agency standards of practice.
- Logging of borehole cuttings under the supervision of a California Professional Geologist and described consistent with the Unified Soil Classification System methods according to ASTM standard D2487-11.
- Written criteria for logging of borehole cuttings for comparison to known geologic formations, principal aquifers and aquitards/aquicludes, or specific marker beds to aid in consistent stratigraphic correlation within and across basins.
- Geophysical surveys of boreholes to aid in consistency of logging practices. Methodologies should include resistivity, spontaneous potential, spectral gamma, or other methods as appropriate for the conditions. Selection of geophysical methods should be based upon the opinion of a professional geologist or professional engineer, and address the DQOs for the specific borehole and characterization needs.
- Prepare and submit State well completion reports according to the requirements of §13752. Well completion report documentation should include geophysical logs, detailed geologic log, and formation identification as attachments. An example well completion as-built log is illustrated in **Figure 2.** DWR well completion reports can be filed directly at the Online System for Well Completion Reports (OSWCR) http://water.ca.gov/oswcr/index.cfm.

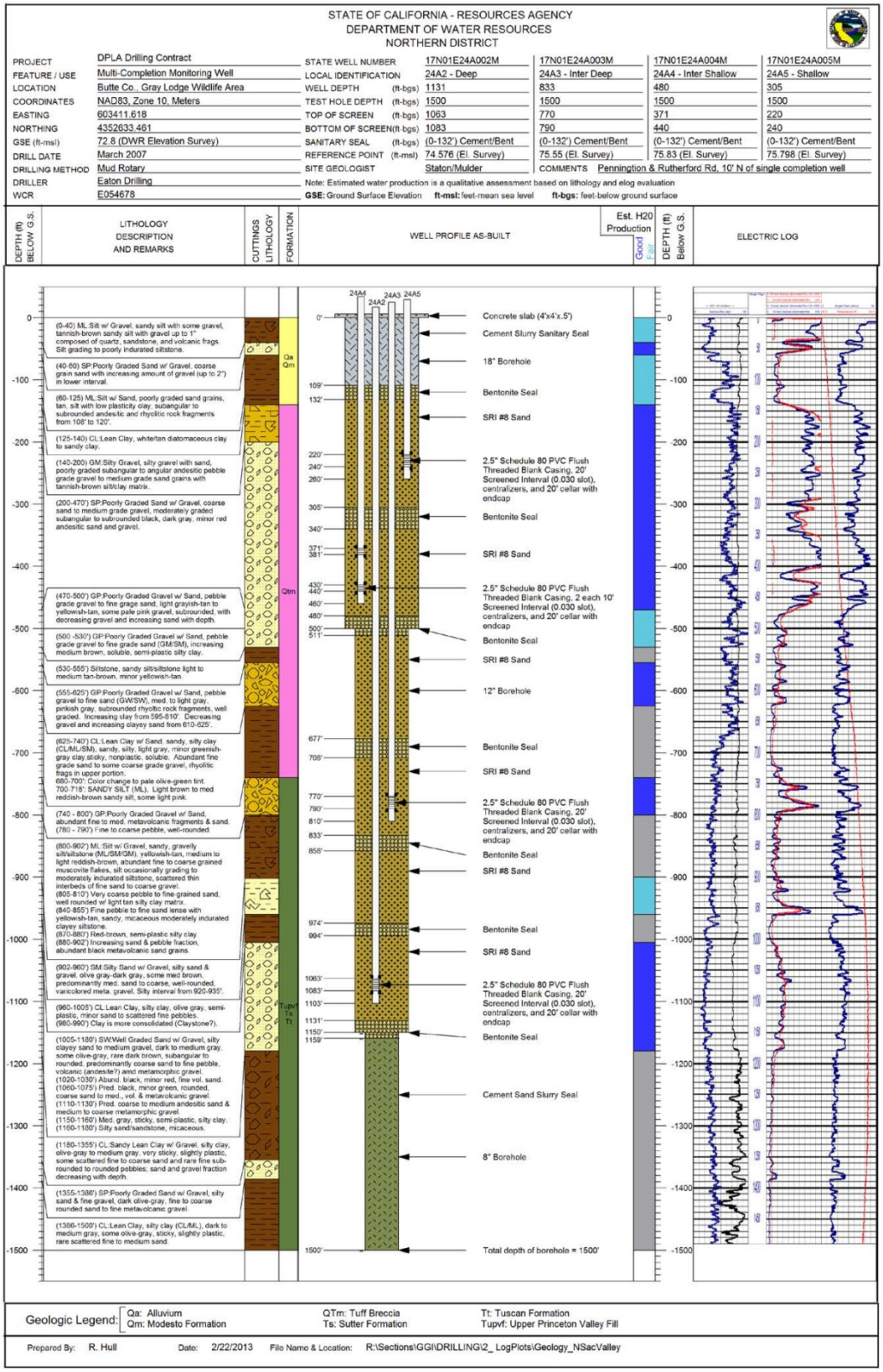


Figure 2 – Example As-Built Multi-Completion Monitoring Well Log

Measuring Groundwater Levels

Well construction, anticipated groundwater level, groundwater level measuring equipment, field conditions, and well operations should be considered prior collection of the groundwater level measurement. The USGS *Groundwater Technical Procedures* (Cunningham and Schalk, 2011) provide a thorough set of procedures which can be used to establish specific Standard Operating Procedures (SOPs) for a local agency. **Figure 3** illustrates a typical groundwater level measuring event and simultaneous pressure transducer download.

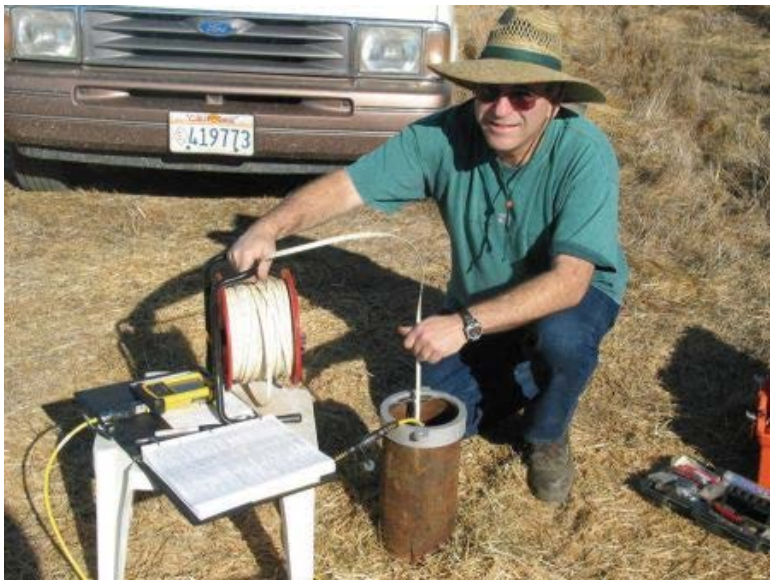


Figure 3 – Collection of Water Level Measurement and Pressure Transducer Download

The following points provide a general approach for collecting groundwater level measurements:

- Measure depth to water in the well using procedures appropriate for the measuring device. Equipment must be operated and maintained in accordance with manufacturer's instructions. Groundwater levels should be measured to the nearest 0.01 foot relative to the RP.
- For measuring wells that are under pressure, allow a period of time for the groundwater levels to stabilize. In these cases, multiple measurements should be collected to ensure the well has reached equilibrium such that no significant changes in water level are observed. Every effort should be made to ensure that a representative stable depth to groundwater is recorded. If a well does not stabilize, the quality of the value should be appropriately qualified as a

questionable measurement. In the event that a well is artesian, site specific procedures should be developed to collect accurate information and be protective of safety conditions associated with a pressurized well. In many cases, an extension pipe may be adequate to stabilize head in the well. Record the dimension of the extension and document measurements and configuration.

- The sampler should calculate the groundwater elevation as:

$$GWE = RPE - DTW$$

Where:

GWE = Groundwater Elevation
RPE = Reference Point Elevation
DTW = Depth to Water

The sampler must ensure that all measurements are in consistent units of feet, tenths of feet, and hundredths of feet. Measurements and RPEs should not be recorded in feet and inches.

Recording Groundwater Levels

- The sampler should record the well identifier, date, time (24-hour format), RPE, height of RP above or below ground surface, DTW, GWE, and comments regarding any factors that may influence the depth to water readings such as weather, nearby irrigation, flooding, potential for tidal influence, or well condition. If there is a questionable measurement or the measurement cannot be obtained, it should be noted. An example of a field sheet with the required information is shown in **Figure 4**. It includes questionable measurement and no measurement codes that should be noted. This field sheet is provided as an example. Standardized field forms should be used for all data collection. The aforementioned USGS *Groundwater Technical Procedures* offers a number of example forms.
- The sampler should replace any well caps or plugs, and lock any well buildings or covers.
- All data should be entered into the GSA data management system (DMS) as soon as possible. Care should be taken to avoid data entry mistakes and the entries should be checked by a second person for compliance with the DQOs.

STATE OF CALIFORNA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WELL DATA

STATE WELL NUMBER	COUNTY	REFERENCE POINT ELEV.	MEASURING AGENCY
			DWR

NO MEASUREMENT	QUESTIONABLE MEASUREMENT
0. Measurement discontinued	0. Caved or deepened
1. Pumping	1. Pumping
2. Pump house locked	2. Nearby pump operating
3. Tape hung up	3. Casing leaky or wet
4. Can't get tape in casing	4. Pumped recently
5. Unable to locate well	5. Air or pressure gauge measurement
6. Well has been destroyed	6. Other
7. Special	7. Recharge operation at or nearby well
8. Casing leaky or wet	8. Oil in casing
9. Temporarily inaccessible	

DATE	N M	Q M	TAPE AT RP	TAPE AT WS	RP to WS	OBSR VR	COMMENTS

DWR 1213

Figure 4 – Example of Water Level Well Data Field Collection Form

Pressure Transducers

Groundwater levels and/or calculated groundwater elevations may be recorded using pressure transducers equipped with data loggers installed in monitoring wells. When installing pressure transducers, care must be exercised to ensure that the data recorded by the transducers is confirmed with hand measurements.

The following general protocols must be followed when installing a pressure transducer in a monitoring well:

- The sampler must use an electronic sounder or chalked steel tape and follow the protocols listed above to measure the groundwater level and calculate the groundwater elevation in the monitoring well to properly program and reference the installation. It is recommended that transducers record measured groundwater level to conserve data capacity; groundwater elevations can be calculated at a later time after downloading.
- The sampler must note the well identifier, the associated transducer serial number, transducer range, transducer accuracy, and cable serial number.
- Transducers must be able to record groundwater levels with an accuracy of at least 0.1 foot. Professional judgment should be exercised to ensure that the data being collected is meeting the DQO and that the instrument is capable. Consideration of the battery life, data storage capacity, range of groundwater level fluctuations, and natural pressure drift of the transducers should be included in the evaluation.
- The sampler must note whether the pressure transducer uses a vented or non-vented cable for barometric compensation. Vented cables are preferred, but non-vented units provide accurate data if properly corrected for natural barometric pressure changes. This requires the consistent logging of barometric pressures to coincide with measurement intervals.
- Follow manufacturer specifications for installation, calibration, data logging intervals, battery life, correction procedure (if non-vented cables used), and anticipated life expectancy to assure that DQOs are being met for the GSP.
- Secure the cable to the well head with a well dock or another reliable method. Mark the cable at the elevation of the reference point with tape or an indelible marker. This will allow estimates of future cable slippage.
- The transducer data should periodically be checked against hand measured groundwater levels to monitor electronic drift or cable movement. This should happen during routine site visits, at least annually or as necessary to maintain data integrity.

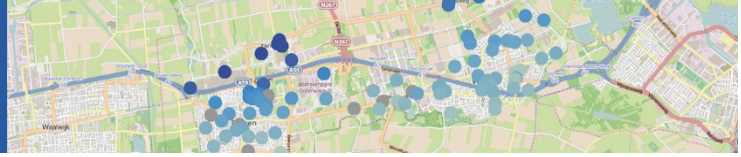
- The data should be downloaded as necessary to ensure no data is lost and entered into the basin's DMS following the QA/QC program established for the GSP. Data collected with non-vented data logger cables should be corrected for atmospheric barometric pressure changes, as appropriate. After the sampler is confident that the transducer data have been safely downloaded and stored, the data should be deleted from the data logger to ensure that adequate data logger memory remains.

PROTOCOLS FOR SAMPLING GROUNDWATER QUALITY

The following protocols can be incorporated into a GSP's monitoring protocols for collecting groundwater quality data. More detailed sampling procedures and protocols are included in the standards and guidance documents listed at the end of this BMP. A GSP that adopts protocols that deviate from these BMPs must demonstrate that the adopted protocols will yield comparable data.

In general, the use of existing water quality data within the basin should be done to the greatest extent possible if it achieves the DQOs for the GSP. In some cases it may be necessary to collect additional water quality data to support monitoring programs or evaluate specific projects. The USGS *National Field Manual for the Collection of Water Quality Data* (Wilde, 2005) should be used to guide the collection of reliable data. **Figure 5** illustrates a typical groundwater quality sampling setup.

Figure 5 – Typical Groundwater Quality Sampling Event



1 Introduction

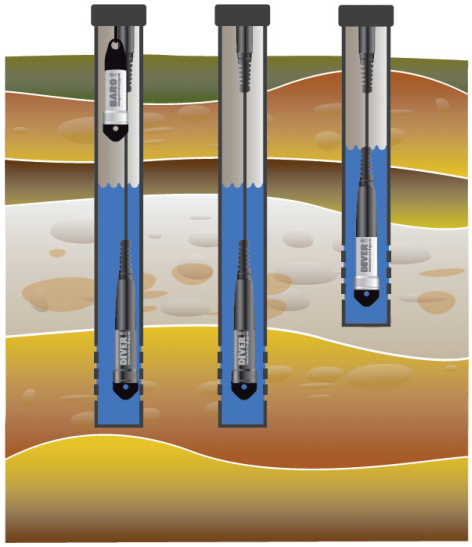
1.1 About this Manual

This manual contains information about Van Essen Instruments' Divers®. It contains a description of the Mini-Diver (DI5xx), Micro-Diver (DI6xx), Cera-Diver (DI7xx), Baro-Diver (DI500) and the CTD-Diver (DI27x). The number in brackets designates the Diver part number.

This section contains a brief introduction to the Diver's measurement principles, an instrument designed to measure groundwater levels and temperatures. Furthermore, a brief description of the software that can be used in combination with the Divers is provided. The next section contains the technical specifications for each type of Diver. The following section covers the installation of Divers in monitoring wells and in surface waters. This is followed by a description of how to maintain a Diver. The next section discusses conductivity measurements using the CTD-Diver and conductivity calibration. The last section includes the answers to frequently asked questions.

1.2 Operating Principle

The Diver is a datalogger designed to measure water pressure and temperature. Measurements are subsequently stored in the Diver's internal memory. The Diver consists of a pressure sensor designed to measure water pressure, a temperature sensor, memory for storing measurements and a battery. The Diver is an autonomous datalogger that can be programmed by the user. The Diver has a completely sealed enclosure. The communication between Divers and Laptops/field devices is based on optical communication.

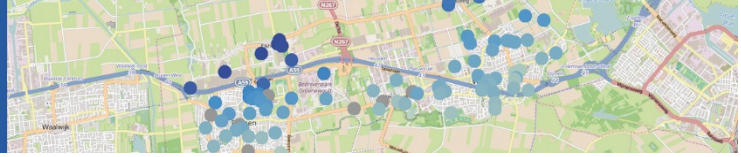


The Divers measures the absolute pressure. This means that the pressure sensor not only measures the water pressure, but also the air pressure pushing on the water surface. If the air pressure varies, the measured water pressure will thus also vary, without having to vary the water level.

1.3 Measuring Water Levels

All Divers establish the height of a water column by measuring the water pressure using the built-in pressure sensor. As long as the Diver is not submerged in water it measures atmospheric pressure, just like a barometer. Once the Diver is submerged this is supplemented by the water's pressure: the higher the water column the higher the measured pressure. The height of the water column above the Diver's pressure sensor is determined on the basis of the measured pressure.

To measure these variations in atmospheric pressure a Baro-Diver is installed for each site being measured. The barometric compensation for these variations in atmospheric pressure can be done using the Diver-Office software. It is also possible to use alternative barometric data such as data made available online.



The compensated values can be related to a reference point such as the top of the monitoring well or a vertical reference datum, for example Mean Sea Level (MSL).

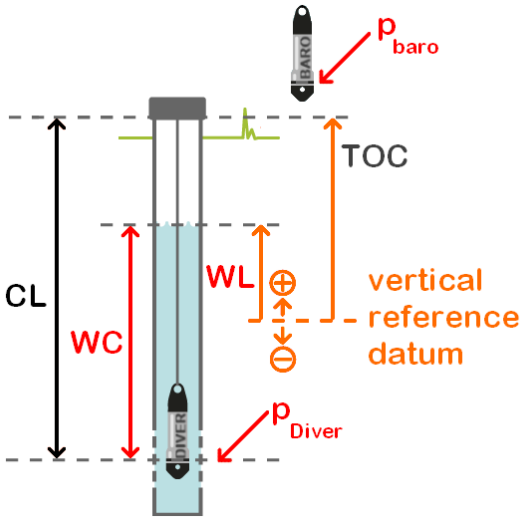
Theory

This section explains how to calculate the water level in relation to a vertical reference datum using the Diver and Baro-Diver's measurements.

The figure below represents an example of a monitoring well in which a Diver has been installed. In this case we are therefore interested in the height of the water level (WL) in relation to the vertical reference datum. If the water level is situated above the reference datum it has a positive value and a negative value if it is situated below the reference datum.

The top of casing (TOC) is measured in relation to the vertical reference datum and is denoted in the diagram below as TOC cm. The Diver is suspended with a cable with a length equal to CL cm.

The Baro-Diver measures the atmospheric pressure (p_{baro}) and the Diver measures the pressure exerted by the water column (WC) and the atmospheric pressure (p_{Diver}).



The water column (WC) above the Diver can be expressed as:

$$WC = 9806.65 \frac{p_{Diver} - p_{baro}}{\rho \cdot g} \quad (1)$$

where p is the pressure in cmH_2O, g is the acceleration due to gravity (9.81 m/s^2) and ρ is the density of the water (1,000 kg/m^3).

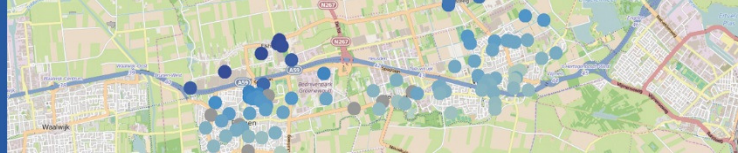
The water level (WL) in relation to the vertical reference datum can be calculated as follows:

$$WL = TOC - CL + WC \quad (2)$$

By substituting WC from equation (1) in equation (2) we obtain:

$$WL = TOC - CL + 9806.65 \frac{p_{Diver} - p_{baro}}{\rho \cdot g} \quad (3)$$

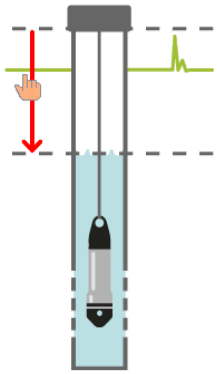
If the cable length is not exactly known, it can be determined using a manual measurement. From the figure below it is clear that the manual measurement (MM) is taken from the top of casing to the water level. The value of the water level is positive unless, in exceptional circumstances, the water level is situated above the top of casing.



The cable length can now be calculated as follows:

$$CL = MM + WC \quad (4)$$

where the water column (WC) is calculated on the basis of the measurements taken by the Diver and the Baro-Diver.



Comments:

- If the pressure measured by the Diver and the Baro-Diver is measured at different points in time, it is necessary to interpolate. The software automatically performs this interpolation.
- It is possible to enter manual measurements into the software. The software subsequently automatically calculates the cable length.

Example:

The top of casing is measured to be 150 cm above the Mean Seal Level (MSL). TOC = 150 cm. The cable length is not exactly known and is therefore measured manually. It turns out to be 120 cm: MM = 120 cm.

The Diver measures a pressure of 1,170 cmH_2O and the Baro-Diver measures a pressure of 1,030 cmH_2O. Substituting these values into equation (1), results in a water column of 140 cm above the Diver: WC = 140 cm.

Substituting the values of the manual measurement and the water column in equation (4) results in the following cable length: CL = 120 + 140 = 260 cm.

The water level in relation to MSL can now be easily calculated using equation (2): WL = 150 – 260 + 140 = 30 cm above MSL.

1.4 Measuring Temperature

All Divers measure the groundwater temperature. This can, for example, provide information about groundwater flows. This also makes it possible to determine the diffusion of (polluted) water.

The temperature is measured using a semiconductor sensor. This sensor not only measures the temperature, but also uses the value of the temperature to at the same time compensate the pressure sensor and electronics (incl. the crystal clock) for the effects of temperature.

Quick Reference Guide

Barometric Compensation

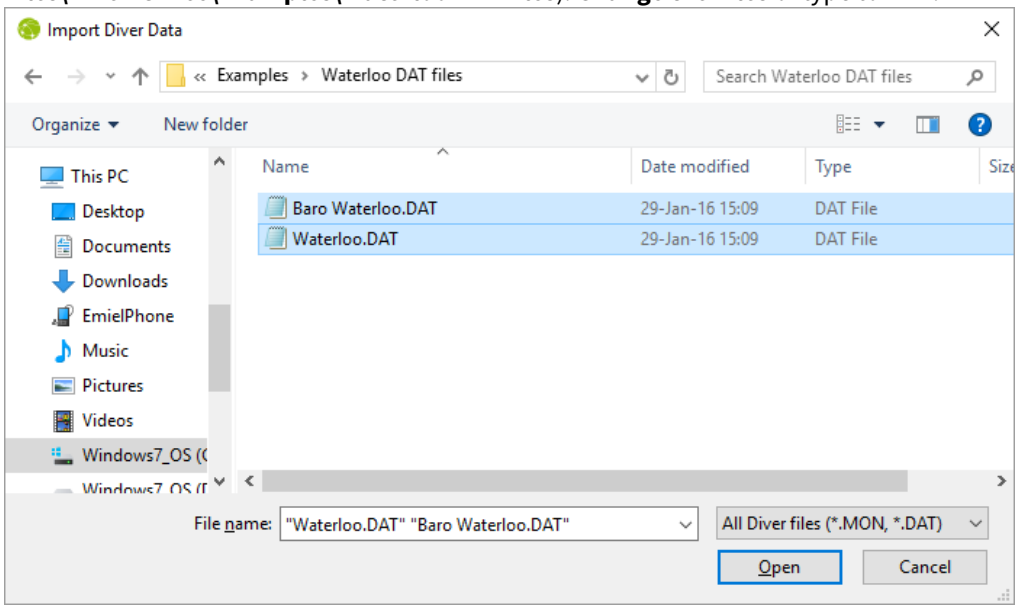
Introduction

This document outlines the basics to perform the barometric compensation. Please refer to the Diver-Office help for more details.

Importing Sample Data

Diver-Office comes with example data. The default folder is **C:\Program Files\Diver-Office\Examples**.

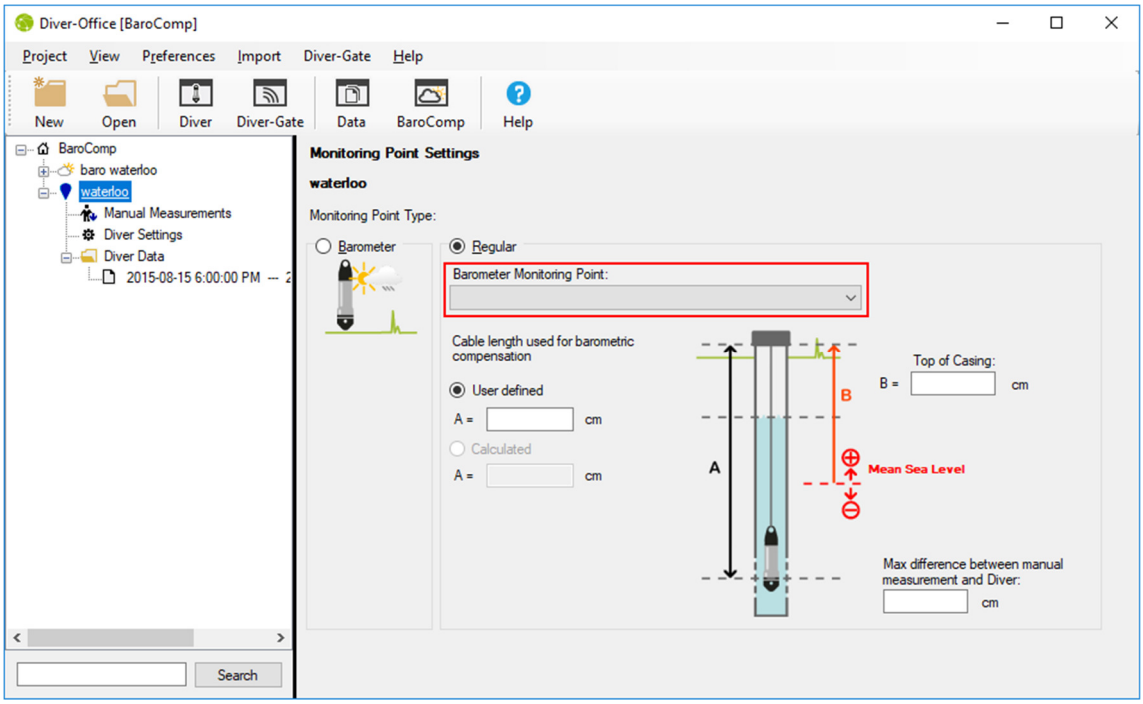
1. In Diver-Office click on the menu bar item **Import > Diver Data…** (CTRL+E). In the dialog that opens navigate to the **Waterloo DAT files** folder in the **Examples** folder (**C:\Program Files\Diver-Office\Examples\Waterloo DAT files**). **Change the Files** of type to **DAT**.



2. Select the two files and click **[Open]**.

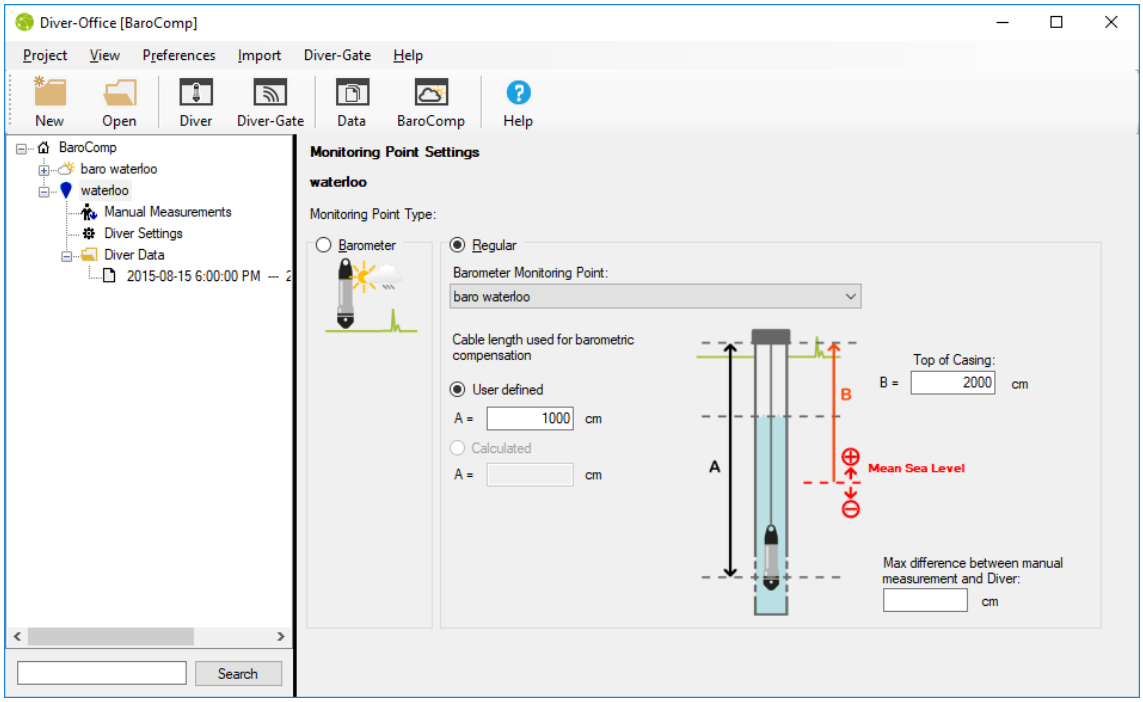
Setting the barometer

One of the imported data series is now shown. Click on **Waterloo** in the tree view on the left. The screen should no look something like the window shown below. Note that the **Barometer Monitoring Point** field is blank. To perform the barometric compensation this field must contain a value.



1. From the **Barometer Monitoring Point** dropdown list select **baro waterloo**.
2. Enter a value for the cable length (**A**) if the barometric compensation should calculate the depth to water
3. Enter a value both (**A**) and for the top of casing (**B**) if the barometric compensation should calculate the water level with respect to Mean Sea Level.

The window should now be similar to the window shown below:

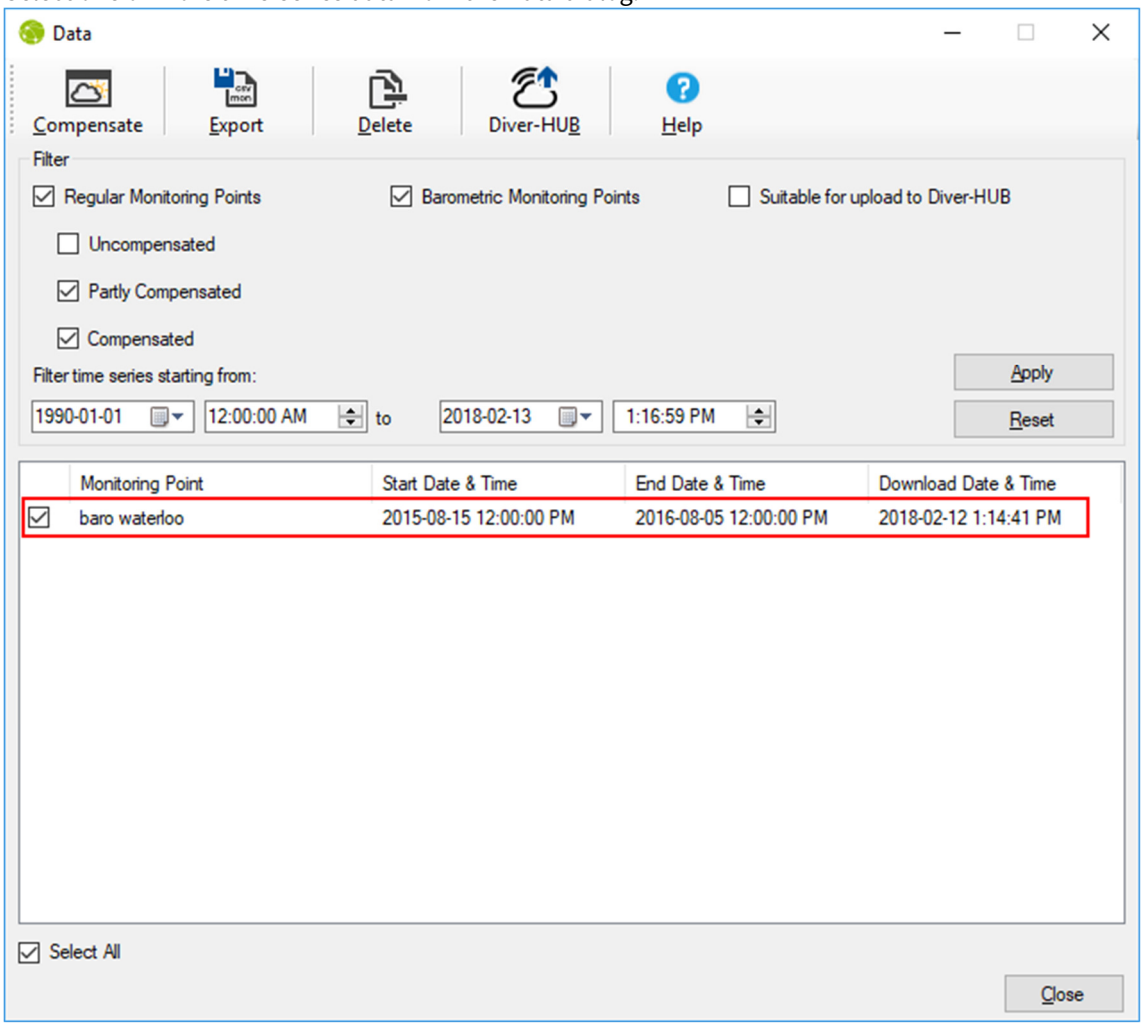


Compensating Diver Data

1. Click the  **BaroComp** button from the main toolbar.

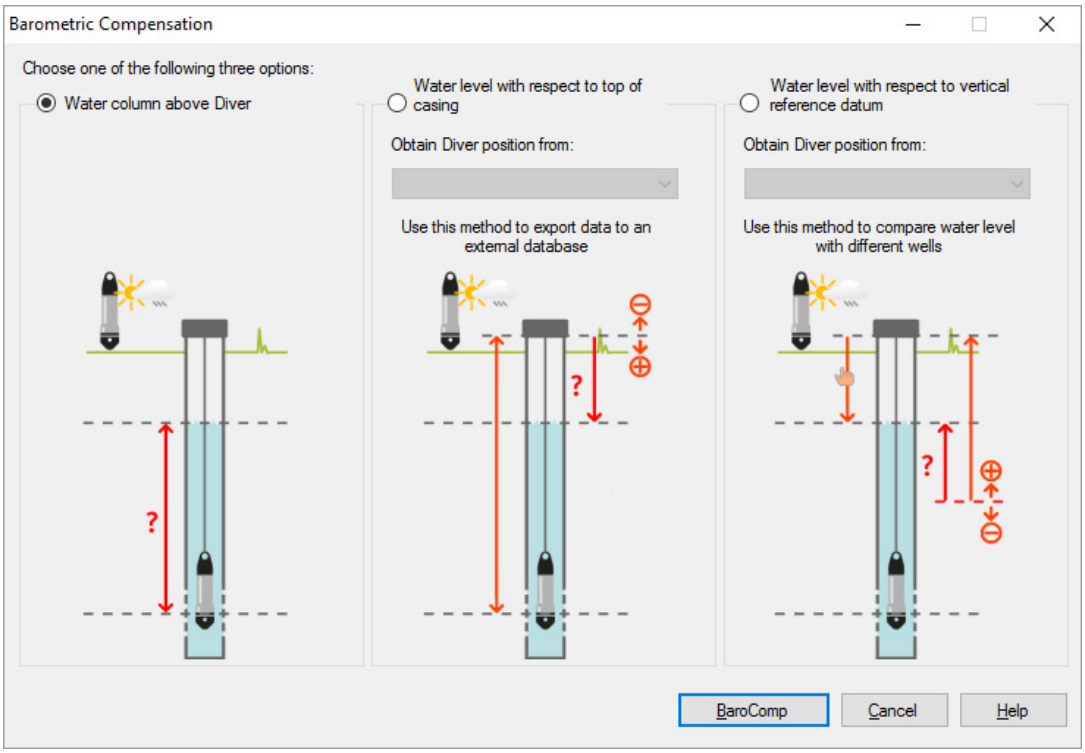
   *You may also right click on the data set in the project tree to go directly to the BaroCompensation dialog.

2. Select one or more time-series data from the Data dialog.



3. Select the  **BaroComp** button from the Data dialog toolbar.
4. Select the desired barometric compensation method from the **BaroComp** dialog (shown on following page). You may choose from five barometric compensation methods:
   a. Water Column above Diver
   b. Water level with respect to Top of Casing *using Cable Length*
   c. Water level with respect to Top of Casing *using Manual Measurement*
   d. Water Level with respect to VRD *using Cable Length*
   e. Water Level with respect to VRD *using Manual Measurement*

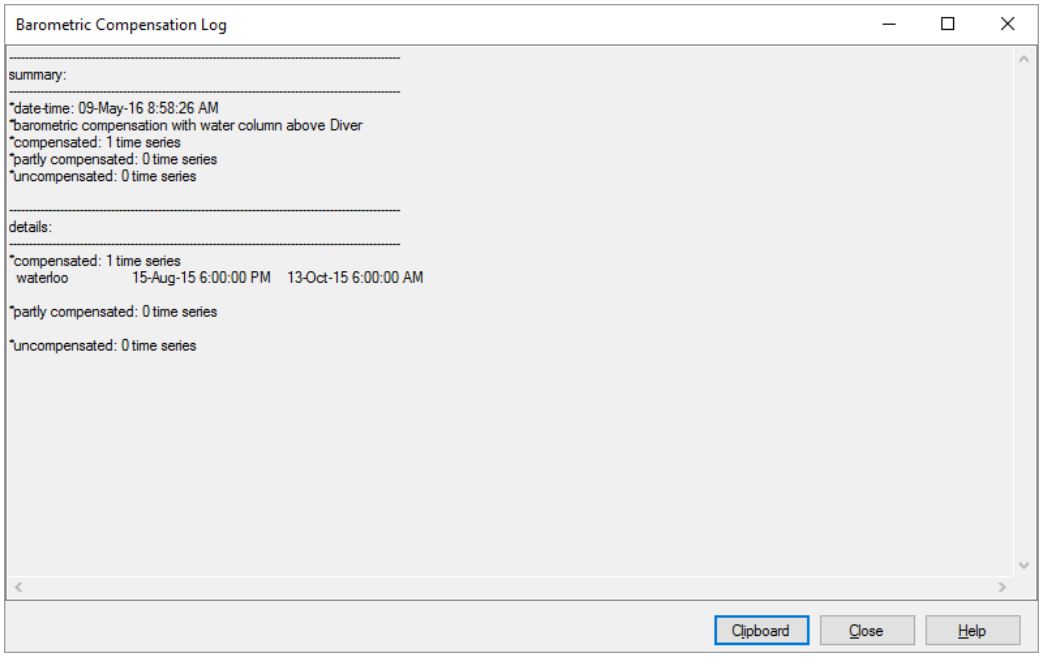
   Note: Each barometric compensation method requires that certain data be entered before the compensation can be performed. Please refer to the Diver-Office user's manual for more information on the data requirements for each compensation method.



5. Once the method is chosen, select the **[BaroComp]** button to perform the barometric compensation.

   Note: If the compensation fails, the type of missing information will be indicated in the log dialog.

6. When the compensation is complete, the barometric compensation log will show, displaying a summary with details.



7. Click the **[Close]** button to finish. You can now view the compensated data in the time series table and plot. You will notice that the time series symbol in the **Project Tree** will change once compensation has been performed:

   means that the data was Partially Compensated

   means that all the data in the time series was Compensated

   means that the data is Uncompensated.

APPENDIX G-2

Well Completion Reports

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*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR 08N 34W 02

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0368151

Page 1 of 1

Owner's Well Number Well 19

Date Work Began 08/10/2017 Date Work Ended 10/30/2017

Local Permit Agency Santa Barbara County Environmental Health Department

Permit Number WP#1495 Permit Date 8/22/16

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Reverse Circulation Rotary Drilling Fluid Bentonite mud

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	121	Sand
121	141	Clay / Sand / Rock
141	221	Sand
221	241	Sand / Rock
241	261	Sand / Clay
261	281	Rock / Sand
281	301	Sand
301	341	Sand / Clay / Rock
341	461	Sand
461	501	Sand / Rock
501	541	Sand
541	561	Sand / Rock
561	601	Sand
601	621	Sand / Clay / Rock
621	661	Sand
661	701	Clay
701	721	Clay / Sand
721	750	Clay

Total Depth of Boring 520 Feet

Total Depth of Completed Well 500 Feet

Well Location

Address 8385 Graciosa Rd.

City Santa Maria County Santa Barbara

Latitude ___ Deg. ___ Min. ___ Sec. N Longitude ___ Deg. ___ Min. ___ Sec. W

Datum ___ Dec. Lat. 34.801389 Dec. Long. -120.434444

APN Book 101 Page 080 Parcel 089

Township ___ Range ___ Section ___

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West — See attached map — East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

◉ New Well

○ Modification/Repair

○ Deepen

○ Other ___

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

◉ Water Supply

☐ Domestic ☐ Public

☑ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

○ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other ___

Water Level and Yield of Completed Well

Depth to first water 147 (Feet below surface)

Depth to Static Water Level 147 (Foot) Date Measured 11/21/2018

Estimated Yield * 1,000 (GPM) Test Type Constant Rate

Test Length 12.0 (Hours) Total Drawdown 59 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	50	40	Conductor	Low Carbon Steel	0.312	30		
0	200	26	Blank	Low Carbon Steel	0.312	16		
200	200	26	Coupler	Di-Electric	N/A	16		
200	240	26	Blank	304 Stainless Steel	0.312	16		
240	500	26	Scrn+cap	304 Stainless Steel	N/A	16	Wire Wrap	0.312

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other ___

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Tyson R. Davis, Pacific Coast Well Drilling, Inc.
Person, Firm or Corporation

PO Box 184 Templeton CA 93465
Address City State Zip

Signed [signature] 3-2-18
C-57 Licensed Water Well Contractor Date Signed

927400
C-57 License Number

DWR 188 REV. 2/2017

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

JUL 12 2018

ORIGINAL - File with DWR

Page 1 of 2

Owner's Well No. #3

Date Work Began 9/16/98, Ended 9/23/98

Local Permit Agency S.B. County Environmental Health

Permit No. SR100017 Permit Date 8/17/98

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 521842

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ___ VERTICAL X HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER 186 (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	75	Sand And Gravel
75	85	White Clay
85	140	Gravel And Brown Sand
140	160	Brown Clay Some Sand
160	190	Very Coarse Brown Sand
190	270	Brown Clay, Sand, With Streaks Of Gravel
270	480	Grey Clay, Some Fine Sand
480	650	Brown Clay Some Sand
650	740	Brown Sand Some Clay
740	800	Grey Sand And Clay
800	980	Careaga Sand With Clay
980	1100	Shale

TOTAL DEPTH OF BORING 1100 (Feet)

TOTAL DEPTH OF COMPLETED WELL 980 (Feet)

WELL OWNER

N

M

St

WELL LOCATION

Address Palmer Road and US 101

City

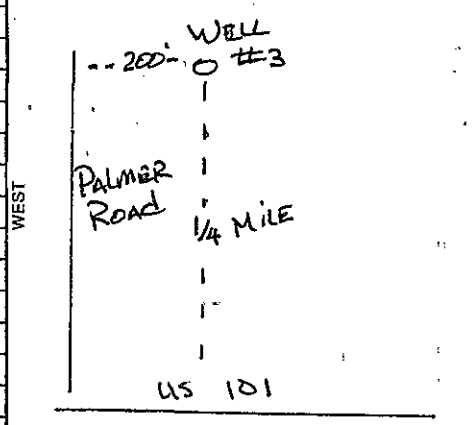
County Santa Barbara County

APN Book 137 Page 36 Parcel 101-060-45

or Township 8N Range 33W Section 2

or Latitude DEG. MIN. SEC. NORTH Longitude DEG. MIN. SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING

WATER SUPPLY

___ Domestic

___ Public

X Irrigation

___ Industrial

___ "TEST WELL"

___ CATHODIC PROTECTION

___ OTHER (Specify)

DRILLING METHOD Mud Rotary FLUID Bentonite

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 186 (Ft.) & DATE MEASURED 10/21/98

ESTIMATED YIELD* 1400 (GPM) & TEST TYPE 12HR Continuous

TEST LENGTH 12 (Hrs.) TOTAL DRAWDOWN 264 (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
"SEE ATTACHED"										

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	55	x			6 Sack Slurry
55	980			x	Lapis #2

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

X Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Floyd V. Wells, Inc. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 1337 W. Betteravia Road CITY Santa Maria STATE CA ZIP 93455

Signed Charles C Wells (WELL DRILLER/AUTHORIZED REPRESENTATIVE) DATE SIGNED 10-29-98

C57-229570 (C-57 LICENSE NUMBER)

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

521842

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (INCHES)	CASING (S) TYPE (X) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (INCHES)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (INCHES)
0	55	38			X		Carbon Steel	30	0.250	
55	290	28	X				Carbon Steel	16	0.312	
290	490	28		X			Carbon Steel	16	xxx-Hvy	0.040
490	550	28	X				Carbon Steel	16	0.312	
550	620	28		X			Carbon Steel	16	xxx-Hvy	0.040
620	650	28	X				Carbon Steel	16	0.312	
650	960	28		X			Carbon Steel	16	xxx-Hvy	0.040
960	980	28	X				Carbon Steel	16	0.312	

Premiere Partners III Production Well Number 3

ORIGINAL
File with DWR

MAR 31 1977

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do Not Fill In

№ 105190

State Well No. 8N/34W-24E1

Other Well No. _____

(1) OWNER:

Name [redacted]

Address

(2) LOCATION OF WELL:

County Santa Barbara Owner's number, if any GK

Township, Range, and Section T8N, R34W, Rancho Los Alamos

Distance from cities, roads, railroads, etc. 1/4 mi S of Harris Road or Hwy 1, 3/10 mi W of San Antonio Creek and Hwy 135, North side of Ranch reservoir

(3) TYPE OF WORK *(check)*:

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE *(check)*:

Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [X] Test Well [ ] Other [ ]

(5) EQUIPMENT:

Rotary [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: X OTHER:

SINGLE [X] DOUBLE [ ]

If gravel packed

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	580	16" od	.312	28"	35	580

Size of shoe or well ring:

Size of gravel: 1/4 x 1/8

Describe joint butt

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen Vertical slot

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
310	570		32	.060 x 2½

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [X] No [ ] To what depth 35 ft.

Were any strata sealed against pollution? Yes [ ] No [ ] If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing 35' of 30" surface pipe cemented in

(9) WATER LEVELS:

Depth at which water was first found, if known ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes [ ] No [ ] If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

Was electric log made of well? Yes [ ] No [ ] If yes, attach copy

(11) WELL LOG:

Total depth ft. Depth of completed well ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to ft.

SEE ATTACHED LOG

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

Work started 2/28 19 77, Completed 3/06 19 77

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Floyd V. Wells, Inc
(Person, firm, or corporation) *(Typed or printed)*

Address P. O. Box 1007
Santa Maira, Ca 93454

[SIGNED] Floyd V. Wells
(Well Driller)

License No. C57-229570 Dated March 14, 1977

SKETCH LOCATION OF WELL ON REVERSE SIDE

105190

SANTA MARIA, CALIFORNIA

FLOYD V. WELLS, INC.

GOLETA, CALIFORNIA

MAR 31 1977

WATER WELL DRILLING LOG

Owner: [redacted] Company:

Well No.: #5 Rig: #5

Location of Well: 1/4 mi S. of Harris Rd or Hwy 1, 3/10 mi W of San Antonio Creek and Hwy 135
T8N, R34W, Rancho Los Alamos, North side of Ranch reservoir

Surface Pipe or Seal: 35' cemented in Size: 30" Depth: 35' Gauge: .250

Well Bore Diameter: 28" Depth of Casing Set: 580'

Casing Size: 16" OD Gauge: .312 Type: steel

Perforations: Size: .060 Type: 2½" vertical slots Number: 32 rows

Perforation Location from Ground Level: From: G.L. 0' To: 310' blank
310' 570' perf
570' 580' blank
Bull nose on bottom

Gravel Pack: Type: Pumped in Size: 1/4 x 1/8 Quantity: 128.84 ton

Bits: No. Used: 4 Size: (1) 9 7/8; (1) 20"; (1) 28"; (1) 36"

Drilling Method: Air: Foam: Mud: X

Material Used: Gel.: 350 gel P-95: 50 clay Foam:

Well Started: 2/28/77 Well Completed: 3/06/77 Driller: Frank & Clarence

TEST PUMPING INFORMATION:

Production Test:

Standing Water Level: Pumping Level:

G.P.M.: Pumping Level

REMARKS:

Ken Vertrees, Printers, Lithographers - Santa Maria, CA

105190

SANTA MARIA, CALIFORNIA

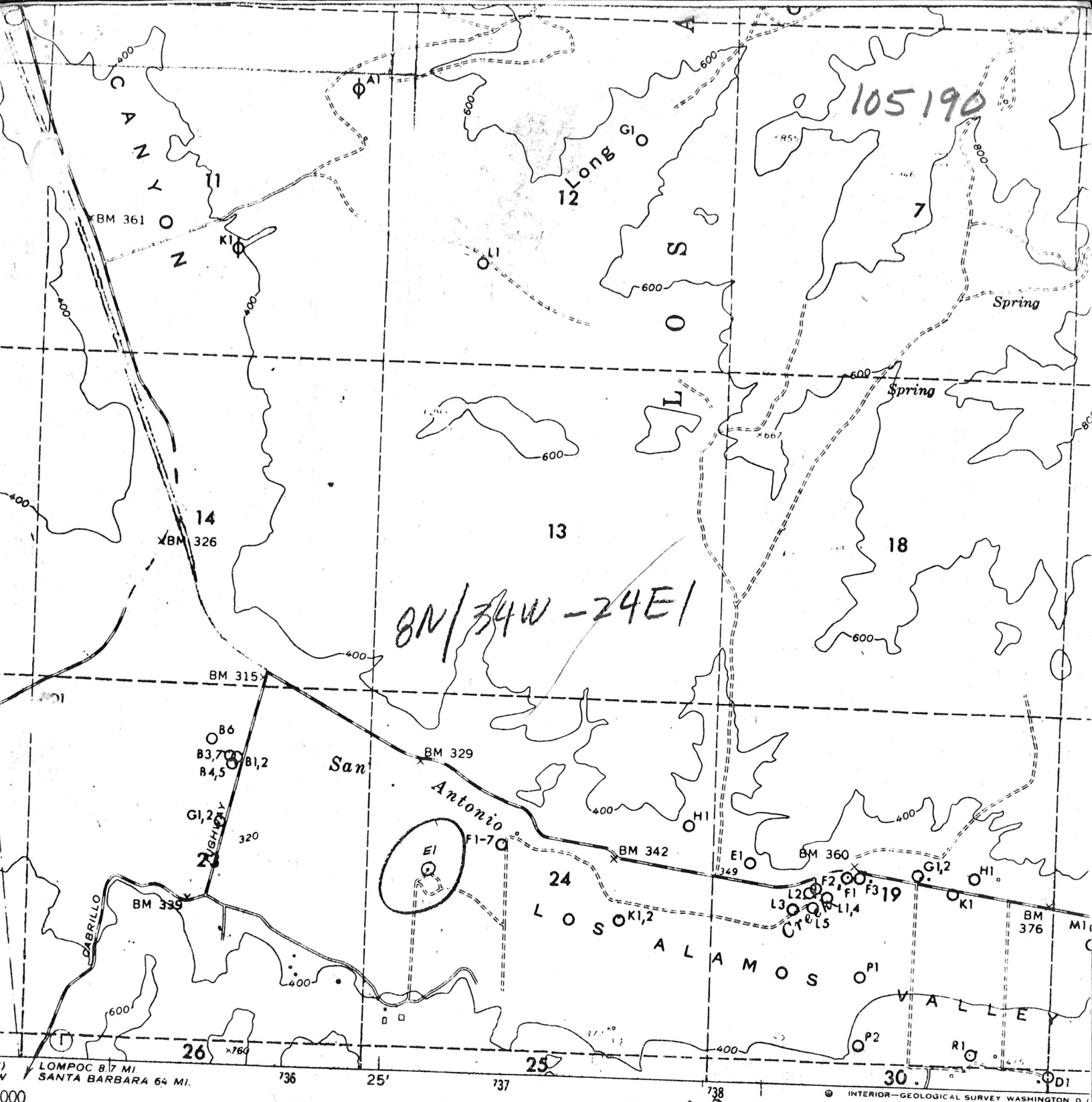
FLOYD V. WELLS, INC.

GOLETA, CALIFORNIA

FORMATION LOG

FROM	TO	DESCRIPTION
0	15	Top soil, fine sand and gravel
15	25	Fine brown sand with some brown clay
25	83	Yellow clay with gravel imbedded strips
83	102	Brown clay with some gravel
102	113	White clay with gravel imbedded
113	122	White and blue clay strips
122	133	Blue clay
133	180	Fine sand
180	212	Fine white sand with yellow clay strips
212	222	Fine white sand
222	253	Fine blue sandy clay
253	263	Fine sand and gravel
263	304	Fine gray sand silty
304	314	Blue clay
314	320	Coarse sand and gravel
320	345	Large gravel with fine sand
345	355	Coarse sand and gravel
355	375	Blue clay
375	385	Blue sandy clay
385	396	Blue clay with coarse sand
396	406	Light brown sandy clay with gravel
406	415	Coarse sand and gravel
415	546	Coarse sand and gravel
546	565	Fine and coarse sand packed
565	607	Blue clay
607	640	Blue mushy clay and silty sand

Ken Vertrees, Printers, Lithographers - Santa Maria, CA



ORCUTT QUAD

1 MILE
4000 5000 6000 7000 FEET
1 KILOMETER

L 40 FEET
20-FOOT CONTOURS
EA LEVEL

MAP SYMBOLS

- WELL
- DRY, DESTROYED, OR FILLED WELL
- SPRING, DRY

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved
U. S. Route — State

MAP ACCURACY STANDARDS
LORADO 80225, OR WASHINGTON, D. C. 20242
SYMBOLS IS AVAILABLE ON REQUEST

DATA COMPILED BY USGS WRD
GARDEN GROVE, CALIF. 2-74

ORCUTT,
SW/4 SANTA MARIA 15
N3445—W120

1959

AMS 1953 IV SW—S

INTERIOR—GEOLOGICAL SURVEY WASHINGTON D

✓

Copy

08N33W25B004S

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Intent No. _____
Permit No. or Date _____

Do not fill in
No. 068870
State Well No. _____
Other Well No. _____

d
y

(12) WELL LOG:
Total depth 100 ft. Depth of completed well 100 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	20	top soil
20	40	coarse gravel (caving)
40	100	clay + gravel

') LOCATION OF WELL (See instructions):
unty Santa Barbra Owner's Well Number
ll address if different from above Hy 135 Los Alamos
wnship Range Section
tance from cities, roads, railroads, fences, etc.
Parcel 101-090-18-00

(3) TYPE OF WORK:
New Well XX Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic X
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

WELL LOCATION SKETCH

EQUIPMENT:
ary XX Reverse ☐
ile ☐ Air ☐
er ☐ Bucket ☐

(6) GRAVEL PACK:
Yes XX No ☐ Size #2 #4
Diameter of bore 10
Packed from 30 to 100 ft.

CASING INSTALLED:
l ☐ Plastic ☒ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
	60	6	200	60	m100	1/16

(8) PERFORATIONS:
Type of perforation or size of screen: saw cut 1/16 x 4

WELL SEAL:
surface sanitary seal provided? Yes X No ☐ If yes, to depth 30 ft.
e strata sealed against pollution? Yes XX No ☐ Interval 5-30 ft.
hod of sealing concrete (pumped in)

) WATER LEVELS:
th of first water, if known 5ft. ft.
ding level after well completion 5ft. ft.

) WELL TESTS:
well test made? Yes ☐ No ☐ If yes, by whom? _____
e of test Pump ☐ Bailer ☐ Air lift ☐
th to water at start of test _____ ft. At end of test _____ ft
harge _____ gal/min after _____ hours Water temperature _____
nical analysis made? Yes ☐ No ☐ If yes, by whom? _____
electric log made? Yes ☐ No ☐ If yes, attach copy to this report

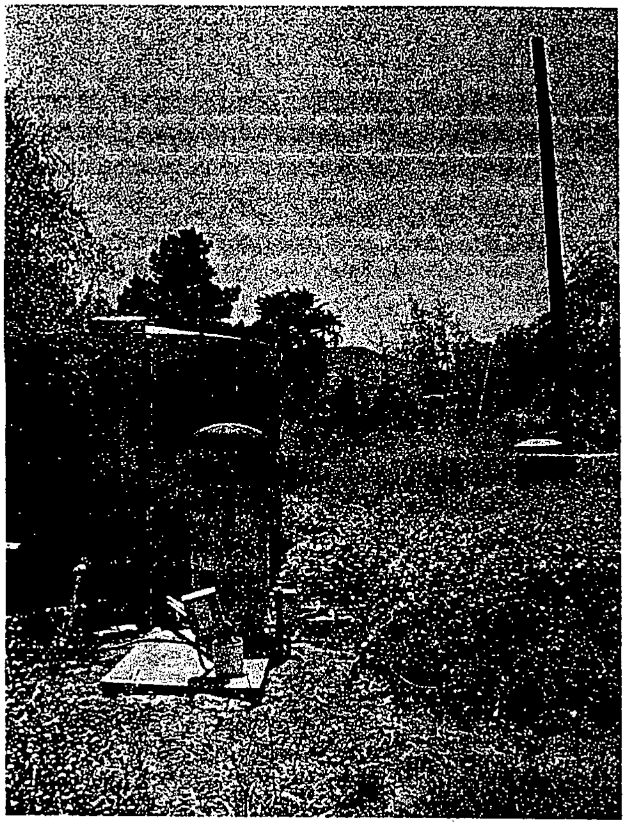
Work started May 13 19 83 Completed 20 19 83

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED _____ (Well Driller)
NAME Enloe Well Drilling (Person, firm, or corporation) (Typed or printed)
Address Rt. 1 Box 199 B
City Santa Maria Zip 93455
License No. 310877 Date of this report June9 '83

R 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

068870



8N/33W-25B (4?)

06870

ENLOE WELL DRILLING

Rotary or Cable Tool

DOUG ENLOE

RT. 3
MESA ROAD
NIPOMO, CA 93444

805-929-1063

Att. Carl Abeloe

April 11, 1983

As we discussed we intend to drill a one hundred foot gravel packed well on your property in Los Alomos, This well will have class 200 P.V.C. casing and a 20ft. cement seal conforming to county codes.

We will also instale a submersiable pump, Goulds 1 hp. modle 25EL this pump will deliver 30 gallons per minute into a 5000 gal. storage tank . A Goulds modle XSH10 boster pump will deliver 30 gallons per minute into a presure tank , Well-X-Trol 252, .

This will give you 50 PSI. water presure and will be plumbed into the existing water line.

The above ground electrial hook up will be the responsibility of the owner

Thank You

Doug Enloe

Cal. Licence # 318277

Ph 343 1698

Cell 448 5365

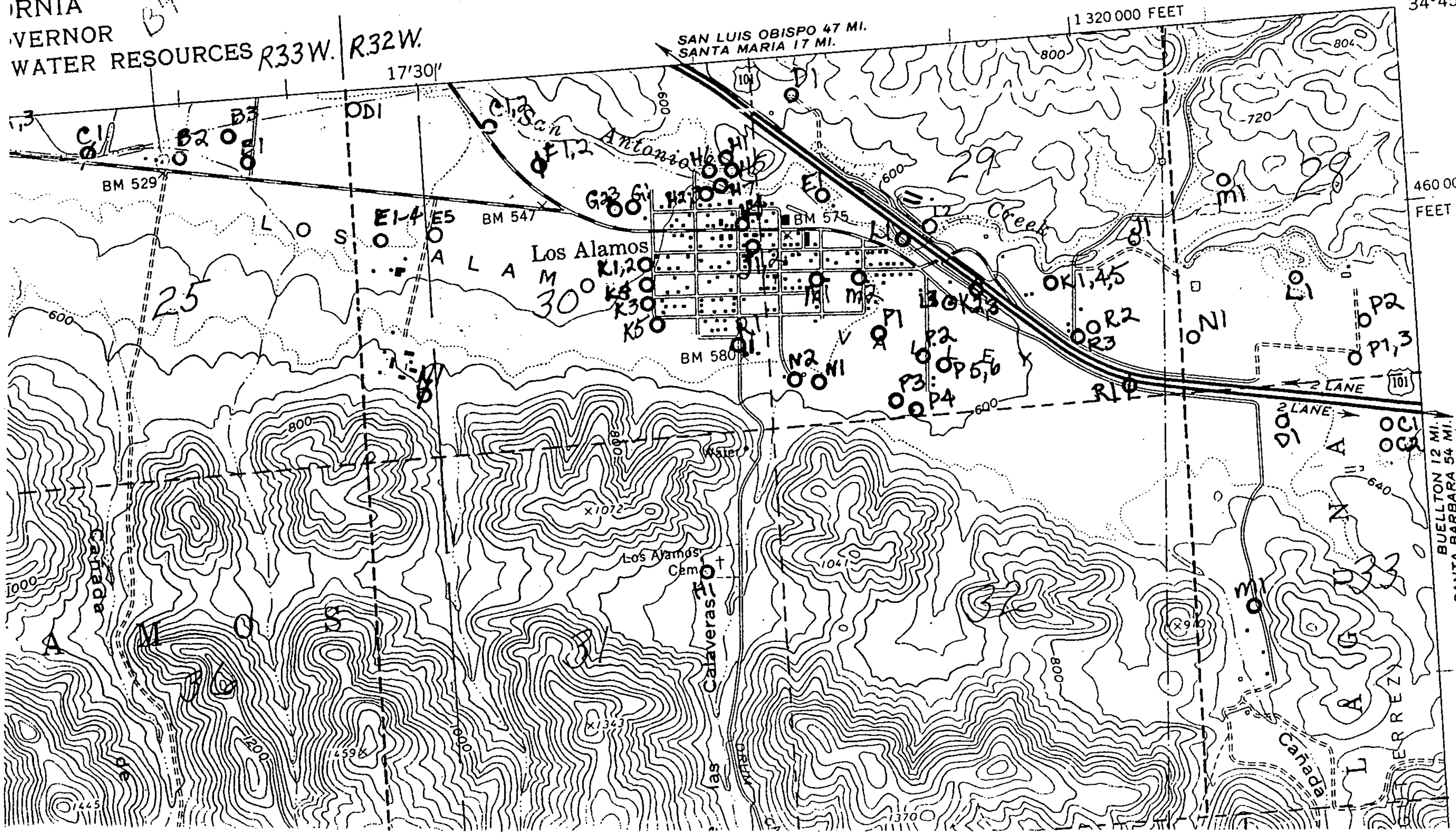
Dennis
Just a remender. Carl abeloe is our brother who lives in SLO. The well is actually on his section of the property. But the well services the house (Laura abeloe) and the farming field (Butch abeloe)

LOS ALAMOS QUADRANGLE
CALIFORNIA—SANTA BARBARA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 LOMPOC 15' QUADRANGLE

(TEPUSQUET PEAK)
1:62 500

…RNIA
…VERNOR
…WATER RESOURCES

068870



(CA District form)

WELL SCHEDULE
GEOLOGICAL SURVEY, WRD

Lat 34 44 54 Long 120 18 12 Seq. No. 01

B&M S

County: Santa Barbara
Well No. 8N/33W-25B4
Area: Los Alamos
Drill Log No. 068870
Date June 26, 2003
Other No.
Recorded by Chuck Lamb / Dennis Gibbs
Source of data drill log / owner / personal inspection

Location map Los Alamos Scale 1:24000
Altitude of LSD ____ ft. How obtained ____
Topography at well flat / flood plain
Owner Carl/Butch/Laura Abeloe Phone No. (805) 344-2815
Address 3899 Hwy 135, Los Alamos, CA
Permission to measure/sample given by Laura Abeloe
Contact before? (Yes) No

Driller Enloe Well Drilling
Address Santa Maria
Date drilled May 20, 1983 Drill depth 100 ft.
Method drilled Rotary Well finish ____
Perforations 60-100 ft.
Type log data drillers
Use of well Withdrawal Use of water domestic
Pump type Submersible Serial No. ____
Motor ____ Serial No. ____
Power type electric HP ____ Meter No. ____

Well Depth ____ ft. From MP Meas. Rept. Date ____

Casing diam. 8 inch Casing type PVC

Water level 10.79 ft. (Stdg.) Pmpg. (Meas) Rept. 6/26/2003
above (below) 1 inch hole, T.O.C., NW which is 1.0 ft. (above) below LSD
Water level abv/blw LSD = 9.79 - 1.00 = 8.79

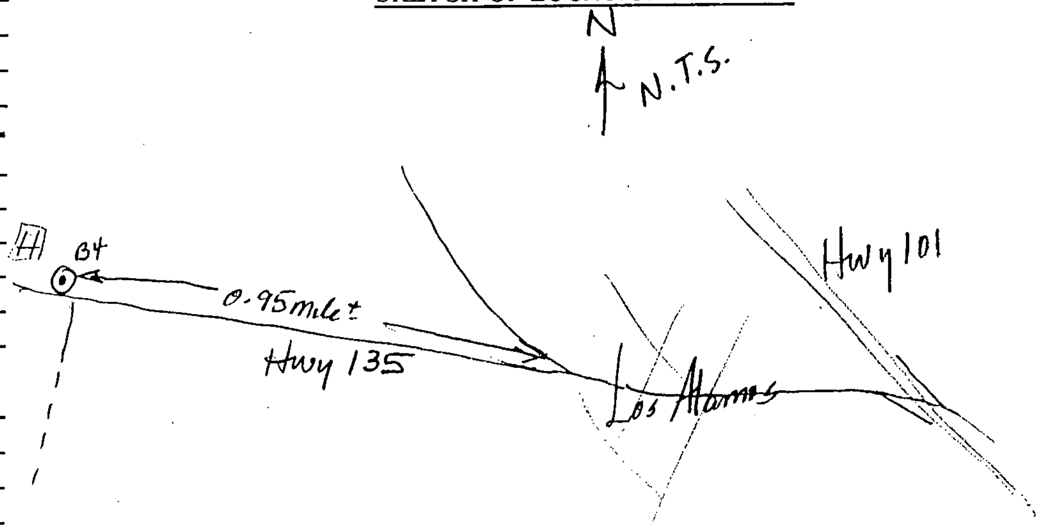
23 - 12.21 = 9.79 steel tape

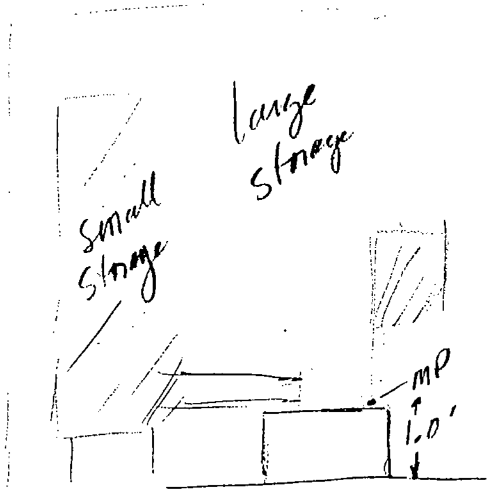
Location: Well is about 200 ft north of Hwy 135 and 10 ft north of large metal storage tank

4/2/03 23.00
− 14.41
8.59

Etrex GPS NAD83
344454.1 ± 16 ft.
120 18 12.3

SKETCH OF LOCATION AND M.P.





068870

☆U.S. GPO:1994—584-769

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 0907621

DWR USE ONLY — DO NOT FILL IN
08N/32W-28P004S
STATE WELL NO./STATION NO.
LATITUDE / LONGITUDE
APN/TRS/OTHER

Page 1 of 1
Owner's Well No. 04-01
Date Work Began 7/09/04, Ended 7/23/04
Local Permit Agency Santa Barbara Co. Environmental Health
Permit No. SR0103311 Permit Date 7/07/04

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Mud Rotary FLUID Bentonite

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
	Please See Attached Formation Log

TOTAL DEPTH OF BORING 562 (Feet)
TOTAL DEPTH OF COMPLETED WELL 524 (Feet)

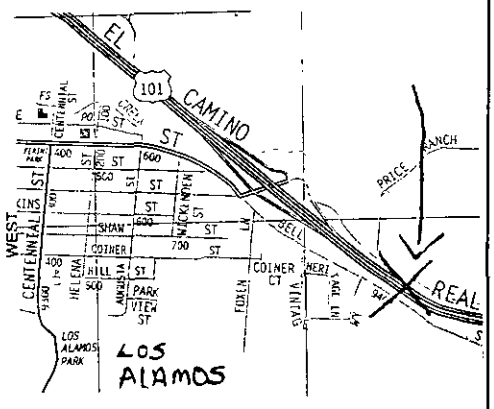
WELL OWNER

WELL LOCATION

Address Bell Street
City Los Alamos
County Santa Barbara
APN Book 133 Page 130 Parcel 009
Township 8N Range 32W Section 28
Lat ___ N DEG. MIN. SEC. Long ___ W DEG. MIN. SEC.

LOCATION SKETCH

NORTH



SOUTH

*Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
X Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 133 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 133 (Ft.) & DATE MEASURED 7/23/04
ESTIMATED YIELD * 385 (GPM) & TEST TYPE Continuous
TEST LENGTH 12 (Hrs.) TOTAL DRAWDOWN 210 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 310	17	x				F480PVC	10	.512	
310 514	17		x			F480PVC	10	.512	.040
514 524	17	x				F480PVC	10	.512	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 50	x			6-Sack
50 524			x	Lonestar #3

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
X Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Floyd V. Wells, Inc. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
1337 W. Betteravia Road, Santa Maria, CA 93455
ADDRESS CITY STATE ZIP

Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 09/24/04
C-57 LICENSE NUMBER 457-229570

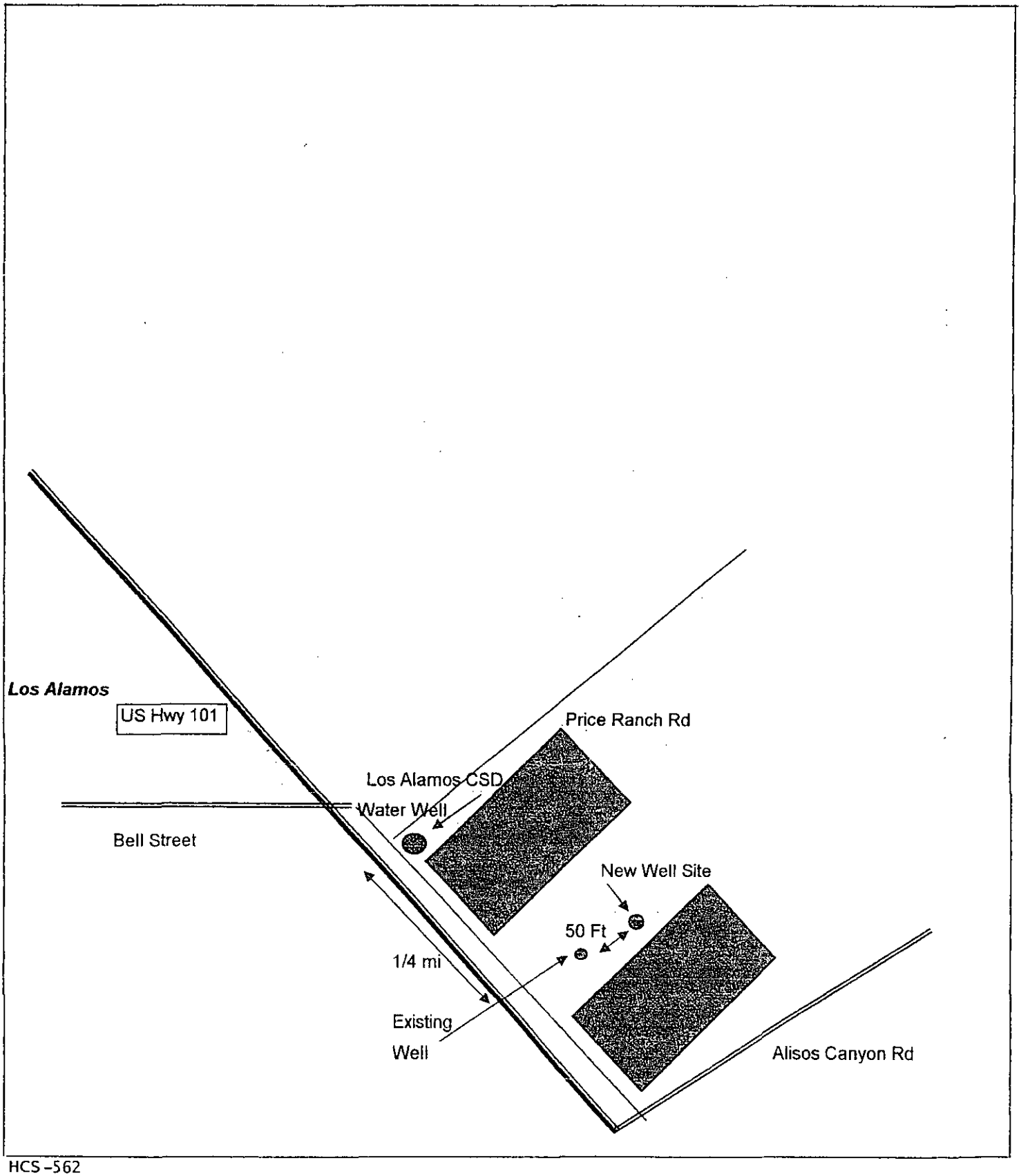
DWR 188 REV. 05-03
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM
OSP 03 78836

0907621

Formation Log		
Depth	Depth	Formation Description
0	12	Dark brown clay fine sand
12	21	1/8 - 1/4 Gravels, small gravels fine sand some dark brown clay ½ gravels
21	29	1/8 to 3/4 Gravels, small gravel
29	61	1/4 - 1" Gravels course sand, fine sand, brown clay
61	79	1/8 – 1 1/2 Gravels course gravels fine sands, some brown clay
79	98	Course gravels, 1/8 to 1 3/4 gravel
98	110	Brown clay fine sand 1" to 1 1/2" gravels
110	148	Mostly brown clay some fine sand
148	153	Some brown clay course sands, fine sands, 1/4 gravels
153	171	Mostly brown clay some fine sands, little course gravel
171	187	Light brown clay very little course gravel
187	192	Light green clay with some tan sand very little course gravels grayish clay
192	200	Brown clay
200	217	Redish brown clay some course sand
217	238	Course gravels, 1/4 to 1/2 gravels, no clay, with some slay
264	286	Light brown clay, small gravel, course gravel, fine sand
286	330	Sticky brown clay
330	386	Brown clay, course sand, fine sand some small gravel
386	474	Course gravel, fine sand, some clay
474	542	Mostly brown clay some fine, sand little course gravel
542	552	1/2 gravels brown clay fine sands
552	562	Grayish blue clay, some fine sands

Plot Plan (1/4" = 20')

Indicate below the exact location of the proposed well with respect to the following items: Property lines, sewer lines and sewage disposal systems, animal enclosures, watercourses, flood plain, drainage pattern, existing wells, access roads, easements, and well site elevation. Include dimensions.



HCS-562

ORIGINAL
File with DWR

OCT 31 1974

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do Not Fill In

№ 115694

State Well No. 8N/32W-30D1

Other Well No. _____

(1) OWNER:

Name [redacted]

Address

(2) LOCATION OF WELL:

County Santa Barbara 42 Owner's number, if any

Township, Range, and Section 1/4 mile N. Hwy 135 & 1/3 mile W.

Distance from cities, roads, railroads, etc. Bell Street, 33' S. of San Antonio Creek.

(3) TYPE OF WORK (check):

New Well XX Deepening ☐ Reconditioning ☐ Destroying ☐

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary Rev. XX

Cable ☐

Other ☐

(6) CASING INSTALLED:

STEEL: OTHER:

SINGLE ☒ DOUBLE ☐

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	If gravel packed From ft.	If gravel packed To ft.
+1	20	30"	14ga	36"		
+1	895	16"	¼"	26"	0	899

Size of shoe or well ring:

Size of gravel: Sandy 5

Describe joint welded

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
265	355			1/8" std.
378	409			1/8" std.
463	523			1/8" std.
667	895			1/8" std.

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes ☒ No ☐ To what depth 50 ft.

Were any strata sealed against pollution? Yes ☐ No ☐ If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing conductor and concrete

(9) WATER LEVELS:

Depth at which water was first found, if known ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes ☐ No ☐ If yes, by whom?

ld: gal./min. with ft. drawdown after hrs.

emperature of water Was a chemical analysis made? Yes ☐ No ☐

Was electric log made of well? Yes ☐ No ☐ If yes, attach copy

(11) WELL LOG:

Total depth 899 ft. Depth of completed well 895 ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to	ft.	
0	20	top soil
20	30	hard clay
30	83	blue sticky clay
83	90	coarse sand & pea gravel & large rocks
90	101	coarse sand, gravel & rock
101	117	coarse sand w/ gravel
117	142	sandy gray clay
142	144	gravel & small rock
144	179	sandy gray clay
179	186	brown sticky clay
186	191	coarse sand & gravel (loose)
191	198	soft brown clay
198	201	coarse sand and gravel
201	227	brown clay rock
227	230	coarse sand, gravel & small /
230	250	soft brown clay
250	296	sticky gray clay
296	300	shale and gravel
300	308	coarse sand & gravel ¼ - ½
308	318	sandy brown clay
318	339	sticky gray clay
339	341	gravel & shale (loose)
341	343	sticky gray clay rock
343	347	coarse sand, gravel & small /
347	363	sticky gray clay
363	366	coarse sand gravel & small roc
366	403	sandy brown clay (tight)
403	412	coarsesand, gravel w/smallrock
412	419	gray clay
419	425	sticky gray clay clay
425	428	coarse sand & gravel w/some /
428	469	brown sticky clay'
469	476	fine sand & gravel
476	492	brown sticky clay
492	498	silt, fine sand & gravel
498	502	sticky gray clay

Work started 7-10 19 74, Completed 7-30 19 74

"OVER"

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

NAME Ben Barrow Company, Inc.
(Person, firm, or corporation) (*Typed or printed*)

Address P.O. Box 888
Woodland, California 95695

[SIGNED] _____
(Well Driller)

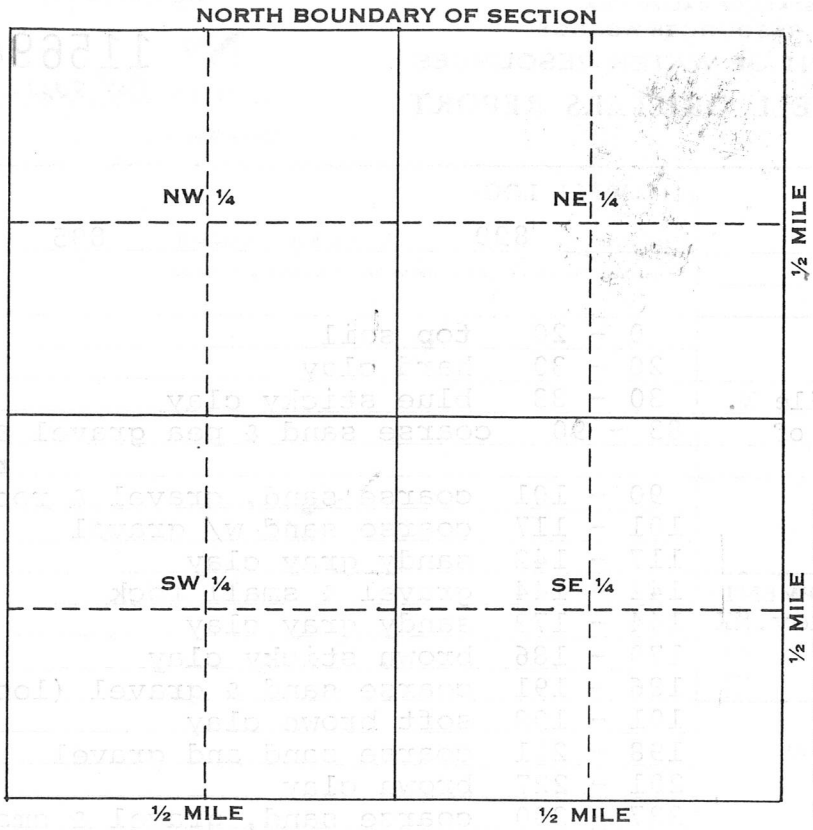
License No. 283326 Dated August 2, 19 74

SKETCH LOCATION OF WELL ON REVERSE SIDE

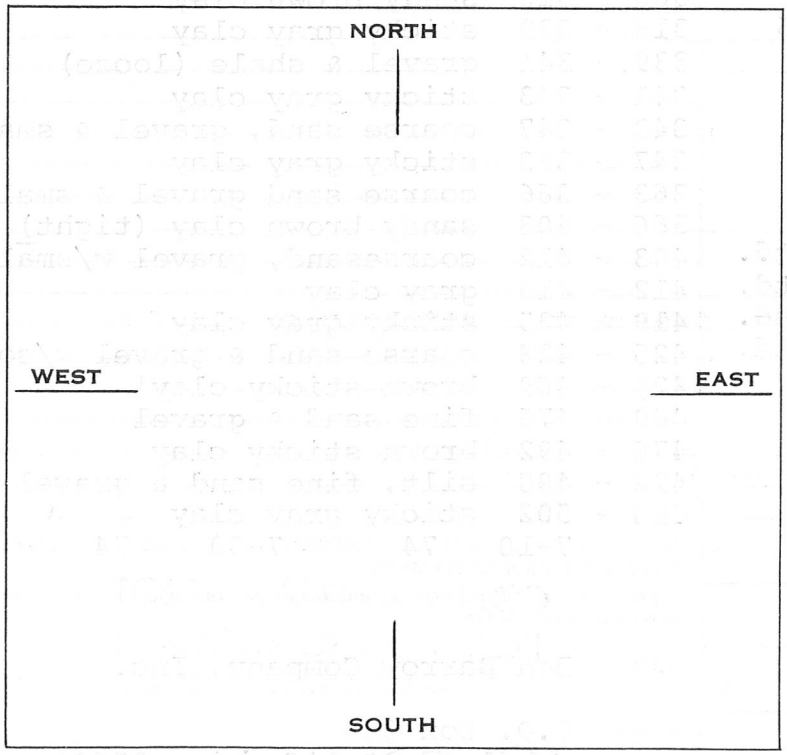
Log continued on back page

67139-750 8-72 30M TRIP ①T OSP

WELL LOCATION SKETCH



A. Location of well in sectionized areas.
Sketch roads, railroads, streams, or other features as necessary.



B. Location of well in areas not sectionized.
Sketch roads, railroads, streams, or other features as necessary.
Indicate distances.

Township _____ N/S

Range _____ E/W

Section No. _____

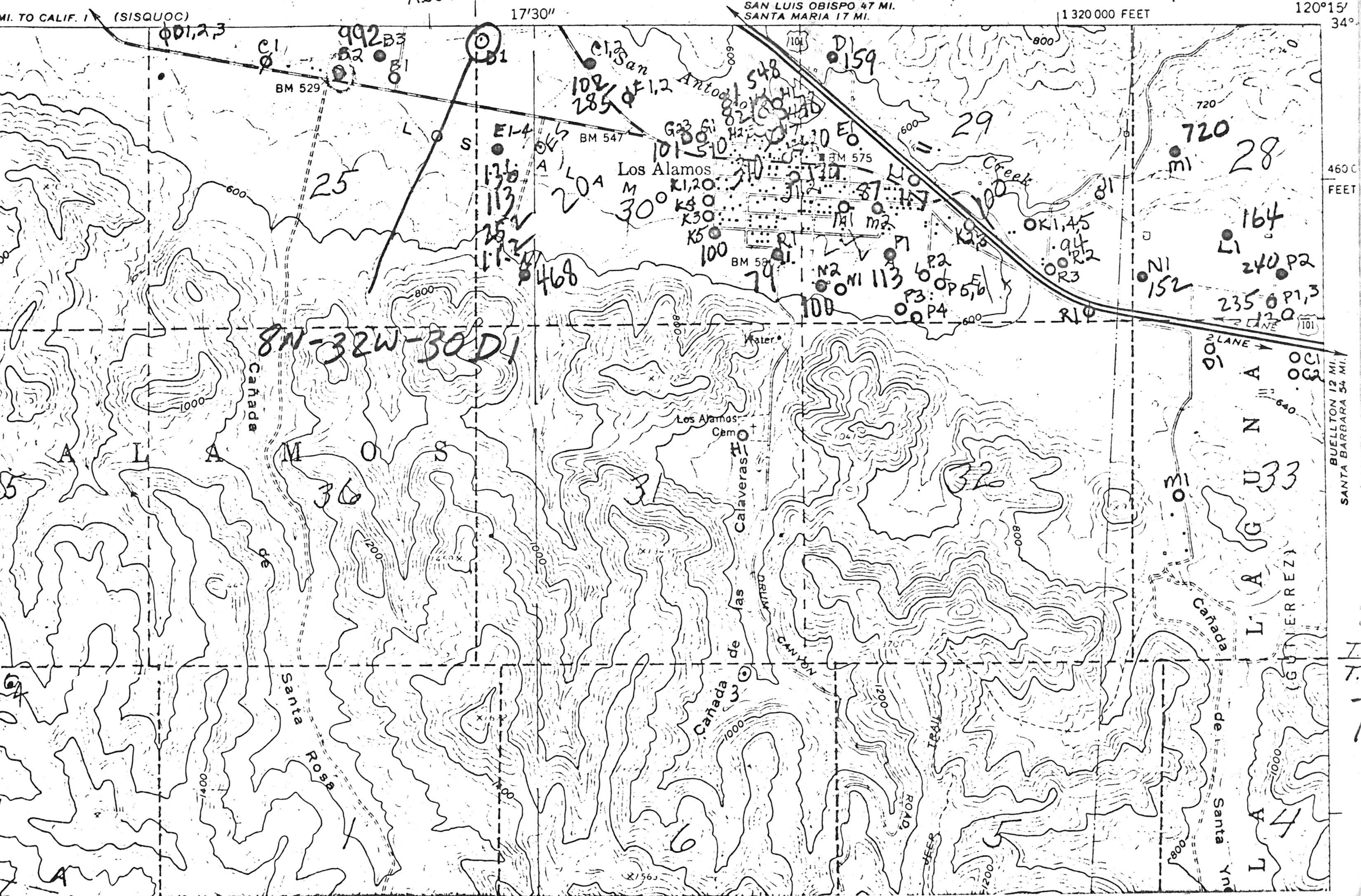
502	- 510	silt, fine sand & gravel
510	- 517	sandy gray clay w/some gravel
517	- 541	sticky gray clay
541	- 567	blue sticky clay
567	- 570	hard brown clay
570	- 572	sand & gravel
572	- 608	blue sticky clay
608	- 609	hard clay
609	- 626	blue clay
626	- 654	hard gray clay
654	- 656	coarse sand & gravel w/ some clay
656	- 662	coarse sand and grave'
662	- 664	gray sticky clay
664	- 676	blue clay
676	- 709	hard sandy brown clay
709	- 721	hard brown clay w/some shale
721	- 728	sticky yellow clay
728	- 732	coarse sand and gravel
732	-733	yellow clay
733	- 751	coarse sand and gravel
751	- 753	yellow sticky clay
753	- 755	coarse sand and gravel
755	- 767	yellow clay
767	- 773	sandy clay & gravel
773	- 791	yellow clay
791	- 793	blue clay
793	- 795	gray clay & shale
795	- 854	yellow clay
854	- 861	coarse sand and gravel
861	- 865	clay and shale
865	- 874	soft yellow clay
874	- 875	sandy clay w/some gravel
875	- 879	coarse sand and gravel
879	- 881	shale and clay
881	- 895	clay and gravel
895	- 899	▪▪▪▪ coarse sand & gravel

Los Alamos quad

STATE OF CALIFORNIA
EDMUND G. BROWN, GOVERNOR
BANKS, DIRECTOR OF WATER RESOURCES

33W 32W

LOS ALAMOS QUADRANGLE
CALIFORNIA—SANTA BARBARA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 LOMPOC 15' QUADRANGLE



R33W. R32W.
MI. TO CALIF. 1 (SISQUOC)
17'30"
SAN LUIS OBISPO 47 MI.
SANTA MARIA 17 MI.
1 320 000 FEET
120°15'
34°
BM 529
BM 547
BM 575
San Antonio
Creek
Los Alamos
LOS ALAMOS
Cañada
Water
Los Alamos Cem
Calaveras
de las
Cañada
DRUM CANYON
ROAD
TRAIL
JEEP
Santa Rosa
Cañada de Santa Ynez
LAGUNA
(GUTIERREZ)
BUELLTON 12 MI.
SANTA BARBARA 54 MI.
LANE
101
460
FEET
8N-32W-30D1
25
29
28
36
31
32
33
6
5
4

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

ORIGINAL
File with DWR

SEP 30 1973

Do Not Fill In

No. 78802

State Well No. 8N/33W

Other Well No.

8N/33W-0

(1) OWNER:

Name

Addre

(2) LOCATION OF WELL:

County Santa Barbara Owner's number, if any 6

Township, Range, and Section 3/10 mile West of Bell St. on Hwy. 135 1/10 mile south of Hwy. 135

Distance from cities, roads, railroads, etc.

(3) TYPE OF WORK (*check*):

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (*check*):

Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [X] Test Well [ ] Other [ ]

(5) EQUIPMENT:

Rotary [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: OTHER:

SINGLE [X] DOUBLE [ ]

From ft.	To ft.	Diam.	Gage or Wall
0	100X	14"	.375
150	680	"	.312
680	1001	"	.375

Size of shoe or well ring:

Describe joint Butt welded

If gravel packed

Diameter of Bore	From ft.	To ft.
24"X	0	1001

Size of gravel:

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
150	1001	14 rows of 125 mesh		

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [ ] No [X] To what depth ft.

Were any strata sealed against pollution? Yes [ ] No [X] If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing

(9) WATER LEVELS:

Depth at which water was first found, if known – ft.

Standing level before perforating, if known – ft.

Standing level after perforating and developing – ft.

(10) WELL TESTS:

Was pump test made? Yes [X] No [ ] If yes, by whom F.V. Wells, INc.

Yield: 1250 gal./min. with 400 ft. drawdown after 4 hrs.

Temperature of water Was a chemical analysis made? Yes [ ] No [X]

Was electric log made of well? Yes [X] No [ ] If yes, attach copy

(11) WELL LOG:

Total depth 1001 ft. Depth of completed well 1001 ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to ft.

SEE ATTACHED LOG

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

Work started 3-14-73 19 , Completed 3-24-73

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Floyd V. Wells, Inc.
(Person, firm, or corporation) (*Typed or printed*)

Address P. O. Box 1007, Santa Maria, Calif.

[SIGNED] F.V. Wells
(*Well Driller*)

License No. C57-229570 Dated Sept. 10, , 19 73

SKETCH LOCATION OF WELL ON REVERSE SIDE

OVER

DWR 188 (REV. 9-68)

25179-950 9-68 50M TRIP △D OSP

78802

Peerless Pumps
Irrigation Systems
Sales and Service

Licensed
Drilling
Contractors

FLOYD V. WELLS, INC.

116 North Blosser Road • Phone WAlnut 5-8626
SANTA MARIA, CALIFORNIA 93454

Mailing Address:
Post Office Box 1007
Santa Maria, California

Goleta Office:
5798 Dawson Ave.
Phone 967-4124
Santa Maria
Phone ZEnith 2-7726

Log of well drilled for :

Well number : #6

Location : 3/10 mile west of Bell St. on Hwy. 135, 1/10 mile south of Hwy. 135, Los Alamos

Well bore : 24"

Casing : 1001 ft. of 14" wall pipe, .375 wall from 680 ft. to 1001 ft., .312 wall from 150 ft. to 680 ft., .375 wall from 0 to 150 ft.

Perforations : 1001 ft. to 150 ft. of 14 rows, 125 mesh

Well completed : 24 March 1972

Formation

From	0	to	10	feet	Adobe
"	10	"	31	"	Adobe and gravel
"	31	"	45	"	Black clay and gravel, loose
"	45	"	70	"	Dark brown clay and gravel
"	70	"	87	"	Light brown clay and coarse sand and gravel
"	87	"	97	"	Dark brown clay and gravel
"	97	"	112	"	Light brown clay and gravel
"	112	"	155	"	Dark brown clay with small amount of gravel
"	155	"	190	"	Light brown sandy clay with coarse sand and gravel, loose
"	190	"	220	"	Dark brown clay with small amount gravel
"	220	"	260	"	Light brown clay with coarse sand and gravel strips
"	260	"	290	"	Dark brown sandy clay with coarse sand strips
"	290	"	320	"	Light gray clay
"	320	"	330	"	Dark brown clay
"	330	"	345	"	Light brown clay with thin gravel strips
"	345	"	368	"	Dark brown clay
"	368	"	423	"	Brown sandy clay with coarse sand and gravel strips
"	423	"	450	"	Dark brown clay with thin gravel strips
"	450	"	460	"	Green clay
"	460	"	515	"	Brown clay with gravel strips
"	515	"	555	"	Dark brown clay with gravel

SEP 30 1913

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

- continued -

78802

Log of well drilled for

From	555	to	615	feet	Blue clay
"	615	"	625	"	Brown clay
"	625	"	665	"	Dark gray clay
"	665	"	685	"	Brown clay
"	685	"	702	"	Dark gray clay with light brown clay
"	702	"	745	"	Brown clay with coarse sand and gravel
"	745	"	779	"	Brown clay
"	779	"	800	"	Gray clay
"	800	"	830	"	Brown clay
"	830	"	860	"	Sandy brown clay
"	860	"	1001	"	Brown sandy clay with coarse sand

8N,33W-0 78802

Schlumberger

INDUCTION-ELECTRICAL LOG

COUNTY / FIELD or LOCATION / WELL / COMPANY

COMPANY

WELL FERRERA #6

FIELD Los Alamos

COUNTY Santa Barbara STATE Calif

LOCATION

Sec. Twp. Rge.

Other Services:

Permanent Datum: G.L. , Elev.

Log Measured From G.L. , Ft. Above Perm. Datum

Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L.

Date	3-17-72			
Run No.	-1-			
Depth—Driller	993			
Depth—Logger	992			
Btm. Log Interval	991			
Top Log Interval	06			
Casing—Driller	- @ -	@	@	@
Casing—Logger	—			
Bit Size	10 5/8 x 9 7/8 @ 300			
Type Fluid in Hole	NATURAL			
Dens. | Visc.	- N.A. -			
pH | Fluid Loss	7 | - ml	ml	ml	
Source of Sample	PIT			
R_m @ Meas. Temp.	7.0 @ 60 °F	@ °F	@ °F	@
R_{mf} @ Meas. Temp.	9.6 @ 60 °F	@ °F	@ °F	@
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@
Source: R_{mf} R_{mc}	M | C			
R_m @ BHT	5.3 @ 75 °F	@ °F	@ °F	@
Time Since Circ.	1-HR			
Max. Rec. Temp.	78 °F	°F	°F	
Equip. | Location	7516 | 15			
Recorded By	BARBARICK			
Witnessed By	FISH			

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR 08N32W30G

Page 1 of 2

Owner's Well Number Well No 5

Date Work Began 10-4-06 Date Work Ended 11-18-06

Local Permit Agency Los Alamos Comm. Serv. Dist

Permit Number N.A Permit Date N.A

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e046752

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Geologic Log

Orientation ☒ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	90	Brown Sand
90	110	Gravel and Sand
110	230	Clay w/ Sand and Gravel
230	360	Brown Sand Clay
360	500	Hard Brown Clay
500	700	Brown Gravelly Clay and Sand
700	800	Brown Clay w/ Sand
800	900	Sandy Clay
900	970	Brown Gravelly Sand
970	1010	Hard Grey Clay

Total Depth of Boring 1010 Feet

Total Depth of Completed Well 962 Feet

Well Owner

Well Location

Address 33 St Joseph St

City Los Alamos County Santa Barbara

Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W

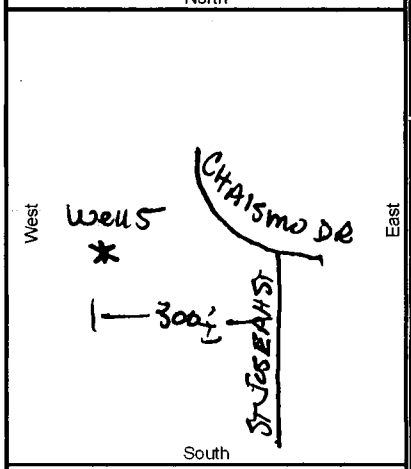
Datum Decimal Lat. Decimal Long.

APN Book 101 Page 110 Parcel 035

Township Range Section

Location Sketch

(Sketch must be drawn by hand after form is printed.)



Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

☒ New Well
○ Modification/Repair
○ Deepen
○ Other
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

☒ Water Supply
☐ Domestic ☒ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water 40 (Feet below surface)

Depth to Static Water Level 89 (Feet) Date Measured 11-7-06

Estimated Yield * 800 (GPM) Test Type Constant

Test Length 72 (Hours) Total Drawdown 115 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	60	36	Cond	Steel	5/16	28		
+2	210	24	Blank	Steel	1/4	12 3/4		
210	212	"	Mechical Connector			12 3/4		
212	217	"	Blank	T 304 SS	1/4	12 3/4		
217	352	"	Screen	T 304 SS		12 3/4	Wire Wound	
352	502	"	Blank	T 304 SS	1/4	12 3/4		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	60	Cement	10.5 SK
60	120	Cement	10.5 SK
120	1010	Gravel	RMC #3

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Best Drilling and Pump, Inc.
Person, Firm or Corporation

29950 Ortega Canyon Highland CA 92346
Address City State Zip

Signed [signature]
C-57 Licensed Water Well Contractor

12-7-06 826672
Date Signed C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

Page 2 of 2

Owner's Well Number Well 5

Date Work Began _____ Date Work Ended _____

Local Permit Agency _____

Permit Number _____ Permit Date _____

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e046752 CONT.

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify _____

Drilling Method _____ Drilling Fluid _____

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc

Total Depth of Boring _____ Feet

Total Depth of Completed Well _____ Feet

Well Owner

Well Location

Address _____

City _____ County _____

Latitude ____ ____ ____ N Longitude ____ ____ ____ W

Deg. Min. Sec. Deg. Min. Sec.

Datum _____ Decimal Lat. _____ Decimal Long. _____

APN Book _____ Page _____ Parcel _____

Township _____ Range _____ Section _____

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc, and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

○ New Well

○ Modification/Repair

○ Deepen

○ Other _____

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

☒ Water Supply

☐ Domestic ☒ Public

☐ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

○ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other _____

Water Level and Yield of Completed Well

Depth to first water 440 (Feet below surface)

Depth to Static Water Level 89 (Feet) Date Measured 11-7

Estimated Yield * 800 (GPM) Test Type CONSTANT

Test Length 72 (Hours) Total Drawdown 115 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
502	702	24	SCREEN	T304 SS		12 3/4	WW	.040
702	792	24	BLANK	T304 SS	1/4	12 3/4		
792	952	24	SCREEN	T304 SS		12 3/4	WW	.040
952	962	24	BLANK	T304 SS	1/4	12 3/4		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other _____

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name _____

Person, Firm or Corporation

Address City CA State Zip

Signed _____

C-57 Licensed Water Well Contractor Date Signed C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

State of California

Well Completion Report

Form DWR 188 Complete 12/15/2017

WCR2017-005628

Owner's Well Number: WELL #6 | Date Work Began: 10/23/2017 | Date Work Ended: 11/08/2017

Local Permit Agency: Santa Barbara County Environmental Health Services

Secondary Permit Agency: | Permit Number: 0002481 | Permit Date: 10/23/2017

Well Owner (must remain confidential pursuant to Water Code 13752)

Name: XXXXXXXXXXXXXXXXXXX

Mailing Address: XXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXX

City: XXXXXXXXXXXXXXXXXXX | State: XX | Zip: XXXXX

Planned Use and Activity

Activity: New Well

Planned Use: Water Supply Public

Well Location

Address: 175 BELL ST

City: LOS ALAMOS | Zip: 93440 | County: Santa Barbara

Latitude: 34 Deg. 44 Min. 40.95 Sec. N | Longitude: -120 Deg. 16 Min. 47.23 Sec. W

Dec. Lat.: 34.7447083 | Dec. Long.: -120.2797861

Vertical Datum: | Horizontal Datum: WGS84

Location Accuracy: | Location Determination Method:

APN: 101-152-008

Township: 08 N

Range: 32 W

Section: 30

Baseline Meridian: San Bernardino

Ground Surface Elevation:

Elevation Accuracy:

Elevation Determination Method:

Borehole Information

Orientation: Vertical | Specify:

Drilling Method: Direct Rotary | Drilling Fluid: Bentonite

Total Depth of Boring: 1005 Feet

Total Depth of Completed Well: 960 Feet

Water Level and Yield of Completed Well

Depth to first water: (Feet below surface)

Depth to Static Water Level: 140 (Feet) | Date Measured: 11/08/2017

Estimated Yield*: 600 (GPM) | Test Type: Air Lift

Test Length: 12 (Hours) | Total Drawdown: (feet)

*May not be representative of a well's long term yield.

Geologic Log - Free Form

Depth from Surface Feet to Feet		Description
0	42	DARK BROWN CLAY
42	54	SAND & GRAVEL
54	71	BROWN SANDY CLAY
71	126	SAND & GRAVEL
126	143	BROWN CLAY
143	152	SAND & GRAVEL
152	157	BROWN CLAY
157	173	SAND & GRAVEL
173	179	BROWN CLAY & GRAVEL LAYERS
179	267	SAND & GRAVEL
267	272	BROWN CLAY
272	281	SAND & GRAVEL
281	293	BROWN CLAY
293	303	SAND & GRAVEL
303	308	BROWN CLAY & HARD LAYERS

308	317	SAND & GRAVEL
317	321	BROWN CLAY
321	348	SAND & GRAVEL
348	364	SAND W/ CLAY LAYERS
364	428	BROWN CLAY
428	437	SAND
437	463	GREY / BROWN CLAY
463	478	GRAVEL LAYERS
478	564	BROWN CLAY
564	570	SAND & GRAVEL
570	637	BROWN CLAY W/ SAND LAYERS
637	648	SAND & THIN GRAVEL ZONES
648	654	BROWN CLAY
654	665	SAND & THIN GRAVEL ZONES
665	677	BROWN CLAY
677	685	SAND & GRAVEL
685	732	BLUE CLAY W/ GRAVEL LAYERS
732	743	SAND & GRAVEL
743	757	BLUE CLAY
757	763	SAND & GRAVEL
763	768	BLUE CLAY
768	782	SAND & GRAVEL
782	836	BLUE CLAY
836	864	SAND
864	902	BLUE CLAY & SAND
902	935	SAND & GRAVEL
935	951	CLAY
951	958	SAND & GRAVEL
958	1005	BROWN CLAY

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	58	Conductor or Fill Pipe	Low Carbon Steel	Grade: ASTM A53	0.25	24			
2	0	190	Blank	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75			
2	190	290	Screen	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75	Milled Slots	0.04	
2	290	330	Blank	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75			
2	330	690	Screen	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75	Milled Slots	0.04	
2	690	810	Blank	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75			
2	810	950	Screen	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75	Milled Slots	0.04	
2	950	960	Blank	PVC	OD: 12.750 in. | SDR: 17 | Thickness: 0.750 in.	0.75	12.75			

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	1005	Filter Pack	Other Gravel Pack		LAPIS #3

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	58	30
58	1005	22

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name: FILIPPONI-THOMPSON DRILLING INC (Person, Firm or Corporation)

P O BOX 845 (Address) | ATASCADERO (City) | CA (State) | 93423 (Zip)

Signed: *electronic signature received* (C-57 Licensed Water Well Contractor) | 11/30/2017 (Date Signed) | 432680 (C-57 License Number)

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

					N	

Latitude Deg/Min/Sec

						W

Longitude Deg/Min/Sec

TRS: 08N32W30H

APN:

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SAC#C | PROJECT: GC16ZG00FUVS300 | PROJECT CHIEF: David O'Leary

ELEV: 583' | LOCATION: 8300 Cat Canyon Rd., Los Alamos, CA 93440; N34°45'20" W120°17'40" | LOGGED BY: ~~Anthony Brown~~ Adam Kiss

DRILLED BY: *USGS RDP* | RIG TYPE: *Mud Rotary- TH60* | LAG METHOD: *Rice (mud)*

Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
0							
7/19	1511		2.5Y 4/2	V HUY / 3900		Gravelly (gran) SAND (vf-vc)	20" HOLE OPENER 7/19
20	1540 1730	12'	2.5Y 5/3			SANDY (vf-vc) gravel (gran-smpeb)	
7/20	1000 1011 1025 1034	23' clatter 32'	2.5Y 6/4	V HUY m / 4890		SAND (vf-vc) SANDY (vf-vc) gravel (gran-md peb)	9 7/8" Longtooth Trauma 7/20
60	1417 1424 1436		10YR 4/4 2.5Y 5/4	V HUY m / 4340		Gravelly (gran-smpeb) SAND (vf-vc)	
80	1520 1532 1552 1558	73'		V HUY m / 3780		Gravelly (gran-smpeb) SAND (vf-vc) SANDY (vf-vc) gravel (gran-lg peb)	
100	1614 1620 1626	85' 95'	2.5Y 5/3	HUY / 3670		SAND (vf-m) SANDY (vf-vc) gravel (gran-lg peb)	
120	1646 1652 1658			HUY / 3580		SANDY (vf-vc) gravel (gran-lg peb)	
140	1713 1721 1728		10YR 5/4	HUY m / 3400		SANDY (vf-vc) gravel (gran-md peb)	Rice Time 1½ min
7/20	1735 1750	144' 155'	10YR 6/4	HUY / 3070		144' silty clay 155' SAND (vf-m)	7/20
160	1804						
7/21	0855 0901			lt m / 2910		SAND (vf-vc) w/ minor gravel (gran-smpeb) & interbedded clay	7/21
180	0908	126' color					
200	0932 0945 1006	199' color	10YR 5/4	lt / 2810		silty SAND (vf-c) clay	
220	1025 1036 1045	212' clatter 218'	2.5Y 6/4 in yellow 10YR 6/4 10YR 5/4	mod / 2800		sandy (vf-c) silty clay sandy (m-vc) gravel (gran-lg peb)	Rice Time 1.5 min
240	1103 1111 1132	235' 237'		V HUY / 2740		silty SAND (vf-m) sand (vf-m) gravelly (gran-md peb) sand (vf-vc) → mostly vf-m	
260	1152 1222 1326 1336	248' 254'		V HUY m / 2830		SAND (vf-m) SANDY (vf-vc) silty clay	
280	1354 1408 1416	261' 275'		HUY / 2790		clay SANDY (vf-vc) silty clay	
300	1428 1435 1443			HUY m / 2760		SANDY (vf-vc) silty clay	
320	1522 1531 1538	306'	10YR 6/4	HUY / 2620		SAND (vf-vc) w/ minor gravel (gran)	Rice Time 2.5 min
340	1552 1558 1605	333'	10YR 5/4	V HUY / 2590		SANDY (vf-vc) silt	
360	1630 1636 1652			mod / 2570		SANDY (vf-vc) silt	
380	1715 1750 1801	362' 364' barrel 374' FAST	10YR 6/4	lt m / 3470		SAND (vf-vc) clayey silt	
400	1810 1817 1824	388' 395' clatter	10YR 5/4	lt / 2540		SAND (vf-m) SANDY (vf-m) silt	

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SAC[redacted] C | PROJECT: GC16ZG00FUVS300 | PROJECT CHIEF: David O'Leary

ELEV: 583' | LOCATION: 8300 Cat Canyon Rd., Los Alamos, CA 93440; N34°45'20" W120°17'40" | LOGGED BY: ~~Anthony Brown~~ ~~Adam Kjos~~

DRILLED BY: *USGS RDP* | RIG TYPE: *Mud Rotary- TH60* | LAG METHOD: *Rice (mud)*

Date	Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time	Date
	400								
7/22	420	1024 1033 1043	416'	10YR 6/4	v HUY m / 2220		clayey silt Gravelly (gran-md peb) SAND (vf-vc)	9 7/8" long tooth Tricone	7/22
	440	1100 1111 1121		10YR 4/3 10YR 5/4	VHUY / 2140		clayey sandy (vf-c) silt	Rice Time 3½ min	
	460	1138 1146 1156			vHUY / 2180		clayey sandy (vf-c) silt		
	480	1232 1246 1257			vHUY / 2240		clay (Bentonitic)		
	500	1325 1335 1346		10YR 5/3	HUY m / 2090		clay clayey silty SAND (vf-c)		
	520	1356 1403 1410	505'	10YR 6/4	v HUY / 2250		SAND (vf-c)		
	540	1538 1543 1548			vHUY m / 2560		Gravelly (gran-sm peb) SAND (vf-vc)		
	560	1603 1608 1616	557' color	7.5Y 5/3	v HUY / 2490		Gravelly (gran-sm peb) SAND (vf-vc)		
	580	1632 1638 1647			VHUY / 2410		Gravelly (gran-sm peb) SAND (vf-vc)	Rice Time 5½ min	
	600	1702 1709 1716			VHUY / 2380		Gravelly (gran-sm peb) SAND (vf-vc)		
	620	1730 1736 1748	chatter 617'	2.5Y 5/2 2.5Y 4/1	vHUY / 2340		Gravelly (gran-sm peb) SAND (vf-vc)		
7/22	640	1758 1833 1846 @ 635' 0837–0856	chatter 628'	2.5Y 5/2	mod / 2250		SANDY (vf-c) silt SANDY (vf-m) silt w/ clay (salt n pepper)	7 7/8"	7/22
7/23	660	0900 0905 0922	652' slow		HUY / 2020		SAND (vf-vc)	long tooth Tricone w/Jets	7/23
	680	0943 0958 1030	669' chatter	2.5Y 4/1	HUY / 1942		clayey silty SAND (vf-vc) S&P	Rice Time 9 min	
	700	1044 1119 1153		2.5Y 5/2	mod / 1916		clayey silty SAND (vf-vc)		
	720	1233–1243 1331	1237" add packing 716'		mod / 2110		silty SAND (vf-vc)		
	740	1345 1406 1431	727'	2.5Y 5/3	mod / 2190		SAND (vf-vc)		
	760	1448 1621 1724			mod / 1847		clayey silty SAND (vf-m) sticky; mostly SAND (vf-c) but drilling like baked up	Rice Time 9 min	
7/23	780	1733 1809 1825 0834–0855	768' chatter 773' slow	2.5Y 6/4 2.5Y 6/3	H / 2166		silty sand (vf-vc) clay stopped @ 776' @ 1825		7/23
7/24	800	0855 0918 0929	796'	2.5Y 5/3	H m / 1943		clay clayey SAND (vf-c)		7/24

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

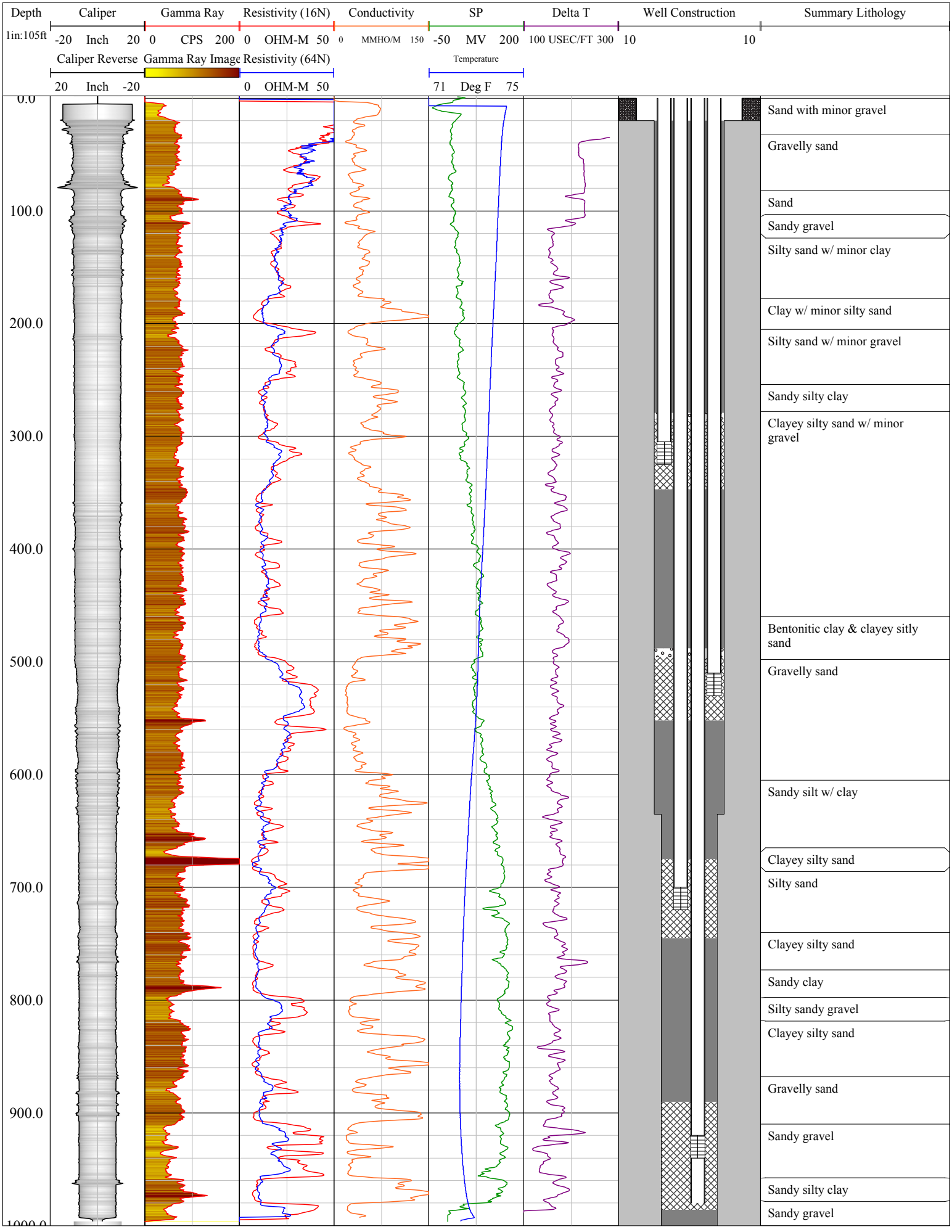
COMMON WELL NAME: SAC[redacted]C | PROJECT: GC16ZG00FUVS300 | PROJECT CHIEF: David O'Leary

ELEV: 583' | LOCATION: 8300 Cat Canyon Rd., Los Alamos, CA 93440; N34°45'20" W120°17'40" | LOGGED BY: Anthony Brown, [redacted]

DRILLED BY: *USGS RDP* | RIG TYPE: *Mud Rotary- TH60* | LAG METHOD: *Rice (mud)*

Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
800							
	0946	805' chatter	2.5Y 5/3	HV?		clayey sand (vf-c)	7 7/8"
	0950					SAND (vf-vc) w/ some silt	long tooth
820	0955	816'		1939		sandy (vf-vc) gravel (gran-mk peb)	tricone
	1014					sandy (vf-vc) Gravel (gran-md peb)	Rice
	1019	832' slow		Mod			Time
840	1120			1974		clay	10 min
	1144			Mod		clay	
	1209	850' chatter					
860	1307	852' slow	2.5Y 5/3	1924		clayey silty SAND (vf-vc)	
	1326			HV?			
	1430	868' chatter		M			
880	1437			1920		Gravelly (gran) sand (vf-vc)	
	1456	886' slower		VHV?			
	1512			M			
900	1537			1906		Gravelly (gran) SAND (vf-vc)	
	1556			VHV?			
	1614	910' chatter		M			
920	1618			2350		Gravelly (gran) sand (vf-vc)	
	1638			VHV?			
	1649						
940	1704	937' slow (1')		1995		sandy (vf-vc) gravel (gran-md peb)	
	1724			VHV?			
	1729						Rice
960	1748	slow 958'		1858		sandy (vf-vc) gravel (gran-md peb)	Time
	1024			1+			11 min
	1057						
980	1122	978' chatter		2020		sandy (vf-vc) silty clay	
	1143			HV?			
	1148						
1000	1155			2000		SANDY (vf-vc) gravel (gran-md peb)	

7/24 — 7/24 — 7/25 — 7/25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Caliper Reverse
20 Inch -20
Gamma Ray
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Gamma Ray Image
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0 OHM-M 50
Resistivity (64N)
0 OHM-M 50
Conductivity
0 MMHO/M 150
SP
-50 MV 200
Temperature
71 Deg F 75
Delta T
100 USEC/FT 300
Well Construction
10
10
Summary Lithology
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100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
Sand with minor gravel
Gravelly sand
Sand
Sandy gravel
Silty sand w/ minor clay
Clay w/ minor silty sand
Silty sand w/ minor gravel
Sandy silty clay
Clayey silty sand w/ minor gravel
Bentonitic clay & clayey sitly sand
Gravelly sand
Sandy silt w/ clay
Clayey silty sand
Silty sand
Clayey silty sand
Sandy clay
Silty sandy gravel
Clayey silty sand
Gravelly sand
Sandy gravel
Sandy silty clay
Sandy gravel

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SACC #5 | PROJECT: | PROJECT CHIEF: David O'Leary

ELEV: | LOCATION: | LOGGED BY:

DRILLED BY: USGS RDP | RIG TYPE: Auger | LAG METHOD: N/A

Depth	Time (min) Start or End	Rig noise etc.	Color (Munsell – soil)	Cones / mud EC	Graphic	Description and other observations * No Lith symbol i.e. (g,mS) No sorting, Can use field shorthand.	Bit size, &Rice time
1/21/2016 5'	16:44 / 16:[illegible]	Hard	10YR 5/4			Sand (S); V.f-Med Sand (Minor Coarse Sand) w/ minor silt ~~Well sorted~~	8.5"
10'	16:[illegible] / 16:[illegible]					Clayey Silty Sand (mS); V.f-Medium Sand (minor Coarse Sand) w/ Silt and Clay	
15'	16:[illegible] / 16:54					(g,mS); V.f-V.Coarse Sand w/ silt, clay and granule-lrg Peb; V. ~~Poorly Sorted~~ — Color Change	
20'	1703 / 1705					(gmS); V.f-V.Coarse Sand w/ silt, Clay and granule-lrg Pebb V. Poorly Sorted	
25'	1711 / 1714					(gmS); V.f-V.Coarse Sand w/ Silt Clay and granule-V.lrg Pebb	
30'	1720 / 17[illegible]					Sandy clayey silt; Silt w/ Clay and V.f.-Medium Sand (minor Crs-V.Crs Sand) — Color change	
35'	17[illegible] / 1732					gravely Sandy Clayey Silt; Silt w/ clay, V.f-V.Crs Sand and gran-Sm peb (minor clay)	
40'	1737 / 1739					Slightly gravelly Clayey Silty Sand; V.f.-V.Crs Sand (dom V.f-Med Sand) w/ Silt, Clay and gran-Med Peb	
45'	1744 / 1747					Sandy Silt; Silt w/ V.f-Med Sand (minor Crs-V.Crs Sand) w/ minor Clay and trace gran-Sm Pebb	
50'	1754 / 1756					Sandy Silt; Silt w/ V.f.-Med Sand (minor Crs-V.Crs Sand) w/ minor Clay and trace gran-lrg Peb	
55'	1801 / 1803		7.5YR 4/3			Sandy Silt; Silt w/ V.f-Med Sand (minor Crs-V.Crs Sand) w/ Minor clay and trace-minor gran-Med Peb	
2/16 60'	0727 / 0730		7.5YR 4/3			Sandy silt; Silt w/ V.f-Med Sand (minor Crs-V.Crs Sand) w/ trace-minor cly and trace granules	
65'	0737 / 0739	Soft	10YR 5/4			Silty Sand; V.f.-Crs Sand (minor V.Crs Sand) w/ Silt and trace gran — More Sandy (loosing clay component)	
70'	0749 / 0751		10YR 5/4			Silty Sand; V.f.-Crs Sand (minor V.Crs Sand) w/ silt and trace gran	
75'	0800 / 0804		10YR 5/3			Silty Sand; V.f-V.Crs Sand w/ Silt, trace minor Clay and trace gran-Med peb	
80'	0812 / 0815		10YR 5/3			Silty Sand; V.f.-V.Crs Sand w/ Silt, trace Clay and trace gran-Sm Peb	
85'	0831 / 0833	really soft	10YR 5/3			Silty Sand; V.f.-V.Crs Sand w/ Silt, trace Clay and trace gran-lrg Peb	
90'	0847 / 0849		10YR 5/3			Sl. gravelly Silty Sand; V.f-V.Crs Sand (dom V.f.-Med Sand) w/ silt and gran-lrg peb	
95'	0856 / 0857		10YR 5/3			Sl. grvly Slty Snd; V.f-V.Crs Snd (dom V.f.-Med Snd) w/ Slt and gran-lrg peb	
100'	0904 / 0906		10YR 5/3			Sl. grvly Slty Snd; V.f-V.Crs Snd w/ Slt, Minor Cly, and gran-Med Peb	

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: ~~SA[illegible]~~ SACC#5 PROJECT: PROJECT CHIEF: David O'Leary

ELEV: LOCATION: LOGGED BY: David O'Leary, Adam Kjos, Chris Kohel

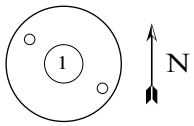
DRILLED BY: USGS RDP RIG TYPE: Auger LAG METHOD: N/A

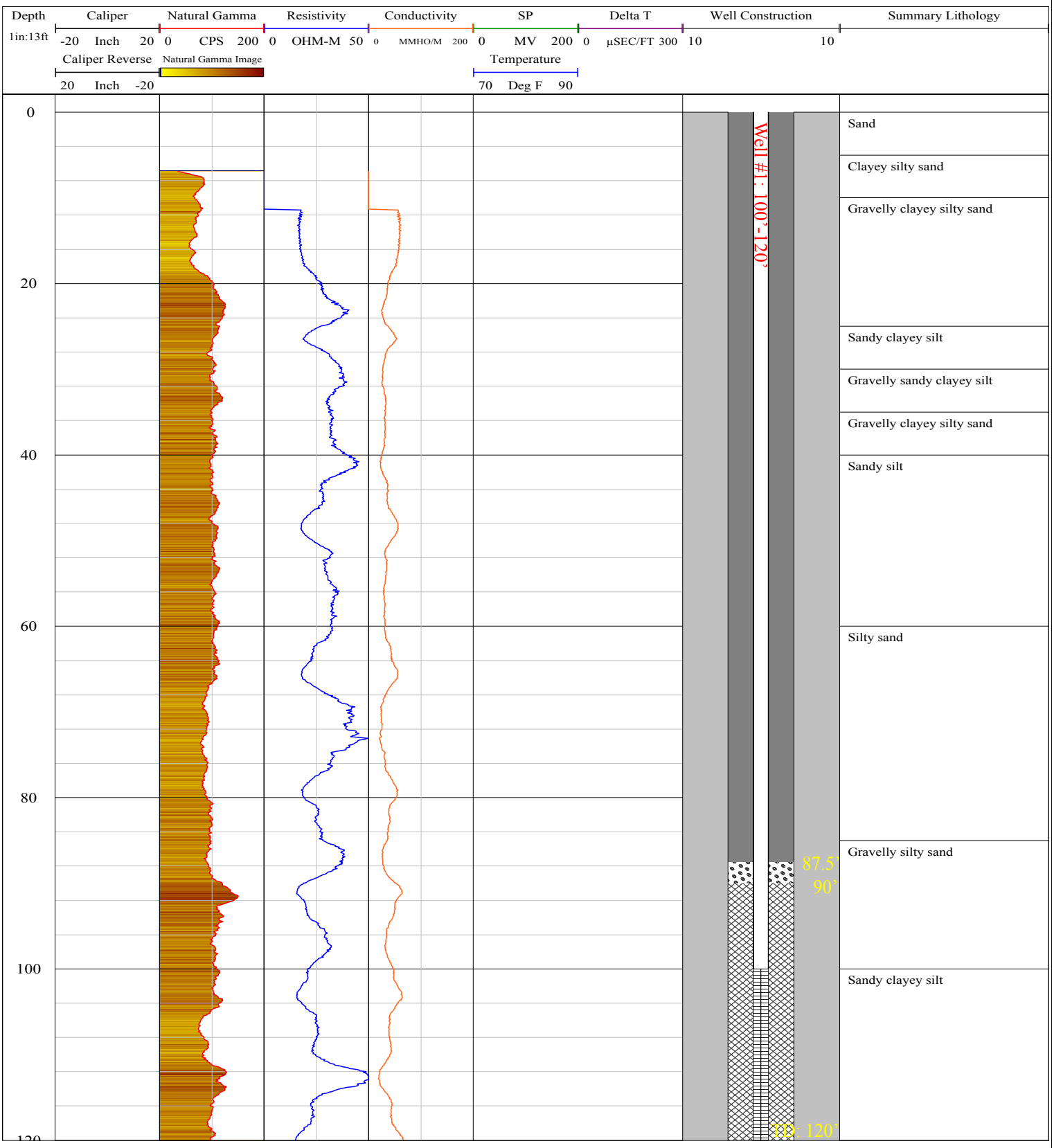
Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / mud EC	Graphic	Description and other observations	Bit size, &Rice time
1/24/2016	0918					Sandy clay silt; Silt+clay and v.f.-v.crs sand; wet sample	8.5"
105'	0920		10YR 6/3				
	0931					105'-110' pass H_2O E-tape = 107.6' BSD	
110'	0933		10YR 4/3			Sandy clay silt; Silt+clay and v.f.-v.crs sand; wet sample	
	1125	Clatter				Sandy clay silt; Silt+clay and v.f.-crs Sand (minor v.crs Sand)	
115'	1127		10YR 4/3				
	1137					Sandy clay silt; Silt+clay and v.f.-crs Sand (minor v.crs Sand) TD	
120'	1139		10YR 4/3				
	1150 TD						

SITE ID: 344520120174005	STATION NAME: 008N032W19M005S	TOTAL DEPTH: 120’
USGS SITE NAME: SACC #5 San Antonio Creek Cat Canyon Road-5		COMPLETION DATE: 11/22/2016
WELL OWNER: County of Santa Barbara		

BOREHOLE FILL KEY: SAND | GROUT | SCREEN | PELLETS | CHIPS | CEMENT

Water Level (10/20/2015)
#1: 66.49’ bls





DRILLER: USGS Research Drilling Program	DRILL TYPE: Auger	WELL FINISH: 8” Monitoring Well Manhole
CASING TYPE: 2” Schedule 80 PVC, 20’ Sections	SCREEN TYPE: 2” Schedule 80 PVC ⟶1.30" X 0.020" Slot	
BOREHOLE DIA.: 8.5”: 0’-120’	FILTER PACK: CEMEX #3 Monterey Sand	
SEALS: Baroid Quik-Grout 0’-87.5’, Pel-Plug 1/4” TR30 Pellets 87.5’-90’		

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SACR 325	PROJECT: GC16ZG00FUVS300	PROJECT CHIEF: David O'Leary
ELEV: 361'	LOCATION: [redacted] CA-135, Los Alamos, CA 93455, N34°45'32" W120°23'39"	LOGGED BY: Anthony Brown Adam Kjos
DRILLED BY: USGS RDP	RIG TYPE: Mud Rotary- TH60	LAG METHOD: Rice (mud)

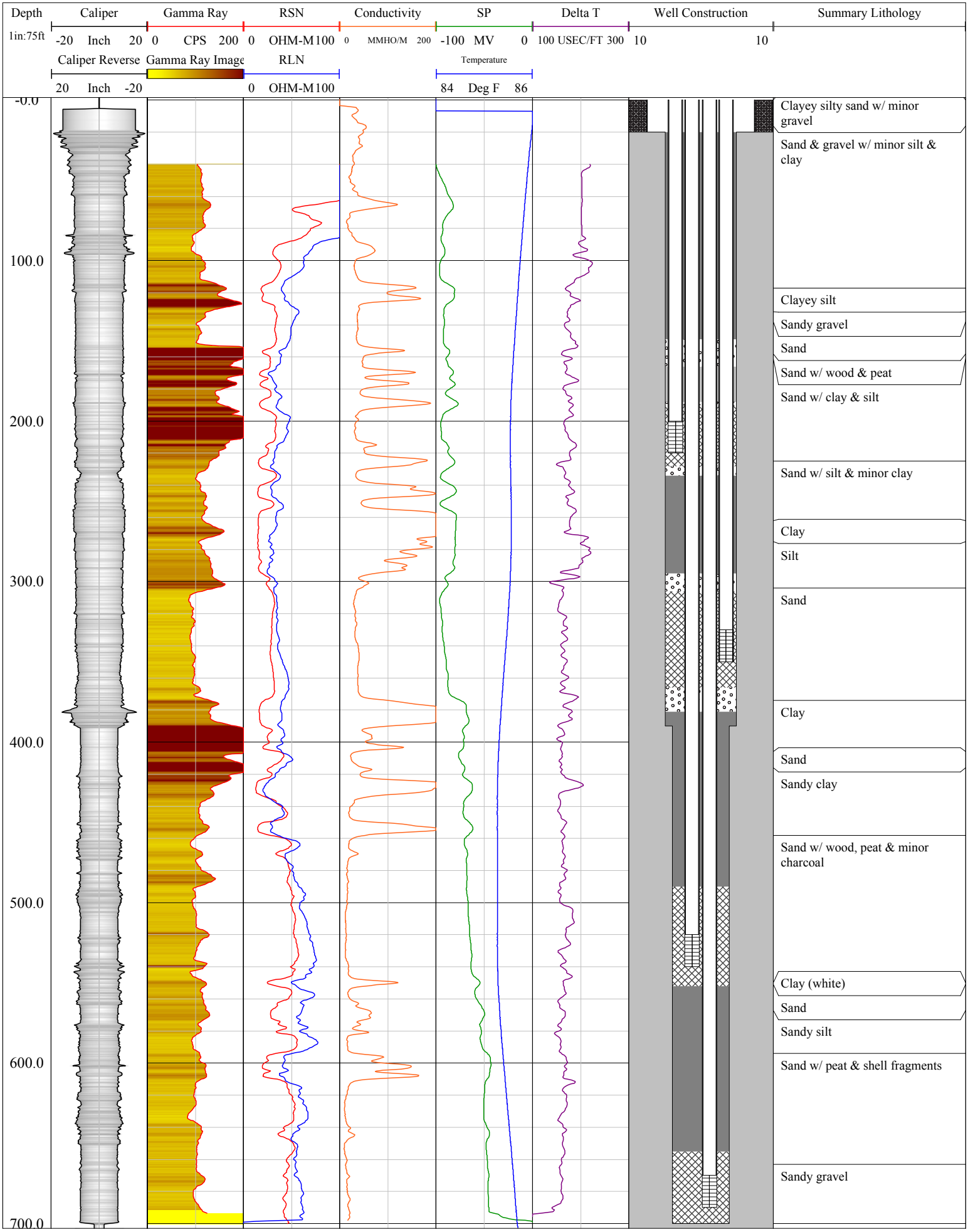
Date	Depth	Time (min)	Rig noise etc.	Color (Munsell - soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
	0				EC 4780			
7/30	20	1514 1543 1614		2.5y 3/2 2.5y 5/3	VHvy 3950		0-1 - wood; 1-2 - RIPRAP - cement/asphalt; 2-3 soil - silty clay; 3-4 silty clay; 4-14 sand (gr-mp)(vf-vc); 14-16 sl(vf-vc) g (gr-mp); 16-17 clayey; 17-20 = 14-16	20" HOLE Opened
7/31	40	0944 0949 0959	33'	2.5y 6/3	VHvy M 3080		SANDY (vf-vc) gravel (gran-med peb); Gravelly (gran-med peb) SAND (vf-vc)	9 7/8" longtooth tricone
	60	1132 1137 1142		2.5y 6/3	VHvy 3050		slightly Gravelly (gran-sm peb) sand (vf-vc)	
	80	1153 1209 1219	68' slow; 71' Fast	2.5y 4/2; 2.5y 5/3	Hvy 3010		64-65' soil Hor; 65-68' silty sand (vf-vc) w/ gravel (gran-med peb); 68'-71' clayey silt w/ med peb; 71-80' - mainly (vf-m) w/ g vc + gran	
	100	1229 1232 1236	81'	2.5y 5/3	Mod 2920		SANDY (vf-vc) gravel (gran-med peb)	
	120	1332 1337 1347	108'; 117'	2.5y 6/3; 2.5y 4/1	Hvy/Lt M 3310		Gravelly (med peb) sand (vf-m) — Lost Circ.; clayey silt	
	140	1437 1447 1455	128'; 138'		VHvy M 3240		clayey silt; sandy (vf-vc) gravel (gran-lg peb); sand (vf-m)	
	160	1504 1510 1519	152'; 158'		VHvy M 3330		SAND (vf-m); SAND (vf-vc); SAND (m-vc) Abundant wood + Peat	Rice Time 2 MIN
	180	1544 1552 1622	161'; 168' color; 171'; 173' Fast; 177' slow		VHvy M 3160		Gray SAND (vf-m); Green SAND (vf-m); clay; SAND (vf-m) clay (silty)	
	200	1637 1659 1727	182'; 188'; 195'		VHvy Lt M 2960		SAND (vf-m); silty clay; SAND (vf-m)	
7/31	220	1736 1739 1752	216' slow		Hvy 2950		SAND (vf-m); SAND (vf-vc)	
8/1	240	1801 1843 0844 0848	225' slow; 230'		H/VHvy M 2830		silty clay; SAND (vf-vc)	Rice Time 3 MIN
	260	0900 0908 0949	241'; 252' slow		Mod M 2850		Sandy (vf-m) silt; clay	
	280	1208 1326 1402	274' Fast		Lt M 2950		clay	
	300	1419 1439 1447	288' Fast		Mod M 2640		silt	
	320	1500 1506 1511			VHvy 2630		SAND (vf-vc) upper - gray; mid - green; bottom - brown	Rice Time 3 MIN
	340	1530 1536 1543			VHvy M 2640		SAND (vf-m)	
	360	1602 1611 1619			VHvy M 2690			
8/1	380	1629 1634 1656	374' slow		VHvy M 2820			
8/2	400	1755 1845 0856 0908	383' slow		Lt M 2540		clay	7 7/8 tricone

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SACR	PROJECT: GC16ZG00FUVS300	PROJECT CHIEF: David O'Leary
ELEV: 361'	LOCATION: 1098 CA-135, Los Alamos, CA 93455, N34°45'32" W120°23'39"	LOGGED BY: Anthony Brown Adam Kjos
DRILLED BY: USGS RDP	RIG TYPE: Mud Rotary- TH60	LAG METHOD: Rice (mud)

8/2 8/2

Depth	Time (min)	Rig noise etc.	Color (Munsell - soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
400							7 7/8" long tooth tricone
420	0919 0928 0934	407'		Hvy / M / 2600		clay SAND (vf-m) w/ SAND (c-vc) w/mafics	Rice Time 4 1/2 min
440	1003 1038 1101	425' slow 434' Fast		lt / 2420		SANDY (vf-m) clay	
460	1114 1119 1141	443' Fast 454' slow 457' Fast		mod / 2440		SAND (vf-m) w/ small wood chips	
480	1155 1158 1202			vHvy / 2470		SAND (vf-m) w/ small wood chips	
500	1215 1218 1220			vHvy / M / 2390		SAND (vf-m) w/ v sm wood chips	
520	1258 1301 1303			VHvy / 2470		SAND (vf-m) w/ v sm wood chips	Rice Time 5 min
540	1319 1321 1323	539'		vHvy / 2270		SAND (vf-m) w/ v sm wood chips some charcoal SAND (vf-m) w/ Peat and wood chips	
560	1340 1343 1346	550'		Hvy / 2170		SAND (vf-m)	
580	1400 1407 1409	567' slow - Fast		vHvy / M / 2260		SANDY (vf-m) silt	
600	1422 1423 1438	594' slow/fast		lt / 2310		Peat SAND (vf-vc) w/ shell fragments	
620	1451 1516 1518	601' slow 604' fast 607' slow/Fast		mod / 2290			Rice Time 6 min
640	1531 1532 1533			Hvy / 2300		SAND (vf-m) w/ Peat + Shells @ 631'-640'	
660	1555 1558 1601			Mod / 2370		SAND (vf-m) w/ Peat + Shells	
680	1613 1616 1620	663' chatter		v Hvy / m / 2360		SANDY (vf-vc) gravel (gran-sm peb) rounded	
TO 700	1633 1637 1643			vHvy / 2370		sandy (vf-vc) gravel (gran-sm peb)	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Gamma Ray Image
RSN
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RLN
0 OHM-M 100
Conductivity
0 MMHO/M 200
SP
-100 MV 0
Temperature
84 Deg F 86
Delta T
100 USEC/FT 300
Well Construction
10 10
Summary Lithology
-0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
Clayey silty sand w/ minor gravel
Sand & gravel w/ minor silt & clay
Clayey silt
Sandy gravel
Sand
Sand w/ wood & peat
Sand w/ clay & silt
Sand w/ silt & minor clay
Clay
Silt
Sand
Clay
Sand
Sandy clay
Sand w/ wood, peat & minor charcoal
Clay (white)
Sand
Sandy silt
Sand w/ peat & shell fragments
Sandy gravel

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

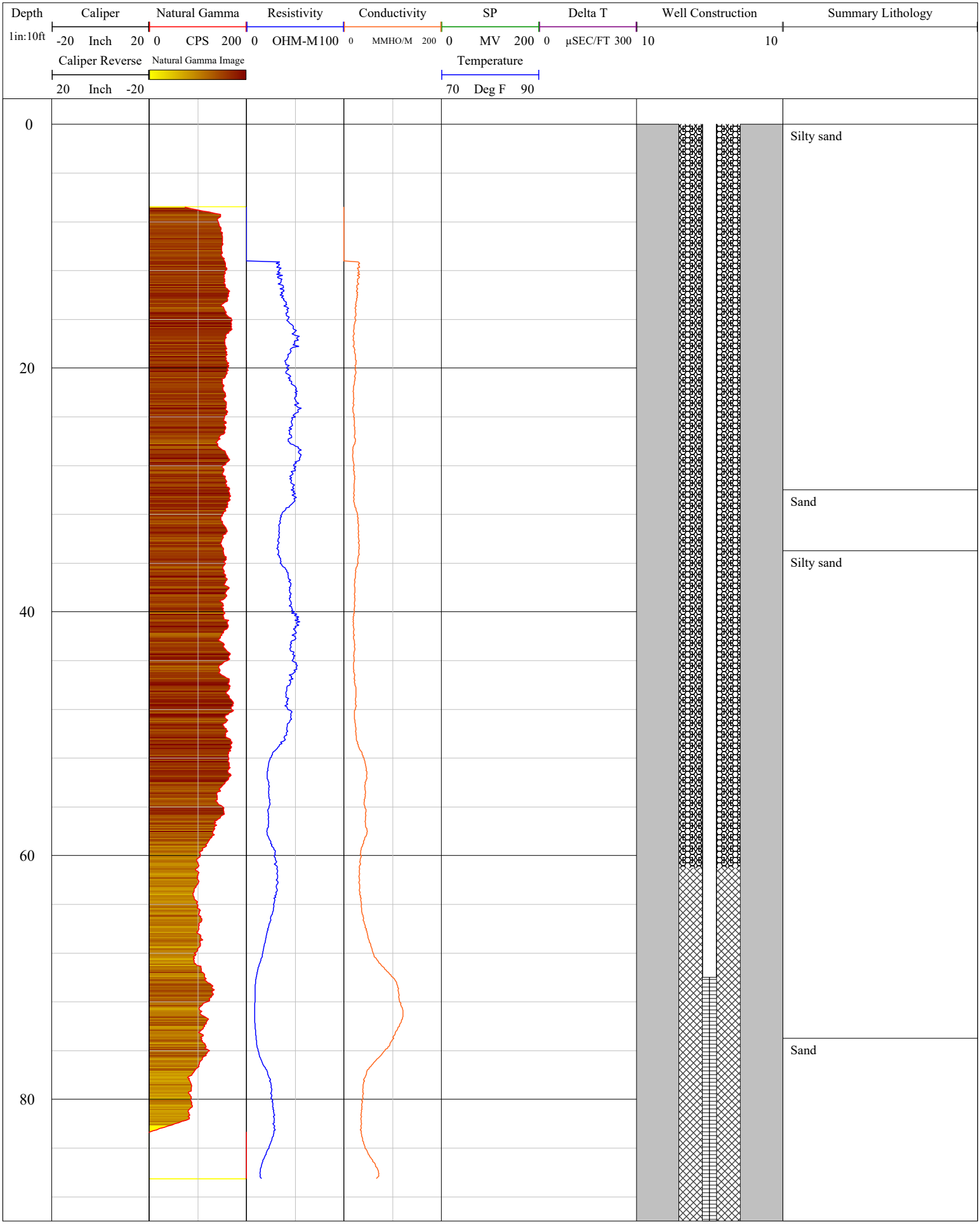
COMMON WELL NAME: SAGR | PROJECT: GC16ZG00FUVS200 | PROJECT CHIEF: David O'Leary

ELEV: ~322' | LOCATION: Graciosa Road, Santa Maria, CA; N34°46'24" W120°25'39" | LOGGED BY: *Adam Kjos*

DRILLED BY: *USGS RDP* | RIG TYPE: *Auger- CME750* | LAG METHOD: *N/A*

Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
10/17/2015	0948					~2' silty sand (vf-m)	
5	0950					moist Sand (f-c) w/ trace gravel (g-sg.)	8.5"
	1001						
10	1003						
	1010						
15	1012					slightly darker	
	1018						
20	1020						
	1026						
25	1028						
	1035						
30	1037						
	1044						
35	1046						
	1055						
40	1057						
	1109						
45	1111						
	1122						
50	1124						
	1134	~52 Torque up					
55	1136						
	1207						
60	1209						
	1214						
65	1216						
	1221						
70	1223						
	1228						
75	1230						
	1236						
80	1238						
	1607						
85	1609						
	1614						
90	1616						
TD							

Nearby Well
62.34' @ MP (~2'a|=0)
@ 0930 10/17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Caliper
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Natural Gamma
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Resistivity
0 OHM-M 100
Conductivity
0 MMHO/M 200
SP
0 MV 200
Delta T
0 µSEC/FT 300
Well Construction
10 10
Summary Lithology
Caliper Reverse
20 Inch -20
Natural Gamma Image
Temperature
70 Deg F 90
0
20
40
60
80
Silty sand
Sand
Silty sand
Sand

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SAHC	PROJECT: GC16ZG00FUVS200	PROJECT CHIEF: David O'Leary
ELEV: ~444'	LOCATION: Vandenberg Road, Santa Maria, CA; N34°48'36" W120°26'57"	LOGGED BY: *Adam Kjos*
DRILLED BY: *USGS RDP*	RIG TYPE: *Auger- CME~~58~~ 85*	LAG METHOD: *N/A*

Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
10/14/2015	1538						
5	1542					Sandy (vf-m) silty clay - moist, minor organic rich	
	1613					Harder	
10	1616					- moist	
	1622						
15	1624						
	1630						
20	1632						
	1637						
25	1639					~24' minor color change, slightly more sand - - -	
	1643					Sandy (vf-m) silty clay	
30	1645						
	1649	softer				~~Potential paraohed zone?~~	
35	1651						
	1656						
40	1658						
	1702						
45	1704						
	1708						
50	1710						
	1713						
55	1715						
	1719						
60	1721						
	1725						
65	1727					~64' candier? - - - - - - - - - - - -	
	1732					silty sandy (vf-m) clay w/ intermittent softer sandy hor.	
70	1734						
	1738						
75	1740						
10/15/2015	0809						
80	0811						
	0817	Poor Returns					
85	0819						
	0823						
90	0825						
TD							

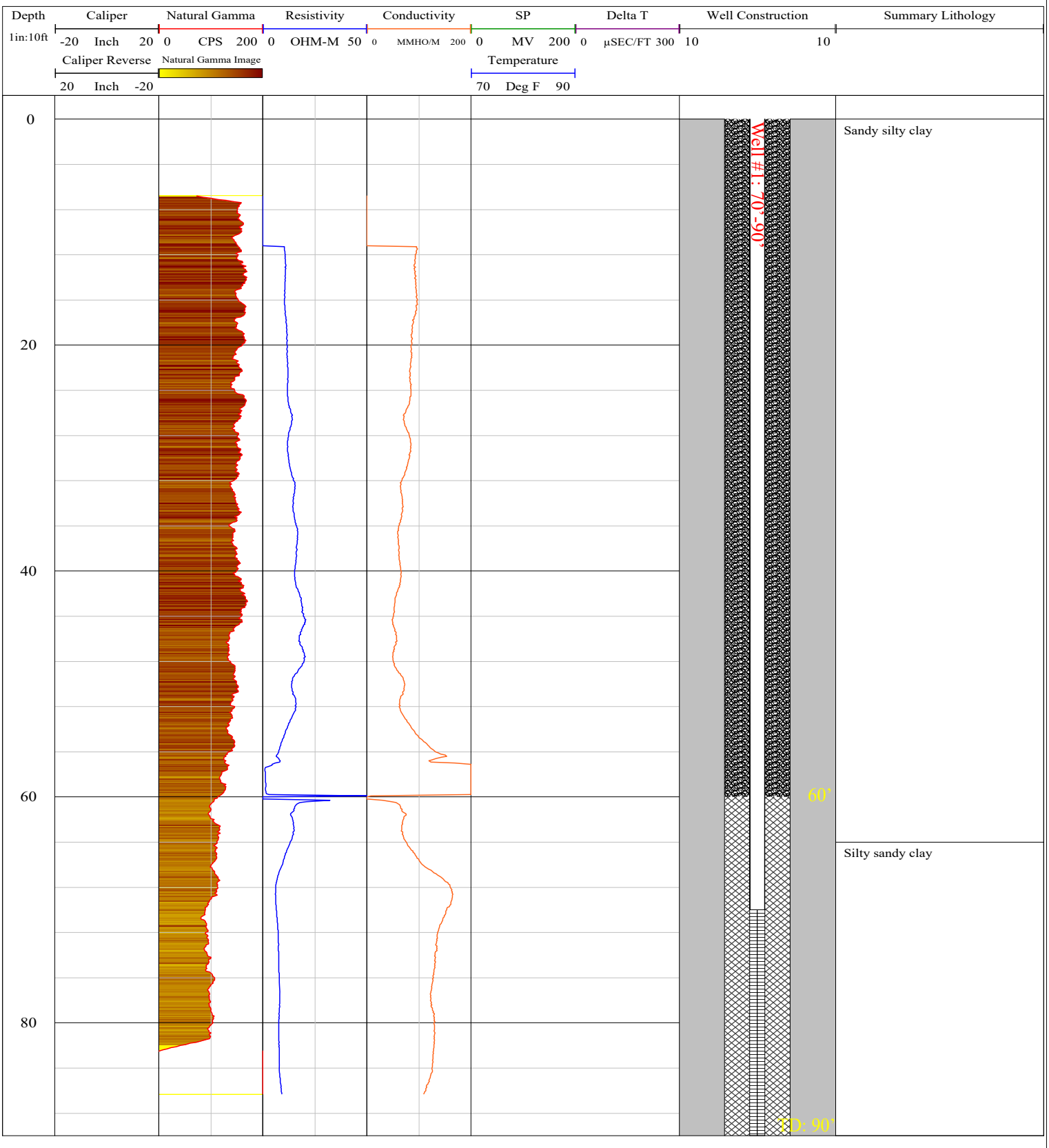
WL 67' bTOC (Near-by well) @ 1430 10/14/15

SITE ID: 344836120270001	STATION NAME: 009N034W34N002S	TOTAL DEPTH: 90’
USGS SITE NAME: SAHC San Antonio Creek Harris Canyon		COMPLETION DATE: 10/15/2015
WELL OWNER: County of Santa Barbara		

BOREHOLE FILL KEY: SAND | GROUT | SCREEN | PELLETS | CHIPS | CEMENT

Water Level (01/04/2018)
#1: 69.82’ bls

Hinge 1 N



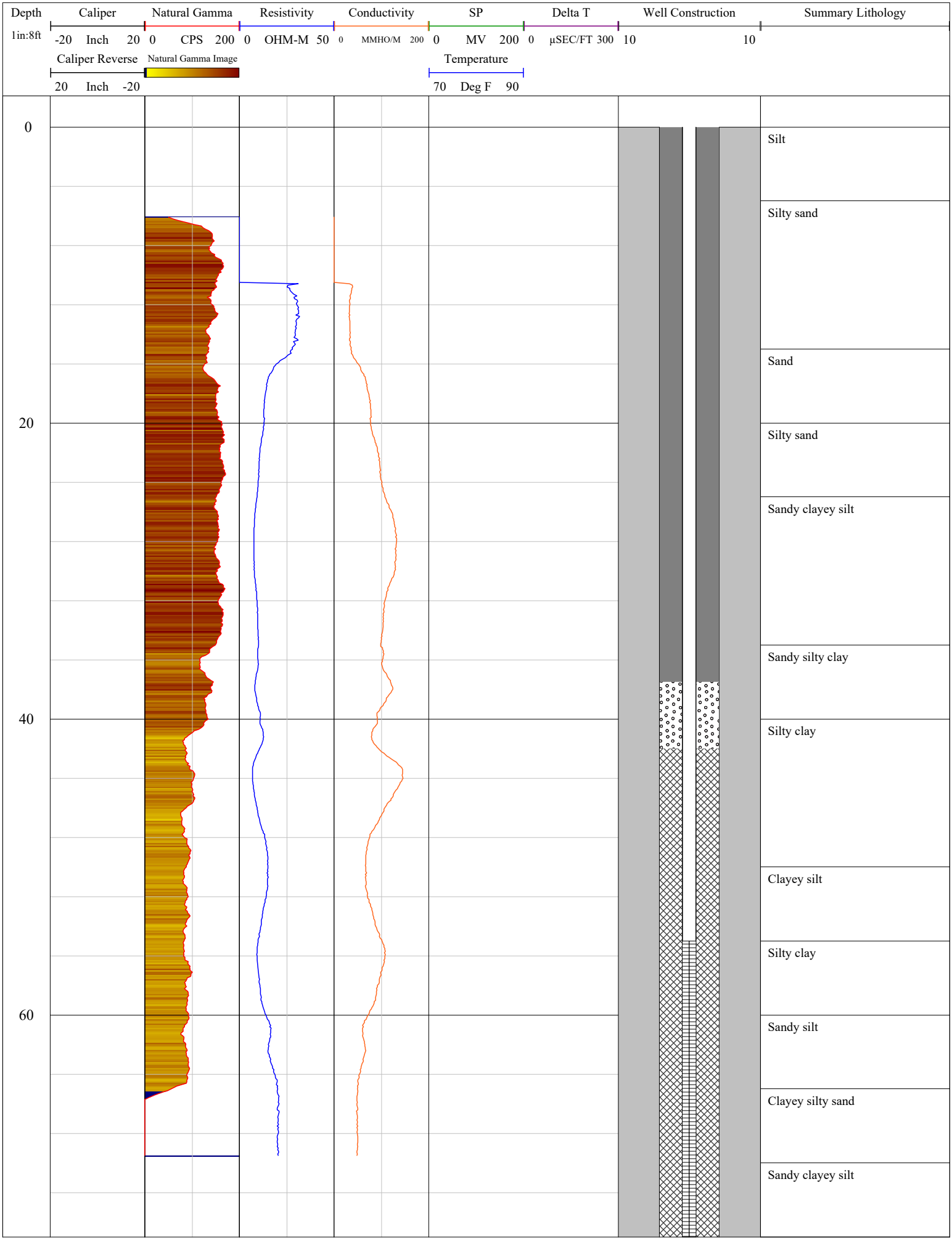
DRILLER: USGS Research Drilling Program	DRILL TYPE: Auger	WELL FINISH: 10” Steel Monument
CASING TYPE: 2” Schedule 80 PVC, 20’ Sections	SCREEN TYPE: 2” Schedule 80 PVC ⟶1.30" X 0.020" Slot	
BOREHOLE DIA.: 8.5”: 0’-90’	FILTER PACK: CEMEX #3 Monterey Sand	
SEALS: Baroid EZ-SEAL (granular) 50’-60’, Baroid HOLEPLUG (3/8” grade) 0’-50’		

Table ___. Lithologic AUGER log for multiple well monitoring site SAHG

Depth (ft)	Description
5	Silt (z); silt with trace fine to coarse sand and clay; well sorted; black (2.5Y 2.5/1)
10	Silty sand (zS); fine to coarse sand with silt and trace clay and granules to very large pebbles; moderately sorted; sub-angular to sub-rounded; very dark gray (2.5Y 3/1)
15	Silty sand (zS); fine to medium sand with silt and trace clay and coarse sand and granules; moderately to well sorted; sub-angular to sub-rounded; very dark grayish brown (10YR 3/2)
20	Sand (S); medium sand with trace coarse sand and granules; well sorted; sub-angular to sub-rounded; grayish brown (2.5Y 5/2)
25	Silty sand (zS); fine to medium sand and silt with trace coarse sand, clay and granules; moderately sorted; sub-angular to sub-rounded; dark grayish brown (2.5Y 4/2)
30	Sandy clayey silt (sM); silt and clay with fine to medium sand; moderately sorted; very dark gray (2.5Y 3/1)
35	Sandy clayey silt (sM); silt and clay with very fine to medium sand; moderately to poorly sorted; very dark grayish brown (2.5Y 3/2)
40	Sandy silty clay (sM); clay and silt with very fine to medium sand; moderately to poorly sorted; very dark grayish brown (2.5Y 3/2)
45	Silty clay (M); clay and silt with trace fine to medium sand; moderately sorted; very dark grayish brown (2.5Y 3/2)
50	Silty clay (M); clay and silt with trace fine to medium sand and granules; moderately sorted; very dark grayish brown (2.5Y 3/2)
55	Clayey silt (M); silt and clay with trace fine to medium sand; moderately to well sorted; very dark grayish brown (2.5Y 3/2)
60	Silty clay (M); clay and silt with trace very fine to fine sand and granules; well sorted; very dark grayish brown (2.5Y 3/2)
65	Sandy silt (sZ); silt with fine to medium sand and trace clay; moderately to well sorted; dark grayish brown (2.5Y 4/2)
70	Clayey silty sand (mS); fine to medium sand with silt and minor clay; moderately to well sorted; sub-angular to sub-rounded; dark grayish brown (2.5Y 4/2)

Table ___. Lithologic AUGER log for multiple well monitoring site SAHG

Depth (ft)	Description
75	Sandy clayey silt (sM); silt with clay and fine to medium sand; moderately sorted; olive brown (2.5Y 4/3)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1in:8ft
Caliper
-20 Inch 20
Natural Gamma
0 CPS 200
Resistivity
0 OHM-M 50
Conductivity
0 MMHO/M 200
SP
0 MV 200
Delta T
0 µSEC/FT 300
Well Construction
10
10
Summary Lithology
Caliper Reverse
20 Inch -20
Natural Gamma Image
Temperature
70 Deg F 90
0
20
40
60
Silt
Silty sand
Sand
Silty sand
Sandy clayey silt
Sandy silty clay
Silty clay
Clayey silt
Silty clay
Sandy silt
Clayey silty sand
Sandy clayey silt

USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SALA	PROJECT:	PROJECT CHIEF: David O'Leary
ELEV: 607'	LOCATION: N34°44'37" W120°16'17"	LOGGED BY: David O'Leary, Adam Kjos, Chris Kohel
DRILLED BY: USGS RDP	RIG TYPE: Auger	LAG METHOD: N/A

11/26/2016

Depth	Time (min)	Rig noise etc.	Color (Munsell soil)	Cones / mud EC	Graphic	Description and other observations	Bit size, &Rice time
5'	10:03 10:04		10YR 3/3			Gravelly Sandy Silt, Silt w/ v.f.-v.crs Sand (dom v.f.-Med Sand) w/ gran-v.lrg Peb.	8.5"
10'	10:13 10:18		10YR 4/2			Silty Sand gravel Gran [illegible] rg Peb w/ v.f.-v.crs Sand and Silt	
15'	1026 1030		10YR 4/3			Sand [illegible] Clay w/ silt v.f.-v.crs Sand and trace gran-Sml Peb; v. firm [illegible]	
20'	1038 1043		10YR 4/3			Sandy [illegible] Clay w/ silt, v.f.-v.crs Sand and trace gran-Sm [illegible]; v. firm Clay	
25'	1047 1050		10YR 5/3			Sandy Silt; Silt [illegible] f-v.crs Sand (dom v.f.-Med Sand), Minor clay and tr. gra[illegible] Sml Peb	
30'	1053 1056	Soft	10YR 5/3			Gravel Sand clay silt [illegible] w/ clay, v.f.-v.crs Sand and gran-rg Peb	
35'	1059 1102		10YR 5/3			Slightly grvl [illegible] silt; Silt w/ Clay, v.f.-v.crs Sand and gran-[illegible] sive Clay	
40'	1111 1113		10YR 5/3			Sand [illegible] Clay [illegible] / silt, v.f.-v.crs Sand and trace gran-rg Peb [illegible] clay	
45'	1116 1118		10YR 5/3			Slight grvl and [illegible] clay; clay w/ silt, v.f.-v.crs Sand and gran lrg [illegible]	
50'	1121 1122		10YR 5/3			Slight grvl Sa[illegible] clay; clay w/ silt, v.f.-v.crs Sand and gran-rg Peb [illegible] clay	
55'	1127 1131		10YR 5/3			Slightly grvl Sa[illegible] clay; clay w/ s[illegible], v.f.-v.crs Sand and gran-Med Peb [illegible] Clay Color Change	
60'	1135 1139		10YR 4/3			Slightly grvly Sand [illegible] clay; clay w/ silt, v.f.-v.crs Sand and [g]ran-Sml Peb [illegible] clay	
65'	1140 1142	Fills	10YR 4/3			Slightly grvl Sandy S[illegible] clay; Clay w/ silt, v.f.-v.crs Sd and [g]ran-Sml Peb; Coh[illegible] clay	
70'	1147 1148		10YR 4/3			Silty Clay; clay w/ [illegible] minor v.f.-v.crs Sand and trace gran-Med [illegible]	
75'	1153 1155		10YR 4/3			Silty Clay; clay w/ [illegible] and minor v.f.-Medium Sand; Cohesive clay	
80'	12:37 1239		10YR 5/3			[S]ilty Clay; Cla[y] w/ [illegible] minor v.f.-Medium Sand; Cohesive Clay	
88'	1242 1244		10YR 5/3			[Sil]ty Clay; Clay w/ s[illegible] minor v.f.-Medium Sand; Cohesive Clay	
90'	1247 1250		10YR 5/3			Silty Clay; Cla[y] w/ s[illegible] minor v.f.-Medium Sand; Cohesive clay TD = 90'	

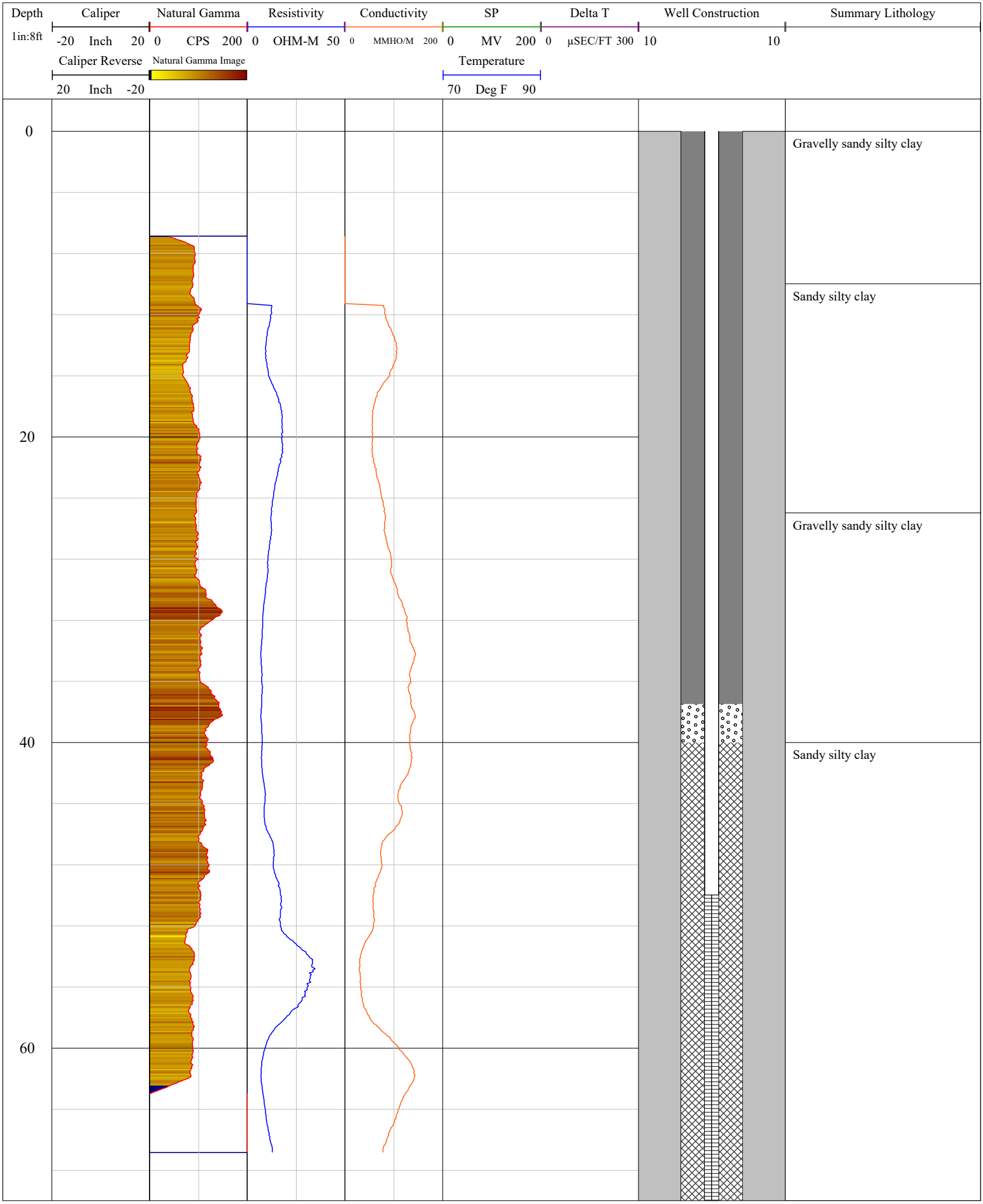
USGS MONITORING WELL DRILLING AND LITHOLOGIC LOG

COMMON WELL NAME: SALS PROJECT: GC.17.ZG00.FUVS2.00 PROJECT CHIEF: David O'Leary

ELEV: LOCATION: San Antonio Creek CA LOGGED BY: C. Kohel / A. Kjos / D. O'Leary

DRILLED BY: *USGS RDP* RIG TYPE: Auger LAG METHOD: *N/A (augers)*

Depth	Time (min)	Rig noise etc.	Color (Munsell – soil)	Cones / EC	Graphic	Description and other observations	Bit size, &Rice time
11/20/2016	11:00						
5'	11:20	None	7.5YR 2.5/1			(sM); Clay w/silt, V.f - f Sand and trace granule - Sm. peb Organic rich black clay; Cohesive clay	8.5"
10'	11:30	None	7.5YR 3/1			(sM); Clay w/silt, V.f f Sand, and trace granule - small peb Organic rich V. dark gray clay; Cohesive clay	
15'	11:37	None	7.5YR 3/1			(sM); Clay w/silt and V. fine - Coarse Sand; Organic rich Clay; Cohesive clay	
20'	11:47	None	10YR 3/2			(zC); Clay w/silt and trace - Minor V.f - Medium Sand; V. Cohesive clay	
25'	11:57	None	10YR 4/2			(zC); Clay w/-ilt, trace - Minor V.f - V. Coarse Sand and trace granules; V. Cohesive Clay	
30'	12:05	None	7.5YR 4/1			(sM); Clay w/silt, V.f - V. Coarse Sand and trace granule - Small peb; V. Cohesive clay	
35'	12:12	None	10YR 3/2			(sM); Clay w/silt, V.f V. Coarse Sand and trace granules, V. Cohesive clay	
40'	12:18	None	2.5Y 3/1			(zC); Clay w/silt, Minor V. fine - V. Coarse Sand and trace granules; Adhesive clay	Brown clay ↑
45'	12:24	None	5Y 3/1			(zC); Clay w/silt and Minor V.f - Coarse Sand; Adhesive clay	— gray clay ↓
50'	12:30	None	5Y 3/1			(zC); Clay w/silt and Minor V. fine - Medium Sand; Adhesive clay	
55'	12:35	None	5Y 3/1			(zC); Clay w/silt and Minor V.f - Medium Sand; Adhesive Clay	
60'	12:40'	None	5Y 3/1			(zC); Clay w/silt and Minor V.f - Medium Sand; Adhesive clay	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Caliper
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Natural Gamma
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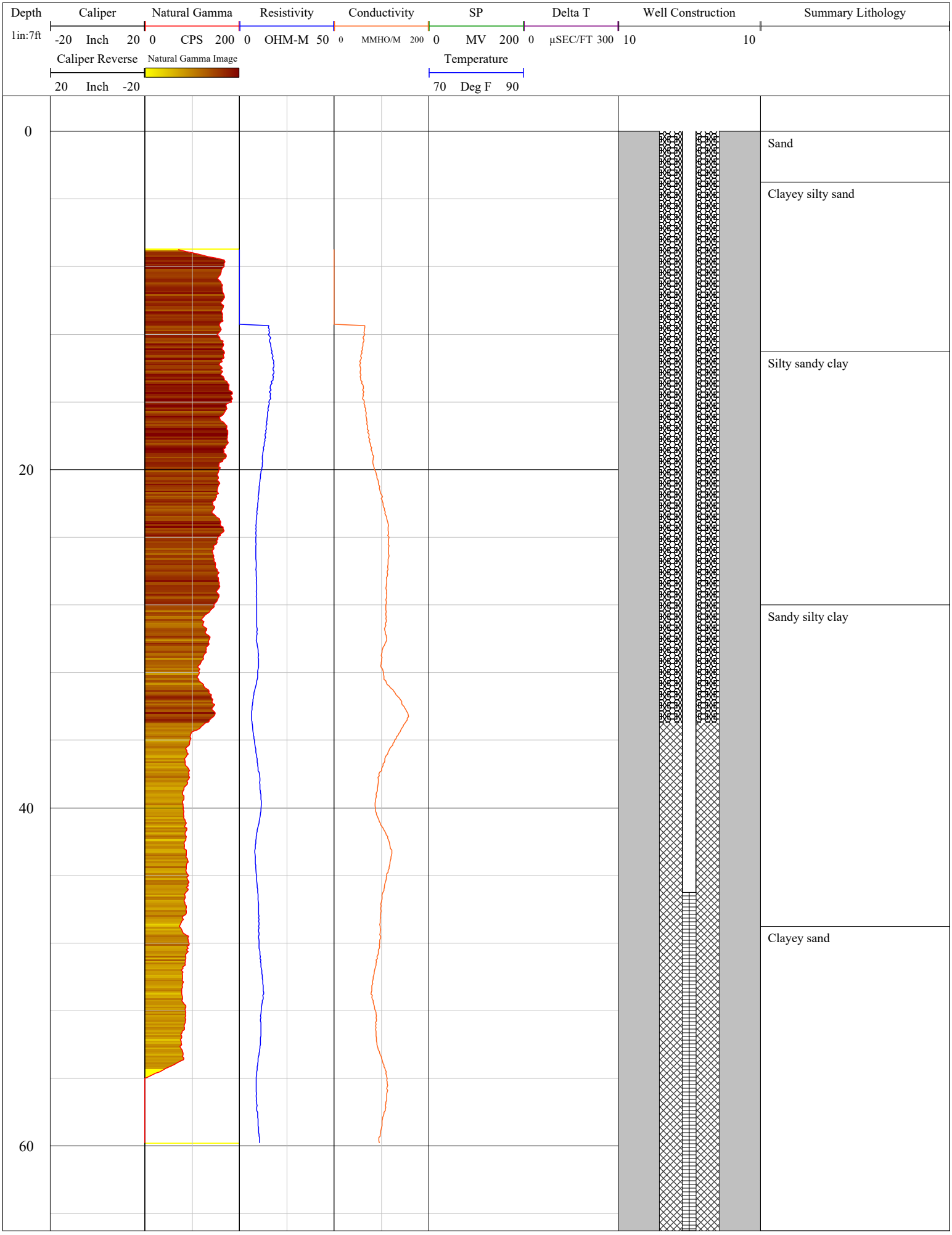
Resistivity
0 OHM-M 50
Conductivity
0 MMHO/M 200
SP
0 MV 200
Delta T
0 µSEC/FT 300
Well Construction
10 10
Summary Lithology
Caliper Reverse
20 Inch -20
Natural Gamma Image
Temperature
70 Deg F 90
0
20
40
60
Gravelly sandy silty clay
Sandy silty clay
Gravelly sandy silty clay
Sandy silty clay

Table ___. Lithologic AUGER log for multiple well monitoring site SASA

Depth (ft)	Description
5	Sandy clayey silt (sM); clay and silt with very fine to medium sand and trace gravel; moderately sorted; very dark gray (2.5Y 3/1)
10	Sandy silty clay (sM); clay and silt with minor very fine to fine sand and trace coarse sand and gravel; moderately sorted; black (2.5Y 2.5/1)
15	Sandy silty clay (sM); clay and silt with minor very fine to fine sand; moderately sorted; black (2.5Y 2.5/1)
20	Sandy silty clay (sM); clay and silt with minor very fine to fine sand; moderately sorted; black (2.5Y 2.5/1)
25	Sandy silty clay (sM); clay and silt with minor very fine sand and trace gravel; well sorted; black (2.5Y 2.5/1)
30	Clayey silt (M); silt and clay with trace very fine sand; well sorted; very dark grayish brown (2.5Y 3/2)
35	Clayey silt (M); silt and clay with trace very fine to coarse sand; well sorted; very dark grayish brown (2.5Y 3/2)
40	Clayey silt (M); silt and clay with trace very fine to medium sand; well sorted; black (2.5Y 2.5/1)
45	Sandy clayey silt (sM); silt and clay with minor very fine to fine sand; moderately sorted; dark grayish brown (2.5Y 4/2)
50	Sandy silt (sZ); silt with very fine sand; well sorted; olive brown (2.5Y 4/3)
55	Sandy silt (sZ); silt with minor very find sand; well sorted; dark olive brown (2.5Y 3/3); slightly calcareous
60	Silt (Z); silt with trace very fine sand; well sorted; olive brown (2.5Y 4/3); slightly to moderately calcareous
65	Sandy silt (sZ); silt with very fine to fine sand and trace coarse sand; moderately to well sorted; light olive brown (2.5Y 5/3); slight to moderately calcareous; poor returns
65 bit	Sandy silt (sZ); silt with very fine to fine sand and trace coarse sand and gravel; moderately to well sorted; dark grayish brown (2.5Y 4/2); slightly to moderately calcareous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Caliper
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Natural Gamma
0 CPS 200
Resistivity
0 OHM-M 50
Conductivity
0 MMHO/M 200
SP
0 MV 200
Delta T
0 µSEC/FT 300
Well Construction
10
10
Summary Lithology
Caliper Reverse
20 Inch -20
Natural Gamma Image
Temperature
70 Deg F 90
0
20
40
60
Sand
Clayey silty sand
Silty sandy clay
Sandy silty clay
Clayey sand

APPENDIX G-3

Domestic Water Quality and Monitoring Regulations; Proposed General Waste Discharge Requirements for Discharges from Irrigated Lands

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§64310. Reduction of Fees for Public Water Systems Serving Disadvantaged Community.

(a) A public water system must pay the full amount of the annual fee unless it requests and receives from the State Board a determination that its annual fees are reduced because it is a community water system that serves a disadvantaged community in which case the fee to be paid is the amount for a disadvantaged community as shown in Table 64305-A.

(b) To qualify for the reduction provided for in subsection (a), a public water system must certify, and provide documentation to the State Board upon request, that it serves a disadvantaged community.

§64315. Payment of Fees

(a) Each fee required by this chapter shall be paid to the State Board within forty five (45) calendar days of the date of the invoice, except that this date may be extended by the State Board for good cause, which shall be determined at the State Board's sole discretion.

CHAPTER 15. DOMESTIC WATER QUALITY AND MONITORING REGULATIONS

Article 1. Definitions

§64400. Acute Risk.

"Acute risk" means the potential for a contaminant or disinfectant residual to cause acute health effects, i.e., death, damage or illness, as a result of a single period of exposure of a duration measured in seconds, minutes, hours, or days.

§64400.05. Combined Distribution System.

"Combined distribution system" means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

§64400.10. Community Water System.

“Community water system” means a public water system which serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents.

§64400.20. Compliance Cycle.

“Compliance cycle” means the nine-year calendar year cycle during which public water systems shall monitor. Each compliance cycle consists of three three-year compliance periods. The first calendar year cycle began January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

§64400.25. Compliance Period.
"Compliance period" means a three-year calendar year period within a compliance cycle. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

§64400.28. Confluent Growth.
"Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

§64400.29. Consecutive System.
"Consecutive system" means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

§64400.30. Customer.
"Customer" means a service connection to which water is delivered by a community water system or a person that receives water from a nontransient-noncommunity water system for more than six months of the year.

§64400.32. Detected.
"Detected" means at or above the detection limit for purposes of reporting (DLR).

§64400.34. Detection Limit for Purposes of Reporting (DLR).
"Detection limit for purposes of reporting (DLR)" means the designated minimum level at or above which any analytical finding of a contaminant in drinking water resulting from monitoring required under this chapter shall be reported to the State Board.

§64400.36. Dual Sample Set.
"Dual sample set" means a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5.

§64400.38. Enhanced Coagulation.
"Enhanced coagulation" means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

§64400.40. Enhanced Softening.
"Enhanced softening" means the improved removal of disinfection byproduct precursors by precipitative softening.

§64400.41. Finished Water.
"Finished water" means the water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

§64400.42. Fluoridation.
"Fluoridation" means the addition of fluoride to drinking water to achieve an optimal level, pursuant to Section 64433.2, that protects and maintains dental health.

§64400.45. GAC10.
"GAC10" means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of once every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with the TTHM and HAA5 MCLs monitored pursuant to section 64534.2(d) shall be once every 120 days.

§64400.46. GAC20.
"GAC20" means granular activated carbon filter beds with an empty-bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of once every 240 days.

§64400.47. Haloacetic Acids (Five) or HAA5.
"Haloacetic acids (five)" or "HAA5" means the sum of the concentrations in milligrams per liter (mg/L) of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

§64400.50. Initial Compliance Period.
"Initial compliance period" means the first full three-year compliance period which began January 1, 1993, for existing systems. For new systems, the "initial compliance period" means the period in which the State Board grants the permit.

§64400.60. Initial Finding.
"Initial finding" means the first laboratory result from a water source showing the presence of an organic chemical listed in §64444, Table 64444-A.

§64400.65. IOC.
"IOC" means inorganic chemical.

§64400.66. Locational Running Annual Average or LRAA.
"Locational running annual average" or "LRAA" means the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

§64400.67. Maximum Residual Disinfectant Level or MRDL.
"Maximum residual disinfectant level" or "MRDL" means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

§64400.70. MCL.
"MCL" means maximum contaminant level.

§64400.80. Nontransient-noncommunity Water System.
"Nontransient-noncommunity water system" means a public water system that is not a community water system and that regularly serves at least the same 25 persons over 6 months per year.

§64400.90. Operational Evaluation Levels or OEL.
"Operational evaluation level" or "OEL" means the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average; or the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average.

§64401. Repeat Compliance Period.
"Repeat compliance period" means any subsequent compliance period after the initial compliance period.

§64401.10. Repeat Sample.
"Repeat sample" means a required sample collected following a total coliform-positive sample.

§64401.20. Replacement Sample.
"Replacement sample" means a sample collected to replace an invalidated sample.

§64401.30. Routine Sample.
"Routine sample" means a bacteriological sample the water supplier is required to collect on a regular basis, or one which the supplier is required to collect for a system not in compliance with Sections 64650 through 64666 when treated water turbidity exceeds 1 nephelometric turbidity unit (NTU), pursuant to §64423(b).

§64401.40. Sanitary Survey.
"Sanitary survey" means an on-site review of a public water system for the purpose of evaluating the adequacy of the water source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

§64401.50. Significant Rise in Bacterial Count.
"Significant rise in bacterial count" means an increase in coliform bacteria, as determined in §64426, when associated with a suspected waterborne illness or disruption of physical works or operating procedures.

§64401.55. SOC.
"SOC" means synthetic organic chemical.

§64401.60. Standby Source.
"Standby source" means a source which is used only for emergency purposes pursuant to §64414.

§64401.65. SUVA.
"SUVA" means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of a water. It is calculated by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (in m^{-1}) by its concentration of dissolved organic carbon (DOC) (in mg/L).

§64401.70. System with a Single Service Connection.
"System with a single service connection" means a system which supplies drinking water to consumers via a single service line.

§64401.71. Tier 1 Public Notice.
"Tier 1 public notice" means a public notice issued in response to the events listed in subsection 64463.1(a) and in the manner specified in subsections 64463.1(b) and (c).

§64401.72. Tier 2 Public Notice.
"Tier 2 public notice" means a public notice issued in response to the events listed in section 64463.4(a) and in the manner specified in subsections 64463.4(b) and (c).

§64401.73. Tier 3 Public Notice.
"Tier 3 public notice" means a public notice issued in response to the events listed in section 64463.7(a) and in the manner specified in subsections 64463.7(b), and (c) or (d).

§64401.75. Too Numerous to Count.
"Too numerous to count" means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

§64401.80. Total Coliform-positive.
"Total coliform-positive" means a sample result in which the presence of total coliforms has been demonstrated.

§64401.82. Total Organic Carbon or TOC.
"Total organic carbon" or "TOC" means total organic carbon reported in units of milligrams per liter (mg/L), as measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

§64401.85. Transient-noncommunity Water System.
"Transient-noncommunity water system" means a public water system that is not a community water system or a nontransient-noncommunity water system.

§64401.90. Treatment.
"Treatment" means physical, biological, or chemical processes, including blending, designed to affect water quality parameters to render the water acceptable for domestic use.

§64401.92. Total Trihalomethanes or TTHM.
"Total Trihalomethanes" or "TTHM" means the sum of the concentrations in milligrams per liter (mg/L) of the trihalomethane compounds (bromodichloromethane, bromoform, chloroform, and dibromochloromethane), rounded to two significant figures after addition.

§64401.95. VOC.
"VOC" means volatile organic chemical.

§64402. Vulnerable System.
"Vulnerable system" means a water system which has any water source which in the judgment of the State Board, has a risk of containing an organic contaminant, based on an assessment as set forth in §64445(d)(1).

§64402.10. Water Source.
"Water source" means an individual groundwater source or an individual surface water intake. Sources which have not been designated as standby sources shall be deemed to be water sources.

§64402.20. Water Supplier.
"Water supplier", "person operating a public water system" or "supplier of water" means any person who owns or operates a public water system. These terms will be used interchangeably in this chapter.

(a) "Wholesale water supplier," or "wholesaler" means any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

(b) "Retail water supplier," or "retailer" means

(1) Any person who owns or operates any distribution facilities and any related collection, treatment, or storage facilities under the control of the operator of the public water system which are used primarily in connection with the public water system; or

(2) Any person who owns or operates any collection or pretreatment storage facilities not under the control of the operator of the public water system which are used primarily in connection with the public water system.

§64402.30. Wholesale System.

"Wholesale system" means a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Article 2. General Requirements

§64412. Determination of Persons Served.

(a) The number of persons served by a community water system shall be determined by the water system using one of the following methods:

(1) Utilizing the most recent United States census data, or more recent special census data certified by the California Department of Finance, for the service area served by the water system;

(2) Multiplying the number of service connections served by the water system by 3.3 to determine the total population served;

(3) Determining the total number of dwelling units or efficiency dwelling units as defined in the Uniform Building Code (Title 24, California Code of Regulations), the number of mobile home park spaces and the number of individual business, commercial, industrial and institutional billing units served by the water system and multiplying this total by 2.8 to arrive at the total population served by the system.

(b) Each community water system shall report to the State Board annually the number of persons and the number of service connections served by the system using the procedures set forth in subsection (a).

§64413.1. Classification of Water Treatment Facilities.

(a) Each water treatment facility shall be classified pursuant to Table 64413.1-A based on the calculation of total points for the facility using the factors specified in subsection (b).

Table 64413.1-A.
Water Treatment Facility Class Designations

Total Points	*Class*
Less than 20	T1
20 through 39	T2
40 through 59	T3
60 through 79	T4
80 or more	T5

(b) The calculation of total points for each water treatment facility shall be the sum of the points derived in each of paragraphs (1) through (13). If a treatment facility treats more than one source, the source with the highest average concentration of each contaminant shall be used to determine the point value in paragraphs (2) through (5).

(1) For water source, the points are determined pursuant to Table 64413.1-B.

Table 64413.1-B.
Points for Source Water Used by the Facility

Type of source water used by the facility	*Points*
Groundwater and/or purchased treated water meeting primary and secondary drinking water standards, as defined in § 116275 of the Health and Safety Code	2
Water that includes any surface water or groundwater under the direct influence of surface water	5

(2) For influent microbiological water quality, points shall be determined by using the median of all total coliform analyses completed in the previous 24 months pursuant to Table 64413.1-C:

Table 64413.1-C.
Influent Water Microbiological Quality Points

Median Coliform Density *Most Probable Number Index (MPN)*	*Points*
less than 1 per 100 mL	0
1 through 100 per 100 mL	2
greater than 100 through 1,000 per 100 mL	4
greater than 1,000 through 10,000 per 100 mL	6
greater than 10,000 per 100 mL	8

(3) For facilities treating surface water or groundwater under the direct influence of surface water, points for influent water turbidity shall be determined pursuant to Table 64413.1-D on the basis of the previous 24 months of data, except that if turbidity data is missing for one or more of the months, the points given for turbidity shall be 5. The maximum influent turbidity sustained for at least one hour according to an on-line turbidimeter shall be used unless such data is not available, in which case, the maximum influent turbidity identified by grab sample shall be used. For facilities that have not been in operation for 24 months, the available data shall be used. For facilities whose permit specifies measures to ensure that influent turbidity will not exceed a specified level, the points corresponding to that level shall be assigned.

Table 64413.1-D.
Influent Water Turbidity Points

Maximum Influent Turbidity Level Nephelometric Turbidity Units (NTU)	*Points*
Less than 15	0
15 through 100	2
Greater than 100	5

(4) The points for influent water perchlorate, nitrate, or nitrite levels shall be determined by an average of the three most recent sample results, pursuant to Table 64413.1-E.

Table 64413.1-E.
Influent Water Perchlorate, Nitrate, and Nitrite Points

Perchlorate, Nitrate, and Nitrite Data Average	*Points*
Less than or equal to the maximum contaminant level (MCL), as specified in Table 64431-A	0
For each contaminant greater than its MCL	5

(5) The points for other influent water contaminants with primary MCLs shall be a sum of the points for each of the inorganic contaminants (Table 64431-A), organic contaminants (Table 64444-A) and radionuclides (Tables 64442 and 64443). The points for each contaminant shall be based on an average of the three most recent sample results, pursuant to Table 64413.1-F. If monitoring for a contaminant has been waived pursuant to sections 64432(m) or (n), 64432.2(c), or 64445(d), the points shall be zero for that contaminant.

Table 64413.1-F.
Influent Water Chemical and Radiological Contaminant Points

Contaminant Data Average	*Points*
Less than or equal to the MCL	0
Greater than the MCL	2
5 Times the MCL or greater	5

(6) The total points for surface water filtration treatment shall be the sum of the points of those treatment processes utilized by the facility for compliance with section 64652, pursuant to Table 64413.1-G.

Table 64413.1-G.
Points for Surface Water Filtration Treatment

Treatment	*Points*
Conventional, direct, or inline	15
Diatomaceous earth	12
Slow sand, membrane, cartridge, or bag filter	8
Backwash recycled as part of process	5

(7) The points for each treatment process utilized by the facility and not included in paragraph (6) that is used to reduce the concentration of one or more contaminants for which a primary MCL exists, pursuant to Table 64431-A, Table 64444-A, and Tables 64442 and 64443, shall be 10. Blending shall only be counted as a treatment process if one of the blended sources exceeds a primary MCL.

(8) The points for each treatment process not included in paragraphs (6), or (7) that is used to reduce the concentration of one or more contaminants for which a secondary MCL exists, pursuant to Tables 64449-A and 64449-B, shall be 3. Blending shall only be counted as a treatment process if one of the blended sources exceeds a secondary MCL.

(9) The points for each treatment process not included in paragraphs (6), (7), or (8) that is used for corrosion control or fluoridation shall be 3.

(10) The total points for disinfection treatment shall be the sum of the points for those treatment processes utilized by the facility for compliance with section 64654(a), pursuant to Table 64413.1-H.

Table 64413.1-H.
Points for Disinfection Treatment

Treatment Process	*Points*
Ozone	10
Chlorine and/or chloramine	10
Chlorine dioxide	10
Ultraviolet (UV)	7

(11) The points for disinfection/oxidation treatment not included in paragraphs (6), (7), (8), or (10) shall be a sum of the points for all the treatment processes used at the facility pursuant to Table 64413.1-I.

Table 64413.1-I.
Points for Disinfection/Oxidation Treatment without Inactivation Credit

Treatment Process	*Points*
Ozone	5
Chlorine and/or chloramine	5
Chlorine dioxide	5
Ultraviolet (UV)	3
Other oxidants	5

(12) The points for any other treatment process that alters the physical or chemical characteristics of the drinking water and that was not included in paragraphs (6), (7), (8), (9), (10), or (11) shall be 3.

(13) The points for facility flow shall be 2 per million gallons per day or fraction thereof of maximum permitted treatment facility capacity, up to a maximum of 50 points; except that for facilities utilizing only blending, the points shall be based on the flow from the contaminated source and the dilution flow required to meet the MCL(s) specified in Tables 64431-A, 64444-A, 64449-A, 64449-B, and Tables 64442 and 64443.

§64413.3. Classification of Distribution Systems.

(a) The distribution system for each community and nontransient- noncommunity water system shall be classified pursuant to Table 64413.3-A unless modified pursuant to subsection(b). For a wholesaler, the population served shall include the customers served by its retailers.

Table 64413.3-A.
Distribution System Classifications

Population Served	*Class*
1,000 or less	D1
1,001 through 10,000	D2
10,001 through 50,000	D3
50,001 through 5 million	D4
Greater than 5 million	D5

(b) The class determined pursuant to (a) shall be upgraded by one level if the population served is 5 million or less and the sum of all the points from paragraphs (1) through (6) exceeds 20.

(1) The points for pressure zones shall be zero for up to three zones, 4 for four to ten zones, or 6 for more than ten zones.

(2) The points for disinfectants used shall be zero if no disinfectant is applied in the distribution system and no more than one type of disinfectant residual is entering the distribution system. The points shall be 5 if a single disinfectant or ammonia is applied in the distribution system. The points shall be 8 if there are multiple disinfectants in the system.

(3) The points based on the largest single pump in the system for which the distribution operator is responsible shall be 4 for up to fifty horsepower, or 6 for fifty or more horsepower.

(4) The points for distribution storage reservoirs in the system shall be 4 for one to five reservoirs, or 6 for greater than five.

(5) The points for one or more existing uncovered distribution reservoirs shall be 10.

(6) The points to be added if any of the distribution system customers are also served by a non-potable water distribution system shall be 6. This does not apply to wholesalers if the only customers receiving non-potable water are served by its retailers.

§64413.5. Treatment Facility Staff Certification Requirements.

(a) Each water supplier shall designate at least one chief operator that meets the requirements specified in §63765 for each water treatment facility utilized by the water system.

(b) Each water supplier shall designate at least one shift operator that meets the requirements specified in §63765 for each water treatment facility utilized by the water system for each operating shift.

(c) Except as provided in (d), a chief operator or shift operator shall be on-site at all times that the facility is operating.

(d) If the water supplier's operations plan, submitted and approved pursuant to §64661, demonstrates an equal degree of operational oversight and reliability with either unmanned operation or operation under reduced operator certification requirements, the chief operator or shift operator is not required to be on-site, but shall be able to be contacted within one hour.

(e) If there is no change in the treatment facility and the employed shift and/or chief operators, the water supplier shall be in compliance until January 1, 2003 with the shift and operator certification requirements that were in effect on December 31, 2000. If the water system employs a new shift and/or chief operator, that operator shall meet the certification requirements pursuant to §63765(a).

§64413.7. Distribution System Staff Certification Requirements.

(a) Each water supplier shall designate at least one chief operator that meets the requirements specified in §63770 for each distribution system utilized by the water system.

(b) Each water supplier shall designate at least one shift operator that meets the requirements specified in §63770 for each distribution system utilized by the water system for each operating shift.

(c) The chief operator or shift operator shall be on-site or able to be contacted within one hour.

§64414. Standby Sources.

(a) A source which has been designated "standby" shall be monitored a minimum of once every compliance cycle for all inorganic, organic, and radiological MCLs, unless a waiver has been granted by the State Board pursuant to Section 64432(m) or (n) for inorganics, Section 64432.2(c) for asbestos, or Section 64445(d) for organics.

(b) A standby source which has previous monitoring results indicating nitrate or nitrite levels equal to or greater than 50 percent of the MCL shall collect and analyze a sample for nitrate and nitrite annually. In addition, upon activation of such a source, a sample shall be collected, analyzed for these chemicals and the analytical results reported to the State Board within 24 hours of activation.

(c) A standby source shall be used only for short-term emergencies of five consecutive days or less, and for less than a total of fifteen calendar days a year.

(d) Within 3 days after the short-term emergency use of a standby source, the water supplier shall notify the State Board. The notification shall include information on the reason for and duration of the use.

(e) The status of a designated standby source shall not be changed to that of a regular source of drinking water supply, unless the source meets all existing drinking water standards and approval is obtained from the State Board in advance.

(f) A standby source for which perchlorate has been previously detected shall have a sample collected and analyzed for perchlorate annually. Additionally, upon activation of such a source, a sample shall be collected and analyzed for perchlorate, and the analytical result shall be reported to the State Board within 48 hours of activation.

§64415. Laboratory and Personnel.

(a) Except as provided in subsection (b), required analyses shall be performed by laboratories certified by the State Board to perform such analyses pursuant to Article 3, commencing with section 100825, of Chapter 4 of Part 1 of Division 101, Health and Safety Code. Unless directed otherwise by the State Board, analyses shall be made in accordance with U.S. EPA approved methods as prescribed at 40 Code of Federal Regulations parts 141.21 through 141.42, 141.66, and 141.89.

(b) Sample collection, and field tests including color, odor, turbidity, pH, temperature, and disinfectant residual shall be performed by personnel trained to perform such sample collections and/or tests by:

(1) The State Board;

(2) A laboratory certified pursuant to subsection (a); or

(3) An operator, certified by the State Board pursuant to section 106875(a) or (b) of the Health and Safety Code and trained by an entity in paragraph (1) or (2) to perform such sample collections and/or tests.

§64416. Sampling Plan for all Monitoring Except Bacteriological.

(a) Each public water system serving contiguous areas totaling more than 10,000 service connections shall submit a plan to the State Board for monitoring the quality of water.

(1) This plan shall be supported by analytical, hydrological and geological data, and may be developed in cooperation with other agencies or water suppliers.

(2) Constituents to be addressed in the plan shall include inorganic chemicals, organic chemicals, trihalomethanes, radioactivity, general minerals and general physical parameters.

(3) Sampling of certain wells on a rotating basis may be included in the plan if the water supplier is able to demonstrate with analytical, hydrological and geological data that those wells are producing similar quality water from the same aquifer.

(4) The water supplier shall submit an updated plan to the State Board at least once every ten years or at any time the plan no longer ensures representative monitoring of the system.

Article 2.5. Point-of-Use Treatment

§64417. Definitions.

"Point-of-use treatment device" or "POU" means a treatment device applied to a single tap for the purpose of reducing contaminant levels in drinking water at that tap.

§64418. General Provisions.

(a) Except for a proposed new community water system that does not have a domestic water supply permit, a public water system that meets the requirements of Health and Safety Code section 116380(a) may be permitted to use POUs in lieu of centralized treatment for the purpose of complying with one or more maximum contaminant levels or action levels in this Title, other than for microbial contaminants, volatile organic chemicals, organic chemicals that pose an inhalation risk, or radon, and as allowed under the state and federal Safe Drinking Water Acts, if:

(1) the public water system meets the requirements of this Article and any applicable statutory requirements;

(2) the public water system has:

(A) applied for funding from any federal, state, or local agency to correct the system's violations, and

(B) demonstrated to the State Board that centralized treatment for achieving compliance is not immediately economically feasible, as defined in section 64418.1;

(3) the public water system has applied for a permit or permit amendment to use POUs. The duration of the permit or permit amendment issued will be in accordance with Health and Safety Code section 116552;

(4) for a community water system, following a public hearing, the State Board determines pursuant to section 64418.6 that there is no substantial community opposition;

(5) the public water system has a State Board-approved:

(A) POU Treatment Strategy, as defined in section 64418.3,

(B) POU Operations and Maintenance Program, as defined in section 64418.4, and

(C) POU Monitoring Program, as defined in section 64418.5; and

(6) the public water system ensures that each building and each dwelling unit connected to the public water system has a POU installed pursuant to this Article.

(b) With State Board approval and without having to meet the requirement of paragraph (a)(6), a public water system may utilize POUs in lieu of centralized treatment for the purpose of reducing contaminant levels, other than microbial contaminants, volatile organic chemicals, or radon, to levels at or below one or more of the maximum contaminant levels or action levels in this Title, in the water it supplies to some or all of the persons it serves, but the public water system will not be deemed in compliance without meeting the requirement of paragraph (a)(6). A public water system's application for a permit to utilize POUs pursuant to this subsection may include a request that one or more of the requirements of this article be amended or eliminated to address

the public water system's specific utilization, and such request may be granted or denied by the State Board.

(c) Funding for centralized treatment is available when funding for centralized treatment, from any source, is received by, or otherwise placed under control of, the public water system.

(d) As used in this article, the estimated cost for both centralized treatment and POU treatment shall be the complete life cycle cost for a similar period of time.

§64418.1. Immediate Economic Feasibility of Centralized Treatment.

(a) To specifically meet the requirements of subparagraph 64418(a)(2)(B), a community water system, when comparing the costs of centralized treatment to the use of POU treatment, shall submit to the State Board information demonstrating that the:

(1) estimated annual cost of centralized treatment, per household, is more than one percent (1%) of the median household income (MHI) of the customers served by the community water system; and

(2) (A) if the community's annual MHI is equal to or less than the statewide annual MHI, the estimated annual cost of centralized treatment, per household, plus the median annual water bill from the most recent 12 months per household is more than 1.5 percent (1.5%) of the annual MHI of the customers served by the community water system, or

(B) if the community's annual MHI is greater than the statewide annual MHI, the estimated annual cost of centralized treatment, per household, plus the median annual water bill from the most recent 12 months per household is more than two percent (2%) of the annual MHI of the customers served by the community water system.

(b) A noncommunity water system shall submit to the State Board documents that demonstrate that centralized treatment is not immediately economically feasible.

§64418.2. POU Requirements.

(a) Each POU must:

(1) be independently certified in accordance with an American National Standard Institute (ANSI) standard that is applicable to the specific type of proposed POU and that adequately addresses a California drinking water standard; or

(2) be approved by the State Board upon determination that the proposed POU unit design, construction, treatment performance, and field or pilot test results can reliably produce water in compliance with California drinking water standards under local expected influent water quality and flow conditions;

(3) be owned, controlled, operated, and maintained by the public water system and/or a person(s) under contract with the public water system, to ensure proper operation, maintenance, monitoring, and compliance with this Article and applicable drinking water standards;

(4) be equipped with a mechanical warning (e.g. alarm, light, etc.) that alerts users when a unit needs maintenance or is no longer operating in a manner that assures the unit is producing effluent meeting state and federal drinking water standards, unless the device is equipped with an automatic shut-off mechanism that prevents the flow of water under such circumstances; and

(5) be equipped with a totalizing flow meter if:

(A) the POU's treatment efficiency or capacity is volume limited; or

(B) if requested by the State Board following a determination that information about the quantity of water treated by the POU is necessary to assess POU efficiency.

(b) Except as provided in subsection (c), pilot testing shall be performed by the public water system, and/or a person(s) under contract with the public water system, on each proposed type of POU to establish its use limitations and operations and maintenance criteria, as well as verification that it will produce effluent that meets drinking water standards under local expected influent water quality and flow conditions. Pilot testing shall include the following steps:

(1) Prior to performing pilot testing, a pilot testing protocol shall be submitted to the State Board for review. The pilot testing protocol must be adequate to demonstrate that water treated by the POU will meet drinking water standards;

(2) Pilot testing for a POU shall be conducted in the manner and for the time period specified by the most current pilot testing protocol for that POU approved under section 64418.2(b)(1), and shall be conducted for no less than two months; and

(3) After completion of the pilot testing, the public water system shall submit a report to the State Board describing the results and findings of the pilot testing.

(c) The State Board may exempt a public water system from the pilot testing requirements in section 64418.2(b), or permit a reduced level of pilot testing required pursuant to subsection (b), if:

(1) the public water system demonstrates to the State Board that the POUs proposed for use have been tested, by the public water system or another person, under equivalent water quality and flow conditions; and

(2) the limitations, criteria, and effluent verification in subsection (b) can be ascertained and have been reported to the State Board.

§64418.3. POU Treatment Strategy.

(a) Prior to installing POUs, and as part of its permit application to use POU in lieu of centralized treatment, a public water system shall submit to the State Board a POU Treatment Strategy sufficient to reliably reduce levels of the contaminants listed in section 64418(a) and comply with drinking water standards. The POU Treatment Strategy shall include the following:

(1) A description of the compliance issues for which POUs are being proposed to address and how the use of POUs will achieve compliance;

(2) A description of how the public water system will determine the type, number, and location of POUs to ensure a sufficient number of devices are installed for human consumption at each building and each dwelling unit connected to the public water system;

(3) The public water system's authority to require customers to accept POUs in lieu of centralized treatment and to take an action, such as discontinuing service, if a customer fails to accept POUs;

(4) The basis for the POU selection(s);

(5) The qualifications and identification of the person(s) responsible for POU installation, operation, maintenance, and water quality sampling and analyses;

(6) A Customer Education Program that includes information about the POU, how the devices work, required maintenance and monitoring, and the need for the person(s) responsible for the POU, as defined in paragraph (a)(5) of this section, to have access to the device to perform required maintenance and monitoring. The Customer Education Program shall be designed to reach all customers and shall be implemented prior to and following installation of POUs;

(7) The authority, ordinances, and/or access agreements adequate to allow the public water system's representatives access to customers' premises for POU installation, maintenance, and water quality monitoring, as well as the surveys necessary to meet paragraph (a)(2);

(8) Identification of applicable local regulatory requirements;

(9) A Consumer Notification Protocol designed to timely inform consumers, in the appropriate language(s), in the event that an installed POU fails to produce water that meets drinking water standards. The Consumer Notification Protocol shall include:

(A) an example of a notice that includes the requirements of Article 18 of this Title, and

(B) a plan for providing an alternative water supply that meets drinking water standards, consistent with section 64551.100 of this Title, in a quantity sufficient for daily household ingestion needs, to customers served by each installed POU not meeting drinking water standards. An alternative water supply shall be provided according to the following timeline;

1. as soon as possible, but no later than 24 hours following the receipt of results of confirmation samples indicating an MCL exceedance for nitrate, nitrite, nitrate plus nitrite, or perchlorate, or

2. as soon as possible, but no later than 7 days following the receipt of results of confirmation samples indicating an MCL exceedance for contaminants other than nitrate, nitrite, nitrate plus nitrite, or perchlorate;

(10) A Customer Notification Protocol for routine notifications that includes examples of notices, to be provided no less frequently than quarterly, in the appropriate language(s) to inform each customer and consumer:

(A) that only the taps for which POUs are installed provide water meeting drinking water standards, and

(B) regarding the mechanical warning or shut-off mechanism required pursuant to paragraph 64418.2(a)(5), including a telephone number that connects the customer or consumer to water system personnel or recording system that shall be accessible by water system personnel 24 hours a day, seven days a week, for the purpose of providing the customer or consumer a reliable means of notifying personnel when the mechanical warning or shut-off mechanism is activated;

(11) The proposed schedules for:

(A) the distribution of public hearing information pursuant to section 64418.6,

(B) the public hearing required pursuant to section 64418.6,

(C) the distribution to customers of POU acceptance surveys pursuant to section 64418.6,

(D) POU installation, and

(E) the construction of centralized treatment; and

(12) An estimate of the percent of all customers within the public water system's service area who are expected to voluntarily allow installation of POU devices, as well as a description of how the public water system will address customers who do not.

(b) A public water system shall comply with the most current State Board-approved version of its POU Treatment Strategy at all times.

§64418.4. POU Operations and Maintenance (O&M) Program.

(a) Prior to installing POUs, and as part of its permit application to use POU in lieu of centralized treatment, a public water system shall submit to the State Board a POU Operations and Maintenance Program (O&M Program) sufficient to reliably reduce levels of the contaminants listed in section 64418(a) and comply with drinking water standards. The O&M Program shall include the following:

(1) An installation protocol that, at a minimum, describes locations and assurances that POUs will be accessible for operation and maintenance;

(2) The type and frequency of maintenance, at intervals specified by the manufacturer and determined by pilot testing, whichever is shorter, that ensures POUs produce effluent that meets drinking water standards;

(3) The number and type of auxiliary POUs and parts necessary to ensure continuous effective treatment;

(4) Replacement schedules for critical components and POUs necessary to ensure continuous effective treatment;

(5) The qualifications and identification of the person(s) responsible for POU installation, operation, and maintenance; and

(6) POU waste-handling and disposal procedures sufficient to ensure that wastes generated by the POU and the POU itself are properly and safely disposed of in accordance with federal, state and local requirements.

(b) To ensure a POU is properly operating and has not been bypassed, POUs shall be inspected by the public water system no less often than every twelve months and when a POU's effluent is monitored pursuant to section 64418.5.

(c) Based on the on-going operation and maintenance of installed POUs, a public water system shall revise its POU O&M Program as necessary to ensure continuous effective treatment and that POUs produce effluent that meets drinking water standards. Revised POU O&M Programs shall be submitted to the State Board for review and may not be implemented without State Board approval, confirming that the revised POU O&M Program meets the requirements of this section.

(d) A public water system shall maintain a copy of, and at all times implement the most current State Board-approved version of its POU O&M Program.

§64418.5. POU Monitoring Program.

(a) Prior to installing POUs, and as part of its permit application to use POU in lieu of centralized treatment, a public water system shall submit to the State Board a POU Monitoring Program sufficient to ensure that water treated by the proposed POU consistently meet drinking water standards. The POU Monitoring Program shall include the following:

(1) source water monitoring – quarterly, with samples collected during the same month (first, second, or third) of each calendar quarter;

(2) POU effluent – initially, with samples collected as soon as possible but no later than 72 hours after a device is installed; and

(3) POU effluent – on-going following the monitoring in paragraph (a)(2), annually, with one twelfth of all units sampled monthly on a rotating basis. After completion of one year of monitoring, a public water system may alternatively monitor one quarter of all units each calendar quarter provided that monitoring results do not exceed 75 percent (75%) of a contaminant's MCL, and the water system submits a revised monitoring plan to the State Board. Water systems shall resume monthly monitoring if results exceed 75 percent (75%) of a contaminant's MCL.

(b) For a contaminant other than nitrate, nitrite, nitrate plus nitrite, or perchlorate, after no less than one year of monitoring conducted pursuant to subsection (a), a public water system may reduce the number of POU units monitored to no less than one third of all installed units per year such that all installed units are monitored no less frequently than once every three years, if all the results of the on-going monitoring conducted pursuant to paragraph (a)(3) do not exceed 75 percent (75%) of a contaminant's MCL, and the public water system submits a revised monitoring plan to the State Board.

(c) In accordance with subsections 64432.8(b) and 64445.2(b) of this Title, the State Board may require additional monitoring for the contaminant of concern or other contaminants, including microbial contaminants, if monitoring results indicate a potential

health risk associated with the contaminant, POU technology, or a public water system's compliance with this Article.

(d) The public water system shall revise its POU Monitoring Program as necessary to ensure continuous effective treatment based on the on-going operation and maintenance of installed POUs or additional monitoring required pursuant to subsection (c). Revised POU Monitoring Programs shall be submitted to the State Board for review and may not be implemented without State Board approval confirming that the revised POU Monitoring Program meets the requirements of this section.

(e) The public water system shall maintain a copy of and implement the most current State Board-approved version of its POU Monitoring Program prepared pursuant to this section.

(f) If a POU effluent sample result exceeds an MCL for a contaminant other than nitrate, nitrite, nitrate plus nitrite, or perchlorate, the public water system shall:

(1) implement the public notification and alternative water procedures identified in its most recent State Board-approved POU Treatment Strategy; and

(2) collect a confirmation sample within seven days of notification of the exceedance. If the confirmation sample, or the average of the original and confirmation sample, exceeds the MCL, notify the State Board within 48 hours of the result, complete corrective actions as soon as possible but within one month of receipt of the result, and increase the monitoring frequency, as requested by the State Board to assess the effectiveness of the corrective actions.

(g) If a POU effluent sample result exceeds an MCL for nitrate, nitrite, nitrate plus nitrite, or perchlorate:

(1) implement the public notification and alternative water procedures identified in its most recent State Board-approved POU Treatment Strategy; and

(2) collect a confirmation sample within 72 hours of notification of the exceedance. If the confirmation sample, or the average of the original and confirmation sample, exceeds the MCL, notify the State Board within 24 hours of the result, continue to provide alternative water until the corrective actions have been confirmed to be effective, complete corrective actions as soon as possible but within one month of receipt of the result, and increase the monitoring frequency, as requested by the State Board to assess the effectiveness of the corrective actions.

§64418.6. Public Hearing and Acceptance.

(a) A community water system shall conduct a customer survey and participate in, and provide information for, a public hearing held by the State Board. At least 30 days prior to placing information into a public repository per paragraph (a)(2), the public water system shall submit a Public Acceptance Protocol to the State Board for review. The

Public Acceptance Protocol must satisfy the following requirements in order to receive State Board approval:

(1) Prior to conducting a customer survey, a community water system shall participate in and provide information for a public hearing that, at a minimum, disseminates the following to those in its service area:

(A) a description of the public water system's POU Treatment Strategy,

(B) a description of the adverse health effects, as specified in the appendices to section 64465, associated with the contaminant(s) of concern,

(C) a copy of those portions of the POU Operation and Maintenance Program and Monitoring Program that necessitates customer involvement,

(D) the estimate of any anticipated increase in water bills that may result from utilization of POUs, and

(E) the supporting documentation, assumptions, and calculations used to determine any anticipated increase in water bills proposed to be presented at the public hearing.

(2) At least 30 days prior to the public hearing, the community water system shall place the information to be presented at the public hearing into a publicly accessible repository and notify the State Board and those in its service area of the date, time, and location of the public hearing, as well as the location and hours of operation of the repository. If the public water system serves multi-unit residential dwellings including, but not limited to, apartments and residential institutions, whether sub-metered or not, the public water system shall provide notice to each resident of such residential dwellings.

(3) Following the public hearing, the community water system shall deliver a survey to each of its customers. The survey shall be delivered in a manner designed to reach each customer and in the language appropriate for communication with the customers. The survey shall consist of the following two choices:

(A) "I vote FOR the use of Point-of-Use treatment devices.", and

(B) "I vote AGAINST the use of Point-of-Use treatment devices."

(b) The community water system shall at all times comply with the most recent Public Acceptance Protocol approved by the State Board pursuant to this section.

(c) Use of POU treatment devices in lieu of centralized treatment shall be considered to have no substantial community opposition if:

(1) the sum of the number of non-voting customers and the number of customers voting against POUs, is less than half of the total customers; and

(2) no more than 25 percent of the total number of customers voted against POUs.

§64418.7. Recordkeeping and Reporting.

(a) A public water system shall maintain the following records for at least ten years and provide the records to the State Board, as specified in subsection (b) or upon request:

(1) results of all water quality monitoring conducted pursuant to this Article;

(2) the location and type of each installed POU;

(3) the date and type of maintenance and repairs performed; and
(4) verbal and written customer complaints received and the resulting corrective actions and/or responses.

(b) A public water system shall report to the State Board, at the frequency noted, the following:
(1) monthly – treated water quality monitoring results;
(2) quarterly – source water monitoring results and any investigations and/or corrective action(s) taken to ensure POUs meet the requirements of this Article including, but not limited to, POU maintenance, customer complaints, inspection results, and manufacturer notices pertaining to proper operation of devices.

(c) The reports required pursuant to subsection (b) shall be submitted to the State Board within ten days following the end of the applicable reporting period.

§64418.8. Compliance.
(a) A public water system using POUs in lieu of centralized treatment shall be in violation of an MCL if:
(1) for all POUs combined, during a 12-month interval, more than five percent (5%) of the results of the effluent monitoring conducted pursuant to section 64418.5 exceed an MCL;
(2) for a POU, the effluent fails to meet the MCL, which is determined in accordance with the applicable compliance determination requirements in this Title. Depending on the contaminant and concentration detected, compliance determination may be based on the result of a single sample, an initial sample averaged with one or two confirmation sample(s), or an average of four quarterly or six monthly samples; or
(3) a building or dwelling unit served by the water system does not have a POU installed pursuant to this Article.

Article 2.7. Point-of-Entry Treatment

§64419. Definitions.
"Point-of-entry treatment device" or "POE" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminant levels in the drinking water distributed throughout the house or building. Notwithstanding the foregoing, where all the water supplied by a public water system for human consumption is treated by the public water system via a single device or facility, regardless of location of the device or facility, the public water system shall be considered to have centralized treatment.

§64420. General Provisions.
(a) Except for a proposed new community water system that does not have a domestic water supply permit, a public water systems that meets the requirements of Health and Safety Code section 116380(a) may be permitted to use POEs in lieu of centralized

treatment for the purpose of complying with one or more maximum contaminant levels, action levels, or treatment techniques in this Title and as allowed under the state and federal State Drinking Water Acts, if:

(1) the public water system meets the requirements of this Article and any applicable statutory requirements;

(2) the public water system has:

(A) applied for funding from any federal, state, or local agency to correct the system's violations, and

(B) demonstrated to the State Board that centralized treatment for achieving compliance is not immediately economically feasible, as defined in section 64420.1;

(3) the public water system has applied for a permit or permit amendment to use POEs. The duration of the permit or permit amendment issued will be in accordance with Health and Safety Code section 116552;

(4) for a community water system, following a public hearing, the State Board determines pursuant to section 64420.6 that there is no substantial community opposition;

(5) the public water system has a State Board-approved:

(A) POE Treatment Strategy, as defined in section 64420.3,

(B) POE Operations and Maintenance Program, as defined in section 64420.4, and

(C) POE Monitoring Program, as defined in section 64420.5; and

(6) the public water system ensures that each building connected to the public water system has a POE installed pursuant to this Article.

(b) With State Board approval and without having to meet the requirement of paragraph (a)(6), a public water system may utilize POEs in lieu of centralized treatment for the purpose of reducing contaminant levels to levels at or below one or more of the maximum contaminant levels, action levels, or treatment techniques in this Title, in the water it supplies to some or all of the persons it serves, but the public water system will not be deemed in compliance without meeting the requirement of paragraph (a)(6). A public water system's application for a permit to utilize POEs pursuant to this subsection may include a request that one or more of the requirements of this article be amended or eliminated to address the public water system's specific utilization, and such request may be granted or denied by the State Board.

(c) Funding for centralized treatment is available when funding for centralized treatment, from any source, is received by, or otherwise placed under control of, the public water system.

(d) As used in this article, the estimated cost for both centralized treatment and POE treatment shall be the complete life cycle cost for a similar period of time.

§64420.1. Immediate Economic Feasibility of Centralized Treatment.

(a) To specifically meet the requirements of subparagraph 64420 (a)(2)(B), a community water system, when comparing the costs of centralized treatment to the use of POE treatment, shall submit to the State Board information demonstrating that the:

(1) estimated annual cost of centralized treatment, per household, is more than one percent (1%) of the median household income (MHI) of the customers served by the community water system; and

(2) (A) if the community's annual MHI is equal to or less than the statewide annual MHI, the estimated annual cost of centralized treatment, per household, plus the median annual water bill from the most recent 12 months per household is more than 1.5 percent (1.5%) of the annual MHI of the customers served by the community water system, or

(B) if the community's annual MHI is greater than the statewide annual MHI, the estimated annual cost of centralized treatment, per household, plus the median annual water bill from the most recent 12 months per household is more than two percent (2%) of the annual MHI of the customers served by the community water system.

(b) A noncommunity water system shall submit to the State Board documents that demonstrate that centralized treatment is not immediately economically feasible.

§64420.2. POE Requirements.

(a) Each POE must:

(1) be independently certified in accordance with an American National Standard Institute (ANSI) standard that is applicable to the specific type of proposed POE and that adequately addresses a California drinking water standard; or

(2) be approved by the State Board upon determination that the proposed POE unit design, construction, treatment performance, and available field or pilot test results can reliably produce water in compliance with California drinking water standards under local expected influent water quality and flow conditions;

(3) be owned, controlled, operated, and maintained by the public water system and/or a person(s) under contract with the public water system, to ensure proper operation, maintenance, monitoring, and compliance with this Article and applicable drinking water standards;

(4) be equipped with a mechanical warning (e.g. alarm, light, etc.) that alerts users when a unit needs maintenance or is no longer operating in a manner that assures the unit is producing effluent meeting state and federal drinking water standards, unless the device is equipped with an automatic shut-off mechanism that prevents the flow of water under such circumstances; and

(5) be equipped with a totalizing flow meter.

(b) Except as provided in subsection (c), pilot testing shall be performed by the public water system, and/or a person(s) under contract with the public water system, on each proposed type of POE to establish its use limitations and operations and maintenance

criteria, as well as verification that it will produce effluent that meets drinking water standards under local expected influent water quality and flow conditions. Pilot testing shall include the following steps:

(1) Prior to performing pilot testing, a pilot testing protocol shall be submitted to the State Board for review. The pilot testing protocol must be adequate to demonstrate that water treated by the POE will meet drinking water standards;

(2) Pilot testing for a POE shall be conducted in the manner and for the time period specified by the most current pilot testing protocol for that POE approved under section 64420.2(b)(1), and shall be conducted for no less than two months; and

(3) After completion of the pilot testing, the public water system shall submit a report to the State Board describing the results and findings of the pilot testing.

(c)The State Board may exempt a public water system from the pilot testing requirements in section 64420.2(b), or permit a reduced level of pilot testing required pursuant to subsection (b), if:

(1) the public water system demonstrates to the State Board that the POEs proposed for use have been tested, by the public water system or another person, under equivalent water quality and flow conditions; and

(2) the limitations, criteria, and effluent verification in subsection (b) can be ascertained and have been reported to the State Board.

§64420.3. POE Treatment Strategy.

(a) Prior to installing POEs, and as part of its permit application to use POE in lieu of centralized treatment, a public water system shall submit to the State Board a POE Treatment Strategy sufficient to reliably reduce levels of contaminants and comply with drinking water standards. The POE Treatment Strategy shall include each of the following:

(1) A description of the compliance issues for which POEs are being proposed to address and how the use of POEs will achieve compliance;

(2) A description of how the public water system will determine the type, number, and location of POEs to ensure POEs serve, in their entirety, each building connected to the public water system;

(3) The public water system's authority to require customers to accept POEs in lieu of centralized treatment and to take an action, such as discontinuing service, if a customer fails to accept POEs, or disconnects or modifies a POE installed pursuant to this Article;

(4) The basis for the POE selection(s);

(5) The qualifications and identification of the person(s) responsible for POE installation, operation, maintenance, and water quality sampling and analyses;

(6) A Customer Education Program that includes information about the POE, how the devices work, required maintenance and monitoring, and the need for the person(s) responsible for the POE, as defined in paragraph (a)(5) of this section, to have access to the device to perform required maintenance and monitoring. The Customer Education

Program shall be designed to reach all customers and shall be implemented prior to and following installation of POEs;

(7) The authority, ordinances, and/or access agreements adequate to allow the public water system's representatives access to customers' premises for POE installation, maintenance, and water quality monitoring, as well as the surveys necessary to meet paragraph (a)(2);

(8) Identification of applicable local regulatory requirements;

(9) A Consumer Notification Protocol designed to timely inform consumers, in the appropriate language(s), in the event that an installed POE fails to produce water that meets drinking water standards. The Consumer Notification Protocol shall include:

(A) an example of a notice that includes the requirements of Article 18 of this Title, and

(B) a plan for providing an alternative water supply that meets drinking water standards, consistent with section 64551.100 of this Title, in a quantity sufficient for daily household ingestion needs, to customers served by each installed POE not meeting drinking water standards. An alternative water supply shall be provided according to the following timeline;

1. as soon as possible, but no later than 24 hours following the receipt of results of confirmation samples indicating an MCL exceedance for nitrate, nitrite, nitrate plus nitrite, or perchlorate, or

2. as soon as possible, but no later than 7 days following the receipt of results of confirmation samples indicating an MCL exceedance for contaminants other than nitrate, nitrite, nitrate plus nitrite, or perchlorate;

(10) A Customer Notification Protocol for routine notifications that includes examples of notices, to be provided no less frequently than quarterly, in the appropriate language(s) to inform each customer:

(A) which water supplies are not treated by the POEs, and

(B) regarding the mechanical warning or shut-off mechanism required pursuant to paragraph 64420.2(a)(5), including a telephone number that connects the customer to water system personnel or recording system that shall be accessible by water system personnel 24 hours a day, seven days a week, for the purpose of providing the customer a reliable means of notifying personnel when the mechanical warning or shut-off mechanism is activated;

(11) The proposed schedules for:

(A) the distribution of public hearing information pursuant to section 64420.6,

(B) the public hearing required pursuant to section 64420.6,

(C) the distribution to customers of POE acceptance surveys pursuant to section 64420.6,

(D) POE installation, and

(E) the construction of centralized treatment;

(12) An estimate of the percent of all customers within the public water system's service area who are expected to voluntarily allow installation of POE devices, as well as a description of how the public water system will address customers who do not; and

(13) The means for ensuring that the rights and responsibilities of the customer, with respect to an installed POE, convey with title upon the sale or transfer of property to which the POE is attached.

(b) A public water system shall comply with the most current State Board-approved version of its POE Treatment Strategy at all times.

§64420.4. POE Operations and Maintenance (O&M) Program.

(a) Prior to installing POEs, and as part of its permit application to use POE in lieu of centralized treatment, a public water system shall submit to the State Board a POE Operations and Maintenance (O&M) Program sufficient to reliably reduce levels of contaminants and comply with drinking water standards. The POE O&M Program shall include the following:

(1) An installation protocol that, at a minimum, describes locations and assurances that POEs will be accessible for operation and maintenance;

(2) The type and frequency of maintenance, at intervals specified by the manufacturer and determined by pilot testing, whichever is shorter, that ensures POEs produce effluent that meets drinking water standards;

(3) The number and type of auxiliary POEs and parts necessary to ensure continuous effective treatment;

(4) Replacement schedules for critical components and POEs necessary to ensure continuous effective treatment;

(5) The qualifications and identification of the person(s) responsible for POE installation, operation, and maintenance; and

(6) POE waste-handling and disposal procedures sufficient to ensure that wastes generated by the POE and the POE itself are properly and safely disposed of in accordance with federal, state and local requirements.

(b) To ensure a POE is properly operating and has not been bypassed, POEs shall be inspected by the public water system no less often than every twelve months and when a POE's effluent is monitored pursuant to section 64420.5.

(c) Based on the on-going operation and maintenance of installed POEs, a public water system shall revise its POE O&M Program as necessary to ensure continuous effective treatment and that POEs produce effluent that meets drinking water standards. Revised POE O&M Programs shall be submitted to the State Board for review and may not be implemented without State Board approval confirming that the revised POE O&M Program meets the requirements of this section.

(d) A public water system shall maintain a copy of and implement the most current State Board-approved version of its POE O&M Program.

§64420.5. POE Monitoring Program.

(a) Prior to installing POEs, and as part of its permit application to use POE in lieu of centralized treatment, a public water system shall submit to the State Board a POE Monitoring Program sufficient to ensure that water treated by the proposed POE consistently meet drinking water standards. The POE Monitoring Program shall include the following:

(1) source water monitoring – quarterly, with samples collected during the same month (first, second, or third) of each calendar quarter;

(2) POE effluent – initially, with samples collected as soon as possible but no later than 72 hours after a device is installed; and

(3) POE effluent, on-going following the monitoring in paragraph (a)(2), annually, with one twelfth of all units sampled monthly on a rotating basis. After completion of one year of monitoring, a public water system may alternatively monitor one quarter of all units each calendar quarter provided that monitoring results do not exceed 75 percent (75%) of a contaminant's MCL, and the water system submits a revised monitoring plan to the State Board. Water systems shall resume monthly monitoring if results exceed 75 percent (75%) of a contaminant's MCL.

(b) For a contaminant other than nitrate, nitrite, nitrate plus nitrite, or perchlorate, after no less than one year of monitoring conducted pursuant to subsection (a), a public water system may reduce the number of POE units monitored to no fewer than one third of all installed units per year such that all installed devices are sampled no less frequently than once every three years, if all the results of the on-going monitoring conducted pursuant to paragraph (a)(3) do not exceed 75 percent (75%) of a contaminant's MCL, and the public water system submits a revised monitoring plan to the State Board.

(c) The State Board may require additional monitoring for the contaminant of concern or other contaminants, including microbial contaminants, if monitoring results indicate a potential health risk associated with the contaminant, POE technology, or a public water system's compliance with this Article.

(d) The public water system shall revise its POE Monitoring Program as necessary to ensure continuous effective treatment based on the on-going operation and maintenance of installed POEs or additional monitoring required pursuant to subsection (c). Revised POE Monitoring Programs shall be submitted to the State Board for review and may not be implemented without State Board approval confirming that the revised POE Monitoring Program meets the requirements of this section.

(e) The public water system shall maintain a copy of and implement the most current State Board-approved version of its POE Monitoring Program prepared pursuant to this section.

(f) If a POE effluent sample result exceeds an MCL for a contaminant other than nitrate, nitrite, nitrate plus nitrite, or perchlorate, the public water system shall:

(1) implement the public notification and alternative water procedures identified in its most current State Board-approved POE Treatment Strategy; and

(2) collect a confirmation sample within seven days of notification of the exceedance. If the confirmation sample, or the average of the original and confirmation sample, exceeds the MCL, notify the State Board within 48 hours of the result, complete corrective actions as soon as possible but within one month of receipt of the result, and increase the monitoring frequency, as requested by the State Board to assess the effectiveness of the corrective actions.

(g) If a POE effluent sample result exceeds an MCL for nitrate, nitrite, nitrate plus nitrite, or perchlorate;

(1) implement the public notification and alternative water procedures identified in its most current State Board-approved POE Treatment Strategy; and

(2) collect a confirmation sample within 72 hours of notification of the exceedance. If the confirmation sample, or the average of the original and confirmation sample, exceeds the MCL, notify the State Board within 24 hours of the result, continue to provide alternative water until the corrective actions have been confirmed to be effective, complete corrective actions as soon as possible but within one month of receipt of the result, and increase the monitoring frequency as requested by the State Board to assess the effectiveness of the corrective actions.

§64420.6. Public Hearing and Acceptance.

(a) A community water system shall conduct a customer survey and participate in, and provide information for, a public hearing held by the State Board. At least 30 days prior to placing information into a public repository per subsection (a)(2), the public water system shall submit a Public Acceptance Protocol, to the State Board for review. The Public Acceptance Protocol must satisfy the following requirements in order to receive State Board approval:

(1) Prior to conducting a customer survey, a community water system shall participate in and provide information for a public hearing that, at a minimum, disseminates the following to those in its service area:

(A) a description of the public water system's POE Treatment Strategy,

(B) the adverse health effects, as specified in the appendices to section 64465, associated with the contaminant(s) of concern,

(C) POE Operation and Maintenance Program and Monitoring Program information that necessitates customer involvement,

(D) the estimate of any anticipated increase in water bills that may result from utilization of POEs, and

(E) the supporting documentation, assumptions, and calculations used to determine any anticipated increase in water bills proposed to be presented at the public hearing.

(2) At least 30 days prior to the public hearing, the community water system shall place the information to be presented at the public hearing into a publicly accessible repository and notify the State Board and those in its service area of the date, time, and location of the public hearing, as well as the location and hours of operation of the repository. If the public water system serves multi-unit residential dwellings including, but not limited to, apartments and residential institutions, whether sub-metered or not, the public water system shall provide notice to each resident of such residential dwellings.

(3) Following the public hearing, the community water system shall deliver a survey to each of its customers. The survey shall be delivered in a manner designed to reach each customer and in the language appropriate for communication with the customers. The survey shall consist of the following two choices:

(A) "I vote FOR the use of Point-of-Entry treatment devices.", and

(B) "I vote AGAINST the use of Point-of-Entry treatment devices."

(b) The community water system shall at all times comply with the most recent Public Acceptance Protocol approved by the State Board pursuant to this section.

(c) Use of POE treatment devices in lieu of centralized treatment shall be considered to have no substantial community opposition if:

(1) the sum of the number of non-voting customers and the number of customers voting against POEs, is less than half of the total customers; and

(2) no more than 25 percent of the total number of customers voted against POEs.

§64420.7. Recordkeeping and Reporting.

(a) A public water system shall maintain the following records for at least ten years and provide the records to the State Board, as specified in subsection (b) or upon request:

(1) results of all water quality monitoring conducted pursuant to this Article;

(2) the location and type of each installed POE;

(3) the date and type of maintenance and repairs performed; and

(4) verbal and written customer complaints received and the resulting corrective actions and/or responses.

(b) A public water system shall report to the State Board, at the frequency noted, the following:

(1) monthly – treated water quality monitoring results;

(2) quarterly – source water monitoring results and any investigations and/or corrective action(s) taken to ensure POEs meet the requirements of this Article including, but not limited to, POE maintenance, customer complaints, inspection results, and manufacturer notices pertaining to proper operation of devices.

(c) The reports required pursuant to subsection (b) shall be submitted to the State Board within ten days following the applicable reporting period.

§64420.8. Compliance.

(a) A public water system using POEs in lieu of centralized treatment shall be in violation of an MCL if:

(1) for all POEs combined, during a 12-month interval, more than five percent (5%) of the results of the effluent monitoring conducted pursuant to section 64420.5 exceed an MCL;

(2) for a POE, the effluent fails to meet the MCL, which is determined in accordance with the applicable compliance determination requirements in this Title. Depending on the contaminant and concentration detected, compliance determination may be based on the result of a single sample, an initial sample averaged with one or two confirmation sample(s), or an average of four quarterly or six monthly samples; or

(3) a building or dwelling unit served by the water system does not have a POE installed pursuant to this Article.

Article 3. Primary Standards--Bacteriological Quality

§64421. General Requirements.

(a) Each water supplier shall:

(1) Develop a routine sample siting plan as required in section 64422;

(2) Collect routine, repeat and replacement samples as required in Sections 64423, 64424, and 64425;

(3) Have all samples analyzed by laboratories approved to perform those analyses by the State Board and report results as required in section 64423.1;

(4) Notify the State Board when there is an increase in coliform bacteria in bacteriological samples as required in section 64426; and

(5) Comply with the Maximum Contaminant Level as required in section 64426.1.

(b) Water suppliers shall perform additional bacteriological monitoring as follows:

(1) After construction or repair of wells;

(2) After main installation or repair;

(3) After construction, repair, or maintenance of storage facilities; and

(4) After any system pressure loss to less than five psi. Samples collected shall represent the water quality in the affected portions of the system.

§64422. Routine Sample Siting Plan.

(a) By September 1, 1992, each water supplier shall develop and submit to the State Board a siting plan for the routine collection of samples for total coliform analysis, subject to the following:

(1) The sample sites chosen shall be representative of water throughout the distribution system including all pressure zones, and areas supplied by each water source and distribution reservoir.

(2) The water supplier may rotate sampling among the sample sites if the total number of sites needed to comply with (a)(1) above exceeds the number of samples

required according to Table 64423-A. The rotation plan shall be described in the sample siting plan.

(b) If personnel other than certified operators will be performing field tests and/or collecting samples, the sample siting plan shall include a declaration that such personnel have been trained, pursuant to Section 64415 (b).

(c) The supplier shall submit an updated plan to the State Board at least once every ten years and at any time the plan no longer ensures representative monitoring of the system.

§64423. Routine Sampling.

(a) Each water supplier shall collect routine bacteriological water samples as follows:

(1) The minimum number of samples for community water systems shall be based on the known population served or the total number of service connections, whichever results in the greater number of samples, as shown in Table 64423-A. A community water system using groundwater which serves 25-1000 persons may request from the State Board a reduction in monitoring frequency. The minimum reduced frequency shall not be less than one sample per quarter.

(2) The minimum number of samples for nontransient-noncommunity water systems shall be based on the known population served as shown in Table 64423-A during those months when the system is operating. A nontransient-noncommunity water system using groundwater which serves 25-1000 persons may request from the State Board a reduction in monitoring frequency if it has not violated the requirements in this article during the past twelve months. The minimum reduced frequency shall not be less than one sample per quarter.

(3) The minimum number of samples for transient-noncommunity water systems using groundwater and serving 1000 or fewer persons a month shall be one in each calendar quarter during which the system provides water to the public.

(4) The minimum number of samples for transient-noncommunity water systems using groundwater and serving more than 1000 persons during any month shall be based on the known population served as shown in Table 64423-A, except that the water supplier may request from the State Board a reduction in monitoring for any month the system serves 1000 persons or fewer. The minimum reduced frequency shall not be less than one sample in each calendar quarter during which the system provides water to the public.

(5) The minimum number of samples for transient-noncommunity water systems using approved surface water shall be based on the population served as shown in Table 64423-A. A system using groundwater under the direct influence of surface water shall begin monitoring at this frequency by the end of the sixth month after the State Board has designated the source to be approved surface water.

(6) A public water system shall collect samples at regular time intervals throughout the month, except that a system using groundwater which serves 4,900

persons or fewer may collect all required samples on a single day if they are taken from different sites.

(b) In addition to the minimum sampling requirements, all water suppliers using approved surface water which do not practice treatment in compliance with Sections 64650 through 64666, shall collect a minimum of one sample before or at the first service connection each day during which the turbidity level of the water delivered to the system exceeds 1 NTU. The sample shall be collected within 24 hours of the exceedance and shall be analyzed for total coliforms. If the water supplier is unable to collect and/or analyze the sample within the 24-hour time period because of extenuating circumstances beyond its control, the supplier shall notify the State Board within the 24-hour time period and may request an extension. Sample results shall be included in determining compliance with the MCL for total coliforms in Section 64426.1.

(c) If any routine, repeat, or replacement sample is total coliform-positive, then the water supplier shall collect repeat samples in accordance with Section 64424 and comply with the reporting requirements specified in Sections 64426 and 64426.1.

Table 64423-A
Minimum Number of Routine Total Coliform Samples

Monthly Population Served	*Service Connections*	*Minimum Number of Samples*
25 to 1000	15 to 400	1 per month
1,001 to 2,500	401 to 890	2 per month
2,501 to 3,300	891 to 1,180	3 per month
3,301 to 4,100	1,181 to 1,460	4 per month
4,101 to 4,900	1,461 to 1,750	5 per month
4,901 to 5,800	1,751 to 2,100	6 per month
5,801 to 6,700	2,101 to 2,400	7 per month
6,701 to 7,600	2,401 to 2,700	2 per week
7,601 to 12,900	2,701 to 4,600	3 per week
12,901 to 17,200	4,601 to 6,100	4 per week
17,201 to 21,500	6,101 to 7,700	5 per week
21,501 to 25,000	7,701 to 8,900	6 per week
25,001 to 33,000	8,901 to 11,800	8 per week
33,001 to 41,000	11,801 to 14,600	10 per week
41,001 to 50,000	14,601 to 17,900	12 per week
50,001 to 59,000	17,901 to 21,100	15 per week
59,001 to 70,000	21,101 to 25,000	18 per week
70,001 to 83,000	25,001 to 29,600	20 per week
83,001 to 96,000	29,601 to 34,300	23 per week
96,001 to 130,000	34,301 to 46,400	25 per week
130,001 to 220,000	46,401 to 78,600	30 per week
220,001 to 320,000	78,601 to 114,300	38 per week
320,001 to 450,000	114,301 to 160,700	50 per week
450,001 to 600,000	160,701 to 214,300	55 per week
600,001 to 780,000	214,301 to 278,600	60 per week
780,001 to 970,000	278,601 to 346,400	70 per week
970,001 to 1,230,000	346,401 to 439,300	75 per week
1,230,001 to 1,520,000	439,301 to 542,900	85 per week
1,520,001 to 1,850,000	542,901 to 660,700	90 per week
1,850,001 to 2,270,000	660,701 to 810,700	98 per week
2,270,001 to 3,020,000	810,701 to 1,078,600	105 per week
3,020,001 to 3,960,000	1,078,601 to 1,414,300	110 per week
3,960,001 or more	1,414,301 or more	120 per week

§64423.1. Sample Analysis and Reporting of Results.

(a) The water supplier shall designate (label) each sample as routine, repeat, replacement, or "other" pursuant to Section 64421(b), and have each sample analyzed for total coliforms. The supplier also shall require the laboratory to analyze the same sample for fecal coliforms or Escherichia coli (*E. coli*) whenever the presence of total coliforms is indicated. As a minimum, the analytical results shall be reported in terms of the presence or absence of total or fecal coliforms, or *E. coli* in the sample, whichever is appropriate.

(b) The water supplier shall require the laboratory to notify the supplier within 24 hours, whenever the presence of total coliforms, fecal coliforms or *E. coli* is demonstrated in a sample or a sample is invalidated due to interference problems, pursuant to Section 64425(b), and shall ensure that a contact person is available to receive these analytical results 24-hours a day. The water supplier shall also require the laboratory to immediately notify the State Board of any positive bacteriological results if the laboratory cannot make direct contact with the designated contact person within 24 hours.

(c) Analytical results of all required samples collected for a system in a calendar month shall be reported to the State Board not later than the tenth day of the following month, as follows:

(1) The water supplier shall submit a monthly summary of the bacteriological monitoring results to the State Board.

(2) For systems serving fewer than 10,000 service connections or 33,000 persons, the water supplier shall require the laboratory to submit copies of all required bacteriological monitoring results directly to the State Board.

(3) For systems serving more than 10,000 service connections, or 33,000 persons, the water supplier shall require the laboratory to submit copies of bacteriological monitoring results for all positive routine samples and all repeat samples directly to the State Board.

(d) Laboratory reports shall be retained by the water supplier for a period of at least five years and shall be made available to the State Board upon request.

§64424. Repeat Sampling.

(a) If a routine sample is total coliform-positive, the water supplier shall collect a repeat sample set as described in paragraph (1) within 24 hours of being notified of the positive result. The repeat samples shall all be collected within the same 24 hour time period. A single service connection system may request that the State Board allow the collection of the repeat sample set over a four-day period.

(1) For a water supplier that normally collects more than one routine sample a month, a repeat sample set shall be at least three samples for each total coliform-positive sample. For a water supplier that normally collects one or fewer samples per month, a repeat sample set shall be at least four samples for each total coliform-positive sample.

(2) If the water supplier is unable to collect the samples within the 24-hour time period specified in subsection (a) or deliver the samples to the laboratory within 24 hours after collection because of circumstances beyond its control, the water supplier shall notify the State Board within 24 hours. The State Board will then determine how much time the supplier will have to collect the repeat samples.

(b) When collecting the repeat sample set, the water supplier shall collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken. Other repeat samples shall be collected within five service connections upstream or downstream of the original site. At least one sample shall be from upstream and one from downstream unless there is no upstream and/or downstream service connection.

(c) If one or more samples in the repeat sample set is total coliform-positive, the water supplier shall collect and have analyzed an additional set of repeat samples as specified in subsections (a) and (b). The supplier shall repeat this process until either no coliforms are detected in one complete repeat sample set or the supplier determines that the MCL for total coliforms specified in Section 64426.1 has been exceeded and notifies the State Board.

(d) If a public water system for which fewer than five routine samples/month are collected has one or more total coliform-positive samples, the water supplier shall collect at least five routine samples the following month. If the supplier stops supplying water during the month after the total coliform-positive(s), at least five samples shall be collected during the first month the system resumes operation. A water supplier may request the State Board waive the requirement to collect at least five routine samples the following month, but a waiver will not be granted solely on the basis that all repeat samples are total coliform-negative. To request a waiver, one of the following conditions shall be met:

(1) The State Board conducts a site visit before the end of the next month the system provides water to the public to determine whether additional monitoring and/or corrective action is necessary to protect public health.

(2) The State Board determines why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. If a waiver is granted, a system shall collect at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with Section 64426.1.

§64425. Sample Invalidation.

(a) A water supplier may request the State Board to invalidate a sample for which a total coliform-positive result has been reported if the supplier demonstrates:

(1) All repeat sample(s) collected at the same tap as the original total coliform-positive sample also are total coliform- positive and all repeat samples collected within five service connections of the original tap are not total coliform-positive; or

(2) The laboratory did not follow the prescribed analytical methods pursuant to Section 64415(a), based on a review of laboratory documentation by the State Board. The supplier shall submit to the State Board a written request for invalidation along with the laboratory documentation, the supplier's sample collection records and any observations noted during sample collection and delivery. The water supplier shall require the laboratory to provide the supplier with documentation which shall include, but not be limited to:

(A) A letter from the director of the laboratory having generated the data, confirming the invalidation request by reason of laboratory accident or error;

(B) Complete sample identification, laboratory sample log number (if used), date and time of collection, date and time of receipt by the laboratory, date and time of analysis for the sample(s) in question;

(C) Complete description of the accident or error alleged to have invalidated the result(s);

(D) Copies of all analytical, operating, and quality assurance records pertaining to the incident in question; and

(E) Any observations noted by laboratory personnel when receiving and analyzing the sample(s) in question.

(b) Whenever any total coliform sample result indicative of the absence of total coliforms has been declared invalid by the laboratory due to interference problems as specified at 40 Code Federal Regulations, Section 141.21(c)(2), the supplier shall collect a replacement sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The supplier shall continue to re-sample at the original site within 24 hours and have the samples analyzed until a valid result is obtained.

§64426. Significant Rise in Bacterial Count.

(a) Any of the following criteria shall indicate a possible significant rise in bacterial count:

(1) A system collecting at least 40 samples per month has a total coliform-positive routine sample followed by two total coliform-positive repeat samples in the repeat sample set;

(2) A system has a sample which is positive for fecal coliform or *E. coli*; or

(3) A system fails the total coliform Maximum Contaminant Level (MCL) as defined in Section 64426.1.

(b) When the coliform levels specified in subsection (a) are reached or exceeded, the water supplier shall:

(1) Contact the State Board by the end of the day on which the system is notified of the test result or the system determines that it has exceeded the MCL, unless the notification or determination occurs after the State Board office is closed, in which case the supplier shall notify the State Board within 24 hours; and

(2) Submit to the State Board information on the current status of physical works and operating procedures which may have caused the elevated bacteriological findings, or any information on community illness suspected of being waterborne. This shall include, but not be limited to:

(A) Current operating procedures that are or could potentially be related to the increase in bacterial count;

(B) Any interruptions in the treatment process;

(C) System pressure loss to less than 5 psi;

(D) Vandalism and/or unauthorized access to facilities;

(E) Physical evidence indicating bacteriological contamination of facilities;

(F) Analytical results of any additional samples collected, including source samples;

(G) Community illness suspected of being waterborne; and

(H) Records of the investigation and any action taken.

(c) Upon receiving notification from the State Board of a significant rise in bacterial count, the water supplier shall implement the emergency notification plan required by Section 116460, Health and Safety Code.

§64426.1. Total Coliform Maximum Contaminant Level (MCL).

(a) Results of all samples collected in a calendar month pursuant to Sections 64423, 64424, and 64425 that are not invalidated by the State Board or the laboratory shall be included in determining compliance with the total coliform MCL. Special purpose samples such as those listed in section 64421(b) and samples collected by the water supplier during special investigations shall not be used to determine compliance with the total coliform MCL.

(b) A public water system is in violation of the total coliform MCL when any of the following occurs:

(1) For a public water system which collects at least 40 samples per month, more than 5.0 percent of the samples collected during any month are total coliform-positive; or

(2) For a public water system which collects fewer than 40 samples per month, more than one sample collected during any month is total coliform-positive; or

(3) Any repeat sample is fecal coliform-positive or E. coli-positive; or

(4) Any repeat sample following a fecal coliform-positive or E. coli-positive routine sample is total coliform-positive.

(c) If a public water system is not in compliance with paragraphs (b)(1) through (4), during any month in which it supplies water to the public, the water supplier shall notify the State Board by the end of the business day on which this is determined, unless the determination occurs after the State Board office is closed, in which case the supplier shall notify the State Board within 24 hours of the determination. The water supplier shall also notify the consumers served by the water system. A Tier 2 Public Notice shall be given for violations of paragraph (b)(1) or (2), pursuant to section 64463.4. A Tier 1 Public Notice shall be given for violations of paragraph (b)(3) or (4), pursuant to section 64463.1.

§64426.5. Variance from Total Coliform Maximum Contaminant Level.

A water system may apply to the State Board for a variance from the total coliform MCL in section 64426.1(b)(1) or (2). To be eligible for a variance, the water system shall demonstrate that it meets the following criteria:

(a) During the thirty days prior to application for a variance, water entering the distribution system has:

(1) Been free from fecal coliform or E. coli occurrence based on at least daily sampling;

(2) Contained less than one total coliform per hundred milliliters of water in at least ninety-five percent of all samples based on at least daily sampling;

(3) Complied with the turbidity requirements of section 64653, if approved surface water; and

(4) Maintained a continuous disinfection residual of at least 0.2 mg/L at the entry point(s) to the distribution system;

(b) The system has had no waterborne microbial disease outbreak, pursuant to section 64651.91, while operated in its present configuration;

(c) The system maintains contact at least twice a week with the State Board and local health departments to assess illness possibly attributable to microbial occurrence in the public drinking water system;

(d) The system has analyzed, on a monthly basis, at least the number of samples required pursuant to the approved sample siting plan and has not had an E. coli-positive

compliance sample within the last six months, unless the system demonstrates to the State Board that the occurrence is not due to contamination entering the distribution system;

(e) The system has undergone a sanitary survey conducted by the State Board within the past twelve months;

(f) The system maintains a cross-connection control program in accordance with sections 7583 through 7605, title 17 of the California Code of Regulations;

(g) The system agrees to submit a biofilm control plan to the State Board within twelve months of the granting of the first request for a variance;

(h) The system monitors general distribution system bacterial quality by conducting heterotrophic bacteria plate counts on at least a weekly basis at a minimum of ten percent of the number of total coliform sites specified in the approved sample siting plan (preferably using the methods in section 9215(a), 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, American Public Health Association, et. al); and

(i) The system conducts daily monitoring at distribution system total coliform monitoring sites approved by the State Board and maintains a detectable disinfectant residual at a minimum of ninety-five percent of those points and a heterotrophic plate count of less than 500 colonies per mL at sites without a disinfectant residual.

(j) No water system shall be eligible for a variance or exemption from the MCL for total coliforms unless it demonstrates that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system pursuant to section 64426.5, rather than to fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system.

§64427. Sanitary Survey.

Systems which collect less than five routine samples per month shall be subject to an initial sanitary survey by the Department by June 29, 1994 for community water systems and June 29, 1999 for nontransient-noncommunity and transient-noncommunity water systems. Sanitary surveys shall be repeated every five years.

Article 3.5. Ground Water Rule

§64430. Requirements.

A public water system that uses ground water shall comply with the following provisions of 40 Code of Federal Regulations as they appear in the Ground Water Rule published in 71 Federal Register 65574 (November 8, 2006) and amended in 71 Federal Register 67427 (November 21, 2006) and 74 Federal Register 30953 (June 29, 2009), which are hereby incorporated by reference: Sections 141.21(d)(3), 141.28(a), 141.153(h)(6),

Appendix A to Subpart O (Consumer Confidence Reports), 141.202(a)(8), 141.203(a)(4), Appendices A and B to Subpart Q (Public Notification), and 141.400 through 141.405, except that in:

(a) sections 141.402(a)(1)(ii), (a)(2), (a)(2)(ii), (a)(4), (a)(4)(ii)(A), (a)(5)(i), and (a)(5)(ii), the phrase "§141.21(a)" is replaced by "22 California Code of Regulations sections 64422 and 64423",

(b) sections 141.402(a)(1)(ii) and 141.405(b)(4), the phrase "§141.21(c)" is replaced by "22 California Code of Regulations section 64425", and

(c) section 141.402(a)(2)(iii), the phrase "§141.21(b)" is replaced by "22 California Code of Regulations section 64424".

[Note: The text reflecting the above section is provided in Addendum A of this book.]

Article 4. Primary Standards--Inorganic Chemicals

§64431. Maximum Contaminant Levels--Inorganic Chemicals.

Public water systems shall comply with the primary MCLs in table 64431-A as specified in this article.

Table 64431-A
Maximum Contaminant Levels
Inorganic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
Aluminum	1.
Antimony	0.006
Arsenic	0.010
Asbestos	7 MFL*
Barium	1.
Beryllium	0.004
Cadmium	0.005
Chromium	0.05
Cyanide	0.15
Fluoride	2.0
Mercury	0.002
Nickel	0.1
Nitrate (as nitrogen)	10.
Nitrate+Nitrite (sum as nitrogen)	10.
Nitrite (as nitrogen)	1.
Perchlorate	0.006
Selenium	0.05
Thallium	0.002

* MFL=million fibers per liter; MCL for fibers exceeding 10 µm in length.

§64432. Monitoring and Compliance--Inorganic Chemicals.

(a) All public water systems shall monitor to determine compliance with the nitrate and nitrite MCLs in table 64431-A, pursuant to subsections (d) through (f) and Section 64432.1. All community and nontransient-noncommunity water systems shall monitor to determine compliance with the perchlorate MCL, pursuant to subsections (d), (e), and (l), and section 64432.3. All community and nontransient-noncommunity water systems shall also monitor to determine compliance with the other MCLs in table 64431-A, pursuant to subsections (b) through (n) and, for asbestos, section 64432.2. Monitoring shall be conducted in the year designated by the State Board of each compliance period beginning with the compliance period starting January 1, 1993.

(b) Unless directed otherwise by the State Board, each community and nontransient-noncommunity water system shall initiate monitoring for an inorganic chemical within six months following the effective date of the regulation establishing the MCL for the chemical and the addition of the chemical to table 64431-A. If otherwise performed in accordance with this section, groundwater monitoring for an inorganic chemical performed no more than two years prior to the effective date of the regulation

establishing the MCL may be used to satisfy the requirement for initiating monitoring within six months following such effective date.

(c) Unless more frequent monitoring is required pursuant to this Chapter, the frequency of monitoring for the inorganic chemicals listed in table 64431-A, except for asbestos, nitrate/nitrite, and perchlorate, shall be as follows:

(1) Each compliance period, all community and nontransient-noncommunity systems using groundwater shall monitor once during the year designated by the State Board. The State Board will designate the year based on historical monitoring frequency and laboratory capacity. All community and nontransient-noncommunity systems using approved surface water shall monitor annually. All systems monitoring at distribution entry points which have combined surface and groundwater sources shall monitor annually.

(2) Quarterly samples shall be collected and analyzed for any chemical if analyses of such samples indicate a continuous or persistent trend toward higher levels of that chemical, based on an evaluation of previous data.

(d) For the purposes of sections 64432, 64432.1, 64432.2, and 64432.3, detection shall be defined by the detection limits for purposes of reporting (DLRs) in table 64432-A.

Table 64432-A
Detection Limits for Purposes of Reporting (DLRs) for Regulated Inorganic Chemicals

Chemical	*Detection Limit for Purposes of Reporting (DLR) (mg/L)*
Aluminum	0.05
Antimony	0.006
Arsenic	0.002
Asbestos	0.2 MFL>10um*
Barium	0.1
Beryllium	0.001
Cadmium	0.001
Chromium	0.01
Cyanide	0.1
Fluoride	0.1
Mercury	0.001
Nickel	0.01
Nitrate (as nitrogen)	0.4
Nitrite (as nitrogen)	0.4
Perchlorate	0.004
Selenium	0.005
Thallium	0.001

* MFL=million fibers per liter; DLR for fibers exceeding 10 um in length.

(e) Samples shall be collected from each water source or a supplier may collect a minimum of one sample at every entry point to the distribution system which is representative of each source after treatment. The system shall collect each sample at the same sampling site, unless a change is approved by the State Board.

(f) A water system may request approval from the State Board to composite samples from up to five sampling sites, provided that the number of sites to be composited is less than the ratio of the MCL to the DLR. Approval will be based on a review of three years of historical data, well construction and aquifer information for groundwater, and intake location, similarity of sources, and watershed characteristics for surface water. Compositing shall be done in the laboratory.

(1) Systems serving more than 3,300 persons shall composite only from sampling sites within a single system. Systems serving 3,300 persons or less may composite among different systems up to the 5-sample limit.

(2) If any inorganic chemical is detected in the composite sample at a level equal to or greater than one fifth of the MCL, a follow-up sample shall be analyzed within 14 days from each sampling site included in the composite for the contaminants

which exceeded the one-fifth-MCL level. If available, duplicates of the original sample taken from each sampling site used in the composite may be used instead of resampling; the analytical results shall be reported within 14 days. The water supplier may collect up to two additional samples each from one or more of the sources to confirm the result(s).

(3) Compliance for each site shall be determined on the basis of the individual follow-up samples, or on the average of the follow-up and confirmation sample(s) if the supplier collects confirmation sample(s) for each detection.

(g) If the level of any inorganic chemical, except for nitrate, nitrite, nitrate plus nitrite, or perchlorate, exceeds the MCL, the water supplier shall do one of the following:

(1) Inform the State Board within 48 hours and monitor quarterly beginning in the next quarter after the exceedance occurred; or

(2) Inform the State Board within seven days from the receipt of the analysis and, as confirmation, collect one additional sample within 14 days from receipt of the analysis. If the average of the two samples collected exceeds the MCL, this information shall be reported to the State Board within 48 hours and the water supplier shall monitor quarterly beginning in the next quarter after the exceedance occurred.

(h) If the concentration of an inorganic chemical exceeds ten times the MCL, within 48 hours of receipt of the result the water supplier shall notify the State Board and resample as confirmation. The water supplier shall notify the State Board of the result(s) of the confirmation sample(s) within 24 hours of receipt of the confirmation result(s).

(1) If the average concentration of the original and confirmation sample(s) is less than or equal to ten times the MCL, the water supplier shall monitor quarterly beginning in the quarter following the quarter in which the exceedance occurred.

(2) If the average concentration of the original and confirmation sample(s) exceeds ten times the MCL, the water supplier shall, if directed by the State Board;

(A) Immediately discontinue use of the contaminated water source; and

(B) Not return the source to service without written approval from the State Board.

(i) Compliance with the MCLs shall be determined by a running annual average; if any one sample would cause the annual average to exceed the MCL, the system is immediately in violation. If a system takes more than one sample in a quarter, the average of all the results for that quarter shall be used when calculating the running annual average. If a system fails to complete four consecutive quarters of monitoring, the running annual average shall be based on an average of the available data.

(j) If a system using groundwater has collected a minimum of two quarterly samples or a system using approved surface water has collected a minimum of four quarterly samples and the sample results have been below the MCL, the system may apply to the State Board for a reduction in monitoring frequency.

(k) Water quality data collected prior to January 1, 1990, and/or data collected in a manner inconsistent with this section shall not be used in the determination of compliance with the monitoring requirements for inorganic chemicals.

(l) Water quality data collected in compliance with the monitoring requirements of this section by a wholesaler providing water to a public water system shall be acceptable for use by that system for compliance with the monitoring requirements of this section.

(m) A water system may apply to the State Board for a waiver from the monitoring frequencies specified in subsection (c)(1), if the system has conducted at least three rounds of monitoring (three periods for groundwater sources or three years for approved surface water sources) and all previous analytical results are less than the MCL. The water system shall specify the basis for its request. If granted a waiver, a system shall collect a minimum of one sample per source while the waiver is in effect and the term of the waiver shall not exceed one compliance cycle (i.e., nine years).

(n) A water system may be eligible for a waiver from the monitoring frequencies for cyanide specified in subsection (c)(1) without any prior monitoring if it is able to document that it is not vulnerable to cyanide contamination pursuant to the requirements in §64445(d)(1) or (d)(2).

(o) Transient-noncommunity water systems shall monitor for the inorganic chemicals in table 64431-A as follows:

(1) All sources shall be monitored at least once for fluoride; and

(2) Surface water sources for parks and other facilities with an average daily population use of more than 1,000 people and/or which are determined to be subject to potential contamination based on a sanitary survey shall be monitored at the same frequency as community water systems.

§64432.1. Monitoring and Compliance--Nitrate and Nitrite.

(a) To determine compliance with the MCL for nitrate in Table 64431-A, all public water systems using groundwater and transient-noncommunity systems using approved surface water shall monitor annually, and all community and nontransient-noncommunity systems using approved surface water shall monitor quarterly.

(1) The water supplier shall require the laboratory to notify the supplier within 24 hours whenever the level of nitrate in a single sample exceeds the MCL, and shall ensure that a contact person is available to receive such analytical results 24-hours a day. The water supplier shall also require the laboratory to immediately notify the State Board of any acute nitrate MCL exceedance if the laboratory cannot make direct contact with the designated contact person within 24 hours. Within 24 hours of notification, the water supplier shall:

(A) Collect another sample, and

(B) Analyze the new sample; if the average of the two nitrate sample results exceeds the MCL, report the result to the State Board within 24 hours. If the average does not exceed the MCL, inform the State Board of the results within seven days from the receipt of the original analysis.

(C) If a system is unable to resample within 24 hours, it shall notify the consumers by issuing a Tier 1 Public Notice pursuant to section 64463.1 and shall collect and analyze a confirmation sample within two weeks of notification of the results of the first sample.

(2) For public water systems using groundwater, the repeat monitoring frequency shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to 50 percent of the MCL. After four consecutive quarterly samples are less than the MCL, a system may request that the State Board reduce monitoring frequency to annual sampling.

(3) For public water systems using approved surface water, the repeat monitoring frequency shall be quarterly following any one sample in which the concentration is greater than or equal to 50 percent of the MCL. After four consecutive quarterly samples are less than 50 percent of the MCL, a system may request that the State Board reduce monitoring frequency to annual sampling. A system using approved surface water shall return to quarterly monitoring if any one sample is greater than or equal to 50 percent of the MCL.

(4) After any round of quarterly sampling is completed, each community and nontransient-noncommunity system which initiates annual monitoring shall take subsequent samples during the quarter which previously resulted in the highest analytical results.

(b) All public water systems shall monitor to determine compliance with the MCL for nitrite in Table 64431-A, by taking one sample at each sampling site during the compliance period beginning January 1, 1993.

(1) If the level of nitrite in a single sample is greater than the MCL, the water supplier shall proceed as for nitrate in accordance with paragraph (a)(1) of this section.

(2) The repeat monitoring frequency for systems with an analytical result for nitrite that is greater than or equal to 50 percent of the MCL shall be quarterly monitoring for at least one year. After four consecutive quarterly samples are less than the MCL, a system may request that the State Board reduce monitoring frequency to annual sampling, collecting subsequent samples during the quarter which previously resulted in the highest analytical results.

(3) The repeat monitoring frequency for systems with an analytical result for nitrite that is less than 50 percent of the MCL shall be one sample during each compliance period (every three years).

(c) All public water systems shall determine compliance with the MCL for nitrate plus nitrite in Table 64431-A. If the level exceeds the MCL, the water supplier shall proceed as for nitrate in accordance with paragraphs (a)(1) through (a)(4) of this section.

§64432.2. Monitoring and Compliance - Asbestos.

(a) All community and nontransient-noncommunity water systems are required to monitor to determine compliance with the MCL for asbestos in Table 64431-A during the year designated by the State Board of the first compliance period of each nine-year compliance cycle, beginning in the compliance period starting January 1, 1993. The State Board will designate the year based on historical monitoring frequency and laboratory capacity.

(1) If a groundwater system is vulnerable to asbestos contamination solely in its source water, it shall collect one sample at every entry point to the distribution system which is representative of each water source after treatment and proceed in accordance with Subsections 64432(c)(2) through (e) and Subsections 64432(g) through (l).

(2) All approved surface water systems shall be designated vulnerable to asbestos contamination in their source waters. If a surface water system is vulnerable solely in its source water, it shall proceed as in paragraph (1) above.

(3) If a system is vulnerable to asbestos contamination due to leaching of asbestos-cement pipe, with or without vulnerability to asbestos contamination in its source water, it shall take one sample at a tap served by asbestos-cement pipe under conditions where asbestos contamination is most likely to occur.

(b) If the level of asbestos exceeds the MCL in Table 64431-A, the supplier shall report to the State Board within 48 hours and monitor quarterly beginning in the next quarter after the violation occurred. A system may request that the State Board reduce monitoring frequency to one sample every compliance cycle, pursuant to §64432(j).

(c) If a system is not vulnerable either to asbestos contamination in its source water or due to leaching of asbestos-cement pipe, it may apply to the State Board for a waiver of the monitoring requirements in paragraphs (a)(1) through (3) of this section. The State Board will determine the vulnerability of groundwater sources on the basis of historical monitoring data and possible influence of serpentine formations. Vulnerability due to leaching of asbestos-cement pipe will be determined by the State Board on the basis of the presence of such pipe in the distribution system and evaluation of the corrosivity of the water. The period of the waiver shall be three years.

§64432.3. Monitoring and Compliance - Perchlorate.

(a) For initial monitoring for the perchlorate MCL, each community and nontransient-noncommunity water system shall collect two samples at each source in a year, five to seven months apart. At least one of the samples shall be collected during the period from May 1 through September 30 (vulnerable time), unless the State Board specifies a different vulnerable time for the water system due to seasonal conditions related to use, manufacture and/or weather.

(b) Data collected since January 3, 2001, that is in conformance with subsection (a) may be used to comply with the initial monitoring requirement.

(c) After meeting the initial monitoring requirements in subsection (a) and if no perchlorate is detected, during each compliance period each water system:

(1) Using groundwater, shall monitor once during the year designated by the State Board;

(2) Using approved surface water, shall monitor annually; and

(3) Monitoring at distribution entry points that have combined surface and groundwater sources, shall monitor annually; if perchlorate is detected in the water from the combined sources, the water system shall sample each source individually to determine which is contaminated.

(d) The water supplier shall require the laboratory to notify the supplier within 48 hours of the result whenever the level of perchlorate in a single sample exceeds the MCL, and shall ensure that a contact person is available to receive such analytical results 24-hours a day. The water supplier shall also require the laboratory to immediately notify the State Board of any perchlorate MCL exceedance if the laboratory cannot make direct contact with the designated contact person within 48 hours. Within 48 hours of notification of the result, the water supplier shall:

(1) Collect and analyze a confirmation sample, and

(2) If the average of the two perchlorate sample results exceeds the MCL, report the result to the State Board within 48 hours. If the average does not exceed the MCL, inform the State Board of the results within seven days from the receipt of the original analytical result.

(3) If a system is unable to resample within 48 hours, it shall issue a Tier 1 notice to the consumers in accordance with sections 64463 and 64463.1 and shall collect and analyze a confirmation sample within two weeks of notification of the results of the first sample.

(e) A water system shall monitor quarterly any source in which perchlorate has been detected. After four consecutive quarterly samples indicate that perchlorate is not present at or above the DLR, a system may request that the State Board reduce monitoring to the frequencies specified in paragraphs (c)(1) through (3).

(f) A water system serving less than 10,000 persons may apply to the State Board for a variance from the perchlorate MCL if it can demonstrate that the estimated annualized cost per household for treatment to comply with the MCL exceeds 1% of the median household income in the community within which the customers served by the water system reside.

§64432.8. Sampling of Treated Water Sources.

(a) Each water supplier utilizing treatment to comply with one or more MCL(s) in Table 64431-A shall collect monthly samples of the treated water at a site prior to the distribution system and analyze for the chemical(s) for which treatment is being applied. If the treated water exceeds an MCL, other than a nitrate, nitrite, nitrate plus nitrite, or perchlorate MCL, within 48 hours of receipt of the result the water supplier shall resample the treated water to confirm the result and report the initial result to the State Board. The result of the analysis of the confirmation sample shall be reported to the State Board within 24 hours of receipt of the confirmation result. For nitrate, nitrite, nitrate plus nitrite, or perchlorate treated water monitoring, the water supplier shall comply with the requirements of section 64432.1(a)(1) for nitrate, section 64432.1(b)(1) for nitrite, section 64432.1(c) for nitrate plus nitrite, and section 64432.3(d) for perchlorate.

(b) The State Board may require more frequent monitoring based on an evaluation of the treatment process used, the treatment effectiveness and efficiency, and the concentration of the inorganic chemical in the water source.

Article 4.1. Fluoridation

§64433. System Requirements and Exemptions.

(a) Any public water system with 10,000 service connections or more that does not have a fluoridation system shall install such a system pursuant to the requirements in this article if the State Board identifies a source of sufficient funds not excluded by Health and Safety Code section 116415 to cover capital and any associated costs necessary to install such a system. Installation shall be completed within two years of the date the funds are received by the water system; the water system may apply to the State Board for an extension of the deadline. Following installation, if the State Board identifies a source of sufficient funds not excluded by Health and Safety Code section 116415 to cover the noncapital operations and maintenance costs for the period of a year or more, the system shall fluoridate within three months of receiving the funds and shall continue fluoridating so long as such funds are received.

(b) Any public water system with 10,000 service connections or more that has a fluoridation system but ceased fluoridating prior to December 31, 1995 shall fluoridate the drinking water if its fluoridation system is determined to be capable of fluoridating the drinking water in compliance with §64433.2, based on a State Board review, and the State Board identifies a source of sufficient funds not excluded by Health and Safety Code section 116415 to cover the noncapital operations and maintenance costs for the period of a year or more. Such a system shall fluoridate within one month of receiving the funds and shall continue fluoridating so long as such funds are received.

(c) Any public water system required to install a fluoridation system pursuant to subsection (a) or required to fluoridate pursuant to subsection (b) shall annually submit an estimate of anticipated fluoridation operations and maintenance costs for the next

fiscal year (July 1 through June 30) to the State Board by the January 1 preceding that fiscal year.

(d) Any public water system with 10,000 service connections or more that has naturally-occurring fluoride and cannot demonstrate that it maintains an average annual fluoride level that is equal to or greater than the low level specified in the temperature-appropriate "control range" in Table 64433.2-A shall be subject to subsections (a) and (b).

(e) Any public water system which achieves 10,000 service connections or more subsequent to July 1, 1996, that does not have a fluoridation system, or that has naturally-occurring fluoride and meets the criteria in subsection (d) shall provide an estimate to the State Board of capital and any associated costs necessary to install a fluoridation system within one year of achieving at least 10,000 service connections:

(f) Any public water system with 10,000 service connections or more shall be exempted from fluoridation in either of the following cases:

(1) The water system does not receive sufficient funds from a source identified by the State Board and not excluded by Health and Safety Code section 116415 to cover the capital and associated costs needed to install a fluoridation system; or

(2) The water system received sufficient capital funds from a source identified by the State Board and not excluded by Health and Safety Code section 116415 and subsequently installed a fluoridation system or the water system meets the criteria in subsection (b), and the water system did not receive sufficient funds from a source identified by the State Board and not excluded by Health and Safety Code section 116415 to cover the noncapital operation and maintenance costs to fluoridate. The water system shall be exempted for any fiscal year (July 1 through June 30) for which it does not receive the funds for noncapital operation and maintenance costs.

§64433.2. Optimal Fluoride Levels.

Any public water system that is fluoridating shall comply with the temperature-appropriate fluoride levels in Table 64433.2-A. The system shall determine, and submit to the State Board, its annual average of maximum daily air temperatures based on the five calendar years immediately preceding the current calendar year.

Table 64433.2-A
Optimal Fluoride Levels

Annual average of maximum daily air temperatures, degrees		*Optimal fluoride level, mg/L*	*Control Range, mg/L*	
Fahrenheit	Celsius		Low	High
50.0 to 53.7	10.0 to 12.0	1.2	1.1	1.7
53.8 to 58.3	12.1 to 14.6	1.1	1.0	1.6
58.4 to 63.8	14.7 to 17.7	1.0	0.9	1.5
63.9 to 70.6	17.8 to 21.4	0.9	0.8	1.4
70.7 to 79.2	21.5 to 26.2	0.8	0.7	1.3
79.3 to 90.5	26.3 to 32.5	0.7	0.6	1.2

§64433.3. Monitoring and Compliance--Fluoride Levels.

(a) If a water system has a single fluoridation system which treats all the water distributed to consumers, the supplier shall collect a daily sample for fluoride analysis, pursuant to §64415(b), either in the distribution system or at the entry point. If a water system does not fluoridate all its water and/or has more than one fluoridation system, the supplier shall collect one sample daily in the distribution system and rotate the sample sites in order to be representative of the water throughout the distribution system according to a monitoring plan the State Board has determined to be representative. For water systems fluoridating as of January 1, 1997, the plan shall be submitted by July 1, 1998. For all others, the plan shall be submitted prior to initiating fluoridation treatment. A water system shall monitor only when it is operating its fluoridation system.

(b) If more than 20 percent of the daily fluoride samples collected in a month by a water system pursuant to subsection (a) fall outside the control range of optimal levels as determined by temperature for that system pursuant to §64433.2, the system shall be out of compliance with §64433.2.

(c) At least once a month, any water supplier with an operating fluoridation system shall divide one sample and have one portion analyzed for fluoride by water system personnel and the other portion analyzed pursuant to §64415(a).

(d) Any water system with an operating fluoridation system shall sample the raw source waters annually and analyze for fluoride pursuant to §64415(a); samples collected pursuant to §64432(c)(1) may be used toward satisfying this requirement. All raw source water samples collected under this subsection are subject to compliance with the fluoride MCL in Table 64431-A.

(e) If any sample result obtained pursuant to subsection (a) does not fall within the temperature-appropriate fluoride level control range in Table 64433.2-A, the water

supplier shall take action as detailed in the water system's approved fluoridation system operations contingency plan as specified in §64433.8.

§64433.5. Fluoridation System.
Each fluoridation system installed or modified after January 1, 1997, shall meet the following criteria, as a minimum:

(a) Operate only when a flow of water is detected. If the water system serves less than 200 service connections, a secondary flow-based control device shall be provided as back-up protection;

(b) Provide flow measuring and recording equipment for the fluoride addition;

(c) Provide design and reliability features to maintain the level of fluoride within the temperature-appropriate control range 95 per cent of the time;

(d) Provide for containment of spills; and

(e) Provide alarm features for fluoride chemical feed and fluoride spills.

§64433.7. Recordkeeping, Reporting, and Notification for Water Systems Fluoridating.

(a) By the tenth day of each month following the month being reported, each water supplier fluoridating its water supply shall send operational reports to the State Board which include the following:

(1) The fluoride compounds used and the calculated fluoride dose in mg/L;

(2) Information on any interruptions in the fluoridation treatment which may have occurred during the month including the duration of the interruptions, an explanation of causes, and what corrective actions were taken to insure that fluoridation treatment was resumed in a timely manner;

(3) The results of the daily monitoring for fluoride in the water distribution system, reported in terms of daily results, and ranges and the number of samples collected; and

(4) The results of monthly split sample(s) analyzed pursuant to §64433.3(c).

(b) For water systems that fluoridated the previous fiscal year (July 1 through June 30), the water supplier shall report the operations and maintenance costs for that year to the State Board by August 1.

(c) Whenever a water system initiates fluoridation, suspends fluoridation for more than ninety days, or reinitiates fluoridation after a suspension of more than ninety days, the water supplier shall notify the consumers, local health departments, pharmacists, dentists, and physicians in the area served by the water system, regarding the status of the fluoridation treatment. If a water system with more than one fluoridation system suspends

the use of one or more of its fluoridation systems, but the level of fluoride being served to the consumers is in conformance with Table 64433.2-A, no notification shall be required.

(d) If a fluoride overfeed exceeding 10.0 mg/L occurs, the water system shall notify the State Board by the end of the business day of the occurrence or within 24 hours if the State Board office is closed.

(e) If the level of fluoride in the distribution system is found to be less than the control range in Table 64433.2-A in two or more samples in a month, the water system shall notify the State Board within three business days of the second occurrence. If the level of fluoride in the distribution system is found to be 0.1 mg/L or more above the control range up to 10.0 mg/L, the water supplier shall notify the State Board within three business days of the occurrence.

§64433.8. Fluoridation System Operations Contingency Plan.

(a) Water systems fluoridating as of July 1, 1996 shall submit a fluoridation system operations contingency plan by July 1, 1998. All other water systems shall submit the plan at least three months before initiating fluoridation treatment. All fluoridating water systems shall operate in accordance with a fluoridation system operations contingency plan determined by the State Board to include the elements in subsection (b).

(b) A fluoridation system operation contingency plan shall include, but not be limited to, the following elements:

(1) Actions to be implemented by the water supplier in the event that the fluoride level in a distribution system sample is found to be less than the control range in Table 64433.2-A, 0.1 mg/L above the control range up to a fluoride level of 2.0 mg/L, from 2.1 to a level of 4.0 mg/L, from 4.1 to a level of 10.0 mg/L, or above a level of 10.0 mg/L.

(2) The procedure for shutting down the fluoridation equipment if there is a fluoride overfeed and the need to do so is identified by the State Board and/or the water supplier;

(3) The procedure for investigating the cause of an underfeed or overfeed;

(4) A list of water system, county health department, and State Board personnel with day and evening phone numbers to be notified by the end of the business day of the occurrence or within 24 hours if the State Board office is closed in the event of an overfeed exceeding 10.0 mg/L; and

(5) The procedure for notifying the public if instructed to do so by the State Board in the event of a fluoride underfeed extending for more than three months or a fluoride overfeed exceeding 10.0 mg/L.

§64434. Water System Priority Funding Schedule.

Public water systems with 10,000 service connections or more that are not fluoridating as of July 1, 1996, shall install fluoridation systems and initiate fluoridation according to the

order established in Table 64434-A, as the water systems receive funds from sources identified by the State Board, pursuant to Health and Safety Code section 116415.

Table 64434-A
Water System Priority Funding Schedule

System No.	*System Name*	*Priority*
3710010	Helix Water District	1
5610017	Ventura, City of	2
4110013	Daly City, City of	3
3710006	Escondido, City of	4
4210011	Santa Maria, City of	5
3410009	Fair Oaks Water District	6
1910083	Manhattan Beach, City of	7
3710025	Sweetwater Authority	8
4210010	Santa Barbara, City of	9
0910001	El Dorado Irrigation District	10
3410006	Citrus Heights Water District	11
4410010	Santa Cruz, City of	12
3610039	San Bernardino, City of	13
3310009	Eastern Municipal Water District	14
3710037	Padre Dam Municipal Water District	15
1910067	Los Angeles, City of	16
2810003	Napa, City of	17
3710020	San Diego, City of	18
3710034	Otay Water District	19
3310031	Riverside, City of	20
1910173	Whittier, City of	21
3410020	Sacramento, City of	22
1910139	California American Water Company - San Marino	23
3710021	San Dieguito Water District	24
3610024	Hesperia Water District	25
1910179	Burbank, City of	26
2710004	California American Water Company - Monterey	27
3310049	Western Municipal Water District	28
3010073	Moulton Niguel Water District	29
3010101	Santa Margarita Water District	30
1910239	Lakewood, City of	31
2110003	North Marin Water District	32
3010037	Yorba Linda Water District	33
3710015	Poway, City of	34
3110025	Placer County Water Agency	35

System No.	*System Name*	*Priority*
5010010	Modesto, City of	36
1910126	Pomona, City of	37
3410004	Carmichael Water District	38
1910043	Glendale, City of	39
3610018	Cucamonga Community Water District	40
3910011	Tracy, City of	41
1910234	Walnut Valley Water District	42
3910012	Stockton, City of	43
1910146	Santa Monica, City of	44
3710027	Vista Irrigation District	45
3010018	La Habra, City of	46
1910009	Valley County Water District	47
3310012	Elsinore Valley Municipal Water District	48
1910051	Inglewood, City of	49
3710005	Carlsbad Municipal Water District	50
4210004	Goleta Water District	51
1910213	Torrance, City of	52
1910152	South Gate, City of	53
1910155	Southern California Water Company - Southwest	54
1510017	Indian Wells Valley Water District	55
1910039	San Gabriel Valley Water Company - El Monte	56
1610003	Hanford, City of	57
3310037	Corona, City of	58
3010062	Garden Grove, City of	59
3610003	Apple Valley Ranchos Water Community	60
3610036	Chino Hills, City of	61
3010064	Westminster, City of	62
4310011	San Jose Water Company	63
3610012	Chino, City of	64
3910004	Lodi, City of	65
5610007	Oxnard, City of	66
1910019	Cerritos, City of	67
1910205	Suburban Water Systems - San Jose Hills	68
1910059	Suburban Water Systems - La Mirada	69
1910092	Monterey Park, City of	70
1910174	Suburban Water Systems - Whittier	71
1910026	Compton, City of	72
1910124	Pasadena, City of	73
3310022	Lake Hemet Municipal Water District	74
1910142	Southern California Water Company - San Dimas	75
4510005	Redding, City of	76

System No.	*System Name*	*Priority*
3610037	Redlands, City of	77
3910005	Manteca, City of	78
3710014	Oceanside, City of	79
3610038	Rialto, City of	80
4310022	Great Oaks Water Company	81
4310014	Sunnyvale, City of	82
3310021	Jurupa Community Services District	83
3410001	Arcade- Town & County	84
3610052	Victor Valley Water District	85
3010023	Newport Beach, City of	86
3610064	East Valley Water District	87
1910225	Las Virgenes Municipal Water District	88
3710001	California American Water Company - Coronado	89
3610034	Ontario, City of	90
3910001	California Water Service Company - Stockton	91
1910033	Dominguez Water Agency	92
5410015	Tulare, City of	93
5710006	Woodland, City of	94
3710029	Olivenhain Municipal Water District	95
1910003	Arcadia, City of	96
1910008	Azusa Valley Water Company	97
4410011	Watsonville, City of	98
3010003	Buena Park, City of	99
4310005	Milpitas, City of	100
1910017	Santa Clarita Water Company	101
1910240	Valencia Water Company	102
3610004	West San Bernardino Water District	103
0910002	South Tahoe Public Utilities District	104
5610059	Southern California Water Company - Simi Valley	105
3010027	Orange, City of	106
5410010	Porterville, City of	107
4410017	Soquel Creek Water District	108
4110023	San Bruno, City of	109
1910001	Alhambra, City of	110
3010022	Southern California Water Company-West Orange County	111
3010091	Los Alisos Water District	112
3610050	Upland, City of	113
3410024	Northridge Water District	114
1010003	Clovis, City of	115
3010004	Mesa Consolidated Water District	116
3610041	San Gabriel Valley Water Company - Fontana	117

System No.	*System Name*	*Priority*
3410010	Citizens Utilities Company of California - Suburban	118
3010038	Santa Ana, City of	119
3010092	Irvine Ranch Water District	120
1910211	Park Water Company - Bellflower	121
3010010	Fullerton, City of	122
4310007	Mountain View, City of	123
3010036	San Clemente, City of	124
3010079	El Toro Water District	125
5610020	Thousand Oaks, City of	126
3610029	Monte Vista Water District	127
1910004	Southern California Water Company - Artesia	128
4210016	Southern California Water Company - Orcutt	129
4110008	California Water Service Company - San Mateo	130
1310038	Rancho California Water District	131
3410017	Citizens Utilities Company of California - Parkway	132
1910024	Southern California Water Company - Claremont	133
1910044	Glendora, City of	134
3010001	Anaheim, City of	135
5710001	Davis, City of	136
1910134	California Water Service Company-Hermosa/Redondo	137
1010007	Fresno, City of	138
1910102	Palmdale Water District	139
4310012	Santa Clara, City of	140
2710010	California Water Service Company - Salinas	141
4910006	Petaluma, City of	142
1910036	California Water Service Company - East Los Angeles	143
3410013	Citizens Utilities Company of California - Lincoln Oaks	144
3310001	Coachella Valley Water District	145
5010019	Turlock, City of	146
5410016	California Water Service Company - Visalia	147
5610023	Waterworks District 8-Simi Valley	148
0410002	California Water Service Company - Chico	149
1910104	California Water Service Company - Palos Verdes	150
3410015	Southern California Water Company - Corodva	151
4910009	Santa Rosa, City of	152
1910194	Rowland Water District	153
1510003	California Water Service Company - Bakersfield	154
5610040	California American Water Company - Village District	155
3310005	Desert Water Agency	156
0110003	California Water Service Company - Livermore	157
3010046	Tustin, City of	158

System No.	*System Name*	*Priority*
4310001	California Water Service Company - Los Altos Suburban	159
4110007	California Water Service Company - San Carlos	160
1910070	Los Angeles, County Water Works District 4&34- Lancaster	161
1510031	Bakersfield, City of	162
4110009	California Water Service Company - South San Francisco	163
3010053	Huntington Beach, City of	164
4110006	California Water Service Company - Bear Gulch	165
1910034	Downey, City of	166
4110022	Redwood City	167

Article 5. Radioactivity

§64442. MCLs and Monitoring - Gross Alpha Particle Activity, Radium-226, Radium-228, and Uranium

(a) Each community and nontransient-noncommunity water system (system) shall comply with the primary MCLs in Table 64442 in the drinking water supplied to the public and use the DLRs for reporting monitoring results:

Table 64442
Radionuclide Maximum Contaminant Levels (MCLs)
and Detection Levels for Purposes of Reporting (DLRs)

Radionuclide	*MCL*	*DLR*
Radium-226	5 pCi/L (combined radium-226 & -228)	1 pCi/L
Radium–228		1 pCi/L
Gross Alpha particle activity (excluding radon and uranium)	15 pCi/L	3 pCi/L
Uranium	20 pCi/L	1 pCi/L

(b) Each system shall monitor to determine compliance with the MCLs in table 64442, as follows:

(1) Monitor at each water source, or every entry point to the distribution system that is representative of all sources being used under normal operating conditions; conduct all monitoring at the same sample site(s) unless a change is approved by the State Board, based on a review of the system and its historical water quality data;

(2) For quarterly monitoring, monitor during the same month (first, second or third) of each quarter during each quarter monitored;

(3) By December 31, 2007, complete initial monitoring that consists of four consecutive quarterly samples at each sampling site for each radionuclide in table 64442, except that nontransient-noncommunity water systems shall not be required to monitor radium-228 as a separate analyte, but shall monitor for compliance with the combined

radium MCL using the analytical method described in Prescribed Procedures for Measurement of Radioactivity in Drinking Water, Section 6, Alpha-emitting Radium Isotopes in Drinking Water, Method 903.0 (EPA/600/4-80-032, August 1980):

(A) Data collected for a sampling site between January 1, 2001, and December 31, 2004, may be used to satisfy the initial monitoring requirement, subject to the State Board's approval based on whether the analytical methods, DLRs, sampling sites, and the frequency of monitoring used were consistent with this article.

(B) For gross alpha particle activity, uranium, radium-226 and radium-228, the State Board may waive the final two quarters of initial monitoring at a sampling site if the results from the previous two quarters are below the DLR(s) and the sources are not known to be vulnerable to contamination.

(c) Any new system or new source for an existing system shall begin monitoring pursuant to Subsection (b) within the first quarter after initiating water service to the public.

(d) After initial monitoring, each system shall monitor for each radionuclide at each sampling site at a frequency determined by the monitoring result(s) [single sample result or average of sample results if more than one sample collected] from the most recent compliance period as follows:

(1) For nontransient-noncommunity water systems, the results for the total radium analyses shall be averaged.

(2) For community water systems, the results of radium-226 and radium-228 analyses shall be added and the average calculated.

(3) The values used for the radionuclide MCLs and DLRs shall be as specified in Table 64442.

(4) If the single sample result or average is:

A. Below the DLR, the system shall collect and analyze at least one sample every nine years (3 compliance periods).

B. At or above the DLR, but at or below ½ the MCL, the system shall collect and analyze at least one sample every six years.

C. Above ½ the MCL, but not above the MCL, the system shall collect and analyze at least one sample every three years.

(e) A system that monitors quarterly may composite up to four consecutive samples from a single sampling site if analysis is done within a year of the first sample's collection. If the result of the composited sample is greater than ½ the MCL, at least one additional quarterly sample shall be analyzed to evaluate the range and trend of results over time before allowing the system to reduce the monitoring frequency.

(f) A gross alpha particle activity measurement may be substituted for other measurements by adding the 95% confidence interval (1.65σ, where σ is the standard deviation of the net counting rate of the sample) to it; and if,

(1) For uranium and radium measurements (after initial radium-228 monitoring has been completed), the gross alpha measurement does not exceed 5 pCi/L; or

(2) For radium measurements (after initial radium-228 monitoring has been completed), the result obtained from subtracting the uranium measurement from the gross alpha measurement does not exceed 5 pCi/L.

(g) If any sample result is greater than an MCL:

(1) For a system monitoring less than quarterly, quarterly samples shall be collected and analyzed to determine compliance, pursuant to subsection (h);

(2) For a system that already has four consecutive quarterly results, compliance shall be determined pursuant to subsection (h).

(3) The system shall monitor quarterly until the results of four consecutive quarterly sample results do not exceed the MCL.

(h) A system with one or more sample results greater than an MCL shall determine compliance with the MCL as follows:

(1) At each sampling site, based on the analytical results for that site. Any confirmation sample result shall be averaged with the initial result.

(2) Using all monitoring results collected under this section during the previous 12 months, even if more than the minimum required number of samples was collected.

(3) By a running annual average of four consecutive quarters of sampling results. Averages shall be rounded to the same number of significant figures as the MCL for which compliance is being determined.

(A) If any sample result will cause the annual average at any sample site to exceed the MCL, the system shall be out of compliance immediately upon receiving the result;

(B) If a system has not analyzed the required number of samples, compliance shall be determined by the average of the samples collected at the site during the most recent 12 months; and

(C) If a sample result is less than the DLR in table 64442, zero shall be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226, total radium, and/or uranium. In that case, if the gross alpha particle activity result is less than the DLR, ½ the DLR shall be used to calculate the annual average.

(4) If compositing is allowed at a sampling site, by the results of a composite of four consecutive quarterly samples.

(5) If the system can provide documentation that a sample was subject to sampling or analytical errors, the State Board may invalidate the result based on its review of the documentation, the sampling result, and the historical sampling data.

(6) Each system shall ensure that the laboratory analyzing its samples collected for compliance with this article calculates and reports the sample-specific Minimum Detectable Activity at the 95% confidence level (MDA_{95}) along with the sample results. The MDA_{95} shall not exceed the DLR and shall be calculated as described in ANSI

N42.23 Measurement and Associated Instrumentation Quality Assurance for Radiobioassay Laboratories, Appendix A.7.6 (September 10, 1995).

§64443. MCLs and Monitoring - Beta Particle and Photon Radioactivity

(a) Each community and nontransient-noncommunity water system (system) shall comply with the primary MCLs in table 64443 and use the DLRs for reporting monitoring results:

Table 64443
Radionuclide Maximum Contaminant Levels (MCLs)
and Detection Levels for Purposes of Reporting (DLRs)

Radionuclide	*MCL*	*DLR*
Beta/photon emitters	4 millirem/year annual dose equivalent to the total body or any internal organ	Gross Beta particle activity: 4 pCi/L
Strontium-90	8 pCi/L (= 4 millirem/yr dose to bone marrow)	2 pCi/L
Tritium	20,000 pCi/L (= 4 millirem/yr dose to total body)	1,000 pCi/L

(b) Each system designated by the State Board as vulnerable to contamination by nuclear facilities and/or a determination of vulnerability by a Source Water Assessment, as defined in section 63000.84, shall monitor to determine compliance with the MCLs in table 64443, as follows:

(1) Beginning within one quarter after being notified by the State Board that the system is vulnerable, quarterly for beta/photon emitters and annually for tritium and strontium-90 at each water source, or every entry point to the distribution system that is representative of all sources being used under normal operating conditions, and shall conduct all monitoring at the same sample site(s) unless a change is approved by the State Board, based on a review of the system and its historical water quality data;

(2) For quarterly monitoring, during the same month (first, second or third) of each quarter during each quarter monitored; and

(3) If the gross beta particle activity minus the naturally-occurring potassium-40 beta particle activity at a sampling site has a running annual average less than or equal to 50 pCi/L (screening level), reduce monitoring to a single sample for beta/photon emitters, tritium and strontium-90 once every three years (compliance monitoring period).

(c) Each system designated by the State Board as utilizing waters contaminated by effluents from nuclear facilities on the basis of analytical data and/or a Source Water Assessment, shall:

(1) Beginning within one quarter after being notified by the State Board of the above designation, monitor on an ongoing basis pursuant to subparagraphs (A) through (C) at each sampling site:

(A) For beta/photon emitters, quarterly by analyzing three monthly samples and averaging the results or by analyzing a composite of three monthly samples;

(B) For iodine-131, quarterly by analyzing a composite of five consecutive daily samples, unless the State Board has directed the system to do more frequent monitoring based on a detection of iodine-131 in the sampled water; and

(C) For strontium-90 and tritium, annually by analyzing four quarterly samples and averaging the results or by analyzing a composite of four quarterly samples.

(2) If the gross beta particle activity minus the naturally-occurring potassium-40 beta particle activity at a sampling site has a running annual average (computed quarterly) less than or equal to 15 pCi/L (screening level), reduce the frequency of monitoring to a single sample for beta/photon emitters, iodine-131, strontium-90 and tritium once every three years (compliance monitoring period).

(d) If the gross beta particle activity minus the naturally-occurring potassium-40 beta particle activity exceeds a system's screening level pursuant to Subsection (b)(3) or (c)(2):

(1) The sample shall be analyzed to identify the primary radionuclides present and the doses shall be calculated and summed to determine compliance with the MCL for beta particle/photon radioactivity; and

(2) Except for strontium-90 and tritium for which the MCLs provide the average annual concentrations assumed to produce a total body or organ dose equivalent to 4 millirem/year, the concentration of manmade radionuclides shall be calculated using the 168 hour data list in "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. (See Title 40, Code of Federal Regulations, section 141.66(d)(2).)

(e) If a system analyzes for naturally-occurring potassium-40 beta particle activity from the same or equivalent samples used for the gross beta particle activity analysis, the potassium-40 beta particle activity shall be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82 pCi/mg.

(f) A system required to monitor under this section may use environmental surveillance data (collected by the nuclear facility to detect any radionuclide contamination) in lieu of monitoring, subject to the State Board's determination that the data is applicable to the system based on a review of the data and the hydrogeology of the area. In the event that there is a release of radioactivity or radioactive contaminants from the nuclear facility, a system using environmental surveillance data shall begin the monitoring in paragraph (b)(1) or (c)(1)(A) through (C), whichever is most applicable.

(g) If a sample result is greater than an MCL:

(1) Compliance shall be determined as follows:

(A) At each sampling site, based on the analytical results for that site. Any confirmation sample result shall be averaged with the initial result.

(B) Using all monitoring results collected under this article during the previous 12 months, even if more than the minimum required number of samples was collected.

(C) By a running annual average of four consecutive quarters of sampling results where quarterly monitoring is required, or by an annual sample when applicable for tritium and strontium-90. Averages shall be rounded to the same number of significant figures as the MCL for which compliance is being determined.

1. If any sample result will cause the annual average at any sample site to exceed the MCL, the system shall be out of compliance immediately after being notified of the result;

2. If a system has not analyzed the required number of samples, compliance shall be determined by the average of the samples collected at the site during the most recent 12 months; and

3. If a sample result is less than the DLR in 64443, zero shall be used to calculate the annual average.

(D) If the system can provide documentation that a sample was subject to sampling or analytical errors, the State Board may invalidate the result based on its review of the documentation, the sampling result, and the historical sampling data.

(E) Each system shall ensure that the laboratory analyzing its samples collected for compliance with this article calculates and reports the sample-specific Minimum Detectable Activity at the 95% confidence level (MDA_{95}) along with the sample results. The MDA_{95} shall not exceed the DLR and is calculated as described in ANSI N42.23 Measurement and Associated Instrumentation Quality Assurance for Radiobioassay Laboratories, Appendix A.7.6 (September 10, 1995). (See Title 40, Code of Federal Regulations, section 141.66(d)(2).)

(2) If a sample has a gross beta/photon radioactivity level greater than the MCL:

(A) A system shall monitor monthly beginning the month after receiving a result greater than the MCL and continue monthly monitoring until an average of three consecutive monthly sample results does not exceed the MCL ;

(B) The system shall then monitor quarterly until the average of four consecutive quarterly sample results does not exceed the MCL; and

(C) Subsequently, the system shall conduct the monitoring in paragraph (b)(1) or (c)(1)(A) through (C), whichever is most applicable.

NOTE: This publication is meant to be an aid to the staff of the State Board's Division of Drinking Water and cannot be relied upon by the regulated community as the State of California's representation of the law. The published codes are the only official representation of the law. Refer to the published codes—in this case, 17 CCR and 22 CCR—whenever specific citations are required. Statutes related to the State Board's drinking water-related activities are in the Health & Safety Code, the Water Code, and other codes.

Article 5.5. Primary Standards -- Organic Chemicals

§64444. Maximum Contaminant Levels – Organic Chemicals.

The MCLs for the primary drinking water chemicals shown in table 64444-A shall not be exceeded in the water supplied to the public.

Table 64444-A
Maximum Contaminant Levels
Organic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
(a) Volatile Organic Chemicals (VOCs)	
Benzene	0.001
Carbon Tetrachloride	0.0005
1,2-Dichlorobenzene	0.6
1,4-Dichlorobenzene	0.005
1,1-Dichloroethane	0.005
1,2-Dichloroethane	0.0005
1,1-Dichloroethylene	0.006
cis-1,2-Dichloroethylene	0.006
trans-1,2-Dichloroethylene	0.01
Dichloromethane	0.005
1,2-Dichloropropane	0.005
1,3-Dichloropropene	0.0005
Ethylbenzene	0.3
Methyl-*tert*-butyl ether	0.013
Monochlorobenzene	0.07
Styrene	0.1
1,1,2,2-Tetrachloroethane	0.001
Tetrachloroethylene	0.005
Toluene	0.15
1,2,4-Trichlorobenzene	0.005
1,1,1-Trichloroethane	0.200
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Trichlorofluoromethane	0.15
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2
Vinyl Chloride	0.0005
Xylenes	1.750*

Table 64444-A (continued)
Maximum Contaminant Levels
Organic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
(b) Synthetic Organic Chemicals (SOCs)	
Alachlor	0.002
Atrazine	0.001
Bentazon	0.018
Benzo(a)pyrene	0.0002
Carbofuran	0.018
Chlordane	0.0001
2,4-D	0.07
Dalapon	0.2
Dibromochloropropane	0.0002
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.004
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene Dibromide	0.00005
Glyphosate	0.7
Heptachlor	0.00001
Heptachlor Epoxide	0.00001
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.03
Molinate	0.02
Oxamyl	0.05
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated Biphenyls	0.0005
Simazine	0.004
Thiobencarb	0.07
Toxaphene	0.003
1,2,3-Trichloropropane	0.000005
2,3,7,8-TCDD (Dioxin)	3×10^{-8}
2,4,5-TP (Silvex)	0.05

*MCL is for either a single isomer or the sum of the isomers.

§64445. Initial Sampling - Organic Chemicals.

(a) Each community and nontransient-noncommunity water system shall collect four quarterly samples during the year designated by the State Board of each compliance period beginning with the compliance period starting January 1, 1993, from each water source at a site prior to any treatment and test for all applicable organic chemicals listed in table 64444-A. The State Board will designate the year based on historical monitoring frequency and laboratory capacity. For surface sources, the samples shall be taken at each water intake. For groundwater sources, the samples shall be taken at each well head. Where multiple intakes or wells draw from the same water supply, the State Board will consider sampling of representative sources as a means of complying with this section. Selection of representative sources shall be based on evidence which includes a hydrogeological survey and sampling results. Wells shall be allowed to flow for a minimum of 15 minutes before sampling to insure that the samples reflect the water quality of the source. In place of water source samples, a supplier may collect samples at sites located at the entry points to the distribution system. The samples shall be representative of each source after treatment. The system shall collect each sample at the same sampling site, unless a change is approved by the State Board.

(b) For any organic chemical added to table 64444-A, the water system shall initiate the quarterly monitoring for that chemical in January of the calendar year after the effective date of the MCL.

(c) A water system may request approval from the State Board to composite samples from up to five sampling sites, provided that the number of the sites to be composited is less than the ratio of the MCL to the DLR in §64445.1. Approval will be based on a review of three years of historical data, well construction and aquifer information for groundwater, and intake location, similarity of sources, and watershed characteristics for surface water. Compositing shall be done in the laboratory and analyses shall be conducted within 14 days of sample collection.

(1) Systems serving more than 3,300 persons shall composite only from sampling sites within a single system. Systems serving 3,300 persons or less may composite among different systems up to the 5-sample limit.

(2) If any organic chemical is detected in the composite sample, a follow-up sample shall be analyzed within 14 days from each sampling site included in the composite for the contaminants which were detected. The water supplier shall report the results to the State Board within 14 days of the follow-up sample collection. If available, duplicates of the original sample taken from each sampling site used in the composite may be used instead of resampling.

(d) A water system may apply to the State Board for a monitoring waiver for one or more of the organic chemicals on table 64444-A in accordance with the following:

(1) A source may be eligible for a waiver if it can be documented that the chemical has not been previously used, manufactured, transported, stored, or disposed of within the watershed or zone of influence and therefore, that the source can be designated nonvulnerable.

(2) If previous use of the chemical locally is unknown or the chemical is known to have been used previously and the source cannot be designated nonvulnerable pursuant to Paragraph (d)(1), it may still be eligible for a waiver based on a review related to susceptibility to contamination. The application to the State Board for a waiver based on susceptibility shall include the following:

(A) previous monitoring results;
(B) user population characteristics;
(C) proximity to sources of contamination;
(D) surrounding land uses;
(E) degree of protection of the water source;
(F) environmental persistence and transport of the chemical in water, soil and air;
(G) elevated nitrate levels at the water supply source; and
(H) historical system operation and maintenance data including previous State Board inspection results.

(3) To apply for a monitoring waiver for VOCs, the water system shall have completed the initial four quarters of monitoring pursuant to subsection (a) or three consecutive years of monitoring with no VOCs detected. If granted a waiver for VOC monitoring, a system using groundwater shall collect a minimum of one sample from every sampling site every six years and a system using surface water shall not be required to monitor for the term of the waiver. The term of a VOC waiver shall not exceed three years.

(4) To obtain a monitoring waiver for one or more of the SOCs, the water system may apply before doing the initial round of monitoring or shall have completed three consecutive years of annual monitoring with no detection of the SOC(s) listed. If the system is granted a waiver for monitoring for one or more SOC(s), no monitoring for the waived SOC(s) shall be required for the term of the waiver, which shall not exceed three years.

(e) For water sources designated by a water supplier as standby sources, the water supplier shall sample each source for any organic chemical added to table 64444-A once within the three-year period beginning in January of the calendar year after the effective date of the MCL.

(f) Water quality data collected prior to January 1, 1988, for VOCs, or January 1, 1990, for SOCs, and/or data collected in a manner inconsistent with this section shall not be used in the determination of compliance with the monitoring requirements for organic chemicals.

(g) MTBE data (i.e., a single sample) collected in a manner consistent with this section after January 1, 1998 in which no MTBE is detected, along with a designation of nonvulnerability pursuant to subsection (d), may be used to satisfy the initial monitoring requirements in subsection (a). If the requirements are satisfied in this way by a water system, the system shall begin annual monitoring pursuant to section 64445.1(b)(1).

(h) Water quality data collected in compliance with the monitoring requirements of this section by a wholesaler agency providing water to a public water system shall be acceptable for use by that system for compliance with the monitoring requirements of this section.

(i) Results obtained from groundwater monitoring performed for an organic chemical in accordance with this section and not more than two calendar years prior to the effective date of a regulation establishing the MCL for that organic chemical may be substituted to partially satisfy the initial monitoring requirements required by this section for that organic chemical. Requests to substitute groundwater monitoring results shall be made in accordance with the following:

1. Requests shall be made in writing by the water system to the State Board; and

2. If the State Board approves the request then results from a given calendar quarter will only be eligible to substitute for a single required initial monitoring result during that same quarter of initial monitoring. (e.g. the second quarter of 2016 may be substituted for the second quarter of 2018).

3. No more than three of the four quarterly samples as required by section 64445(a) or (b) may be substituted.

§64445.1. Repeat Monitoring and Compliance – Organic Chemicals.

(a) For the purposes of this article, detection shall be defined by the detection limits for purposes of reporting (DLRs) in table 64445.1-A:

Table 64445.1-A
Detection Limits for Purposes of Reporting (DLRs)
for Regulated Organic Chemicals

Chemical	*Detection Limit for Purposes of Reporting (DLR)(mg/L)*
(a) All VOCs, except as listed.	0.0005
Methyl-*tert*-butyl ether	0.003
Trichlorofluoromethane	0.005

Chemical	*Detection Limit for Purposes of Reporting (DLR)(mg/L)*
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.01
(b) SOCs	
Alachlor	0.001
Atrazine	0.0005
Bentazon	0.002
Benzo(a)pyrene	0.0001
Carbofuran	0.005
Chlordane	0.0001
2,4-D	0.01
Dalapon	0.01
Dibromochloropropane (DBCP)	0.00001
Di(2-ethylhexyl)adipate	0.005
Di(2-ethylhexyl)phthalate	0.003
Dinoseb	0.002
Diquat	0.004
Endothall	0.045
Endrin	0.0001
Ethylene dibromide (EDB)	0.00002
Glyphosate	0.025
Heptachlor	0.00001
Heptachlor epoxide	0.00001
Hexachlorobenzene	0.0005
Hexachlorocyclopentadiene	0.001
Lindane	0.0002
Methoxychlor	0.01
Molinate	0.002
Oxamyl	0.02
Pentachlorophenol	0.0002
Picloram	0.001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0005
Simazine	0.001
Thiobencarb	0.001
Toxaphene	0.001
1,2,3-Trichloropropane	0.000005
2,3,7,8-TCDD (Dioxin)	5×10^{-9}
2,4,5-TP (Silvex)	0.001

(b) When organic chemicals are not detected pursuant to table 64445.1-A.

(1) A water system which has not detected any of the VOCs on table 64444-A during the initial four quarters of monitoring, shall collect and analyze one sample annually. After a minimum of three years of annual sampling with no detection of a VOC in table 64444-A, a system using groundwater may reduce the monitoring frequency to one sample during each compliance period. A system using surface water shall continue monitoring annually.

(2) A system serving more than 3,300 persons which has not detected an SOC on table 64444-A during the initial four quarters of monitoring shall collect a minimum of two quarterly samples for that SOC in one year during the year designated by the State Board of each subsequent compliance period. The year will be designated on the basis of historical monitoring frequency and laboratory capacity.

(3) A system serving 3,300 persons or less which has not detected an SOC on table 64444-A during the initial four quarters of monitoring shall collect a minimum of one sample for that SOC during the year designated by the State Board of each subsequent compliance period. The year will be designated on the basis of historical monitoring frequency and laboratory capacity.

(c) When organic chemicals are detected pursuant to table 64445.1-A.

(1) Prior to proceeding with the requirements of paragraphs (2) through (7), the water supplier may first confirm the analytical result, as follows: Within seven days from the notification of an initial finding from a laboratory reporting the presence of one or more organic chemicals in a water sample, the water supplier shall collect one or two additional sample(s) to confirm the initial finding. Confirmation of the initial finding shall be shown by the presence of the organic chemical in either the first or second additional sample, and the detected level of the contaminant for compliance purposes shall be the average of the initial and confirmation sample(s). The initial finding shall be disregarded if two additional samples do not show the presence of the organic chemical.

(2) If one or both of the related organic chemicals heptachlor and heptachlor epoxide are detected, subsequent monitoring shall analyze for both chemicals until there has been no detection of either chemical for one compliance period.

(3) A groundwater sampling site at which one or more of the following chemicals has been detected shall be monitored quarterly for vinyl chloride: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene. If vinyl chloride is not detected in the first quarterly sample, the sampling site shall be monitored once for vinyl chloride during each compliance period.

(4) If the detected level of organic chemicals for any sampling site does not exceed any shown in table 64444-A, the water source shall be resampled every three months and the samples analyzed for the detected chemicals. After one year of sampling an approved surface water system or two quarters of sampling a groundwater system, the State Board will consider allowing the water supplier to reduce the sampling to once per

year upon request, based on a review of previous sampling data. Systems shall monitor during the quarter(s) which previously yielded the highest analytical results.

(5) If the detected level of an organic chemical for any sampling site exceeds that listed in table 64444-A, the water supplier shall report this information to the State Board within 48 hours of receipt of the result. Unless use of the contaminated source is discontinued, the water supplier shall resample the contaminated source and compliance shall be determined as follows:

(A) Water systems serving more than 3,300 persons shall sample monthly for six months and shall submit the results to the State Board as specified in section 64469. If the average concentration of the initial finding, confirmation sample(s), and six subsequent monthly samples does not exceed the MCL shown in table 64444-A the water supplier may reduce the sampling frequency to once every three months. If the running annual average or the average concentration of the initial finding, confirmation sample(s), and six subsequent monthly samples exceeds the MCL shown in table 64444-A, the water system shall be deemed to be in violation of section 64444.

(B) Water systems serving 3,300 persons or less shall sample quarterly for a minimum of one year and shall submit the results to the State Board as specified in section 64469. If the running annual average concentration does not exceed the MCL in table 64444-A, the water supplier may reduce the sampling frequency to once every year during the quarter that previously yielded the highest analytical result. Quarterly monitoring shall resume if any reduced frequency sample result exceeds the MCL. If the running annual average concentration exceeds the MCL in table 64444-A, the water system shall be deemed to be in violation of section 64444.

(C) If any sample would cause the running annual average to exceed the MCL, the water system is immediately in violation. If a system takes more than one sample in a quarter, the average of all the results for that quarter shall be used when calculating the running annual average. If a system fails to complete four consecutive quarters of monitoring, the running annual average shall be based on an average of the available data.

(6) If any resample, other than those taken in accordance with paragraph (5), of a water sampling site shows that the concentration of any organic chemical exceeds a MCL shown in table 64444-A, the water supplier shall proceed in accordance with paragraphs (1) and (4), or paragraph (5).

(7) If an organic chemical is detected and the concentration exceeds ten times the MCL, the water supplier shall notify the State Board within 48 hours of the receipt of the results and the contaminated site shall be resampled within 48 hours to confirm the result. The water supplier shall notify the State Board of the result of the confirmation sample(s) within 24 hours of the receipt of the confirmation result(s).

(A) If the average concentration of the original and confirmation sample(s) is less than or equal to ten times the MCL, the water supplier shall proceed in accordance with paragraph (5).

(B) If the average concentration of the original and confirmation samples exceeds ten times the MCL, use of the contaminated water source shall immediately be

discontinued, if directed by the State Board. Such a water source shall not be returned to service without written approval from the State Board.

§64445.2. Sampling of Treated Water Sources.

(a) Each water supplier utilizing treatment to comply with any MCL for an organic chemical listed in table 64444-A shall collect monthly samples of the treated water at a site prior to the distribution system. If the treated water exceeds the MCL, the water supplier shall resample the treated water to confirm the result and report the result to the State Board within 48 hours of the confirmation.

(b) The State Board will consider requiring more frequent monitoring based on an evaluation of (1) the treatment process used, (2) the treatment effectiveness and efficiency, and (3) the concentration of the organic chemical in the water source.

Article 12. Best available technologies (BAT)

§64447. Best Available Technologies (BAT) – Microbiological Contaminants.

The technologies identified by the State Board as the best available technology, treatment techniques, or other means available for achieving compliance with the total coliform MCL are as follows:

(a) Protection of wells from coliform contamination by appropriate placement and construction;

(b) Maintenance of a disinfectant residual throughout the distribution system;

(c) Proper maintenance of the distribution system; and

(d) Filtration and/or disinfection of approved surface water, in compliance with Section 64650, or disinfection of groundwater.

§64447.2. Best Available Technologies (BAT) - Inorganic chemicals.

The technologies listed in table 64447.2-A are the best available technology, treatment techniques, or other means available for achieving compliance with the MCLs in table 64431-A for inorganic chemicals.

Table 64447.2-A
Best Available Technologies (BAT)
Inorganic Chemicals

Chemical	*Best Available Technologies (BATs)*
Aluminum	10
Antimony	2, 7
Arsenic	1, 2, 5, 6, 7, 9, 13
Asbestos	2, 3, 8
Barium	5, 6, 7, 9
Beryllium	1, 2, 5, 6, 7
Cadmium	2, 5, 6, 7
Chromium	2, 5, 6[a], 7
Cyanide	5, 7, 11
Fluoride	1
Mercury	2[b], 4, 6[b], 7[b]
Nickel	5, 6, 7
Nitrate	5, 7, 9
Nitrite	5, 7
Perchlorate	5,12
Selenium	1, 2[c], 6, 7, 9
Thallium	1, 5

[a]BAT for chromium III (trivalent chromium) only.
[b]BAT only if influent mercury concentrations <10 µg/L.
[c]BAT for selenium IV only.

Key to BATs in table 64447.2:
1 = Activated Alumina
2 = Coagulation/Filtration (not BAT for systems < 500 service connections)
3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion Exchange
6 = Lime Softening (not BAT for systems < 500 service connections)
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Optimizing treatment and reducing aluminum added
11 = Chlorine oxidation
12 = Biological fluidized bed reactor
13 = Oxidation/Filtration

§64447.3. Best Available Technologies (BAT) - Radionuclides.

The technologies listed in tables 64447.3-A, B and C are the best available technology, treatment technologies, or other means available for achieving compliance with the MCLs for radionuclides in tables 64442 and 64443.

Table 64447.3-A
Best Available Technologies (BATs)
Radionuclides

Radionuclide	*Best Available Technology*
Combined radium-226 and radium-228	Ion exchange, reverse osmosis, lime softening
Uranium	Ion exchange, reverse osmosis, lime softening, coagulation/filtration
Gross alpha particle activity	Reverse osmosis
Beta particle and photon radioactivity	Ion exchange, reverse osmosis

Table 64447.3-B
Best Available Technologies (BATs) and Limitations for Small Water Systems
Radionuclides

Unit Technologies	*Limitations (see footnotes)*	*Operator Skill Level Required*	*Raw Water Quality Range and Considerations*
1. Ion exchange	(a)	Intermediate	All ground waters; competing anion concentrations may affect regeneration frequency
2. Point of use, ion exchange	(b)	Basic	All ground waters; competing anion concentrations may affect regeneration frequency
3. Reverse osmosis	(c)	Advanced	Surface waters usually require pre-filtration
4. Point of use, reverse osmosis	(b)	Basic	Surface waters usually require pre-filtration
5. Lime softening	(d)	Advanced	All waters

6. Green sand filtration	(e)	Basic	All ground waters; competing anion concentrations may affect regeneration frequency
7. Co-precipitation with barium sulfate	(f)	Intermediate to advanced	Ground waters with suitable quality
8. Electrodialysis/electrodialysis reversal	(g)	Basic to intermediate	All ground waters
9. Pre-formed hydrous manganese oxide filtration	(h)	Intermediate	All ground waters
10. Activated alumina	(a), (i)	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency
11. Enhanced coagulation/filtration	(j)	Advanced	Can treat a wide range of water qualities

Limitation Footnotes:

[a] The regeneration solution contains high concentrations of the contaminant ions, which could result in disposal issues.

[b] When point of use devices are used for compliance, programs for long-term operation, maintenance, and monitoring shall be provided by systems to ensure proper performance.

[c] Reject water disposal may be an issue.

[d] The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small systems.

[e] Removal efficiencies can vary depending on water quality.

[f] Since the process requires static mixing, detention basins, and filtration, this technology is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

[g] Applies to ionized radionuclides only.

[h] This technology is most applicable to small systems with filtration already in place.

[i] Chemical handling during regeneration and pH adjustment may be too difficult for small systems without an operator trained in these procedures.

[j] This would involve modification to a coagulation/filtration process already in place.

Table 64447.3-C
Best Available Technologies (BATs) for Small Water Systems by System Size
Radionuclides

Compliance Technologies for System Size Categories Based On Population Served			
	25-500	*501-3,300*	*3,301 - 10,000*
Contaminant	*Unit Technologies (Numbers Correspond to Table 64447.3-B)*		
Combined radium-226 and radium-228	1, 2 ,3, 4, 5, 6, 7, 8, 9	1, 2 ,3, 4, 5, 6, 7, 8, 9	1, 2 ,3, 4, 5, 6, 7, 8, 9
Gross alpha particle activity	3, 4	3, 4	3, 4
Beta particle activity and photon radioactivity	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
Uranium	1, 2, 4, 10, 11	1, 2, 3, 4, 5, 10, 11	1, 2, 3, 4, 5, 10, 11

§64447.4. Best Available Technologies (BATs) - Organic Chemicals.
The technologies listed in table 64447.4-A are the best available technology, treatment technologies, or other means available for achieving compliance with the MCLs in table 64444-A for organic chemicals.

Table 64447.4-A
Best Available Technologies (BATs)
Organic Chemicals

Chemical	*Best Available Technologies*		
	Granular Activated Carbon	Packed Tower Aeration	Oxidation
(a) Volatile Organic Chemicals (VOCs)			
Benzene	X	X	
Carbon Tetrachloride	X	X	
1,2-Dichlorobenzene	X	X	
1,4-Dichlorobenzene	X	X	
1,1-Dichloroethane	X	X	
1,2-Dichloroethane	X	X	

Chemical	*Best Available Technologies*		
	Granular Activated Carbon	Packed Tower Aeration	Oxidation
1,1-Dichloroethylene	X	X	
cis-1,2-Dichloroethylene	X	X	
trans-1,2-Dichloroethylene	X	X	
Dichloromethane		X	
1,2-Dichloropropane	X	X	
1,3-Dichloropropene	X	X	
Ethylbenzene	X	X	
Methyl-*tert*-butyl ether		X	
Monochlorobenzene	X	X	
Styrene	X	X	
1,1,2,2-Tetrachloroethane	X	X	
Tetrachloroethylene	X	X	
Toluene	X	X	
1,2,4-Trichlorobenzene	X	X	
1,1,1-Trichloroethane	X	X	
1,1,2-Trichloroethane	X	X	
Trichlorofluoromethane	X	X	
Trichlorotrifluoroethane	X	X	
Trichloroethylene	X	X	
Vinyl Chloride		X	
Xylenes	X	X	
(b) Synthetic Organic Chemicals (SOCs)			
Alachlor	X	X	
Atrazine	X		
Bentazon		X	
Benzo(a)pyrene	X		
Carbofuran	X		
Chlordane	X		
2,4-D	X		
Dalapon	X		
Di(2-ethylhexyl)adipate	X	X	
Dinoseb	X		
Diquat	X		
1,2-Dibromo-3-chloropropane	X	X	
Di(2-ethylhexyl)phthalate	X		
Endothall	X		
Endrin	X		
Ethylene Dibromide	X	X	

Chemical	*Best Available Technologies*		
	Granular Activated Carbon	Packed Tower Aeration	Oxidation
Glyphosate			X
Heptachlor	X		
Heptachlor epoxide	X		
Hexachlorobenzene	X		
Hexachlorocyclopentadiene	X	X	
Lindane	X		
Methoxychlor	X		
Molinate	X		
Oxamyl	X		
Picloram	X		
Pentachlorophenol	X		
Polychlorinated Biphenyls	X		
Simazine	X		
Thiobencarb	X		
Toxaphene	X	X	
1,2,3-Trichloropropane	X		
2,3,7,8-TCDD (Dioxin)	X		
2,4,5-TP (Silvex)	X		

Article 14. Treatment Techniques

§64448. Treatment Technique Requirements.

(a) A public water system which uses acrylamide and/or epichlorohydrin in drinking water treatment shall certify annually in writing to the State Board that the combination of dose and monomer does not exceed the following levels:

(1) Acrylamide: 0.05% monomer in polyacrylamide dosed at 1 mg/L, or equivalent.

(2) Epichlorohydrin: 0.01% residual of epichlorohydrin dosed at 20 mg/L, or equivalent.

Article 16. Secondary Drinking Water Standards

§64449. Secondary Maximum Contaminant Levels and Compliance.

(a) The secondary MCLs shown in Tables 64449-A and 64449-B shall not be exceeded in the water supplied to the public by community water systems.

Table 64449-A
Secondary Maximum Contaminant Levels
"Consumer Acceptance Contaminant Levels"

Constituents	*Maximum Contaminant Levels/Units*
Aluminum	0.2 mg/L
Color	15 Units
Copper	1.0 mg/L
Foaming Agents (MBAS)	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Methyl-*tert*-butyl ether (MTBE)	0.005 mg/L
Odor—Threshold	3 Units
Silver	0.1 mg/L
Thiobencarb	0.001 mg/L
Turbidity	5 Units
Zinc	5.0 mg/L

Table 64449-B
Secondary Maximum Contaminant Levels
"Consumer Acceptance Contaminant Level Ranges"

	Maximum Contaminant Level Ranges		
Constituent, Units	*Recommended*	*Upper*	*Short Term*
Total Dissolved Solids, mg/L	500	1,000	1,500
or			
Specific Conductance, µS/cm	900	1,600	2,200
Chloride, mg/L	250	500	600
Sulfate, mg/L	250	500	600

(b) Each community water system shall monitor its groundwater sources or distribution system entry points representative of the effluent of source treatment every three years and its approved surface water sources or distribution system entry points representative of the effluent of source treatment annually for the following:

(1) Secondary MCLs listed in Tables 64449-A and 64449-B; and

(2) Bicarbonate, carbonate, and hydroxide alkalinity, calcium, magnesium, sodium, pH, and total hardness.

(c) If the level of any constituent in Table 64449-A exceeds an MCL, the community water system shall proceed as follows:

(1) If monitoring quarterly, determine compliance by a running annual average of four quarterly samples;

(2) If monitoring less than quarterly, initiate quarterly monitoring and determine compliance on the basis of an average of the initial sample and the next three consecutive quarterly samples collected;

(3) If a violation has occurred (average of four consecutive quarterly samples exceeds an MCL), inform the State Board when reporting pursuant to Section 64469;

(4) After one year of quarterly monitoring during which all the results are below the MCL and the results do not indicate any trend toward exceeding the MCL, the system may request the State Board to allow a reduced monitoring frequency.

(d) For the constituents shown on Table 64449-B, no fixed consumer acceptance contaminant level has been established.

(1) Constituent concentrations lower than the Recommended contaminant level are desirable for a higher degree of consumer acceptance.

(2) Constituent concentrations ranging to the Upper contaminant level are acceptable if it is neither reasonable nor feasible to provide more suitable waters.

(3) Constituent concentrations ranging to the short term contaminant levelare acceptable only for existing community water systems on a temporary basis pending construction of treatment facilities or development of acceptable new water sources.

(e) New services from community water systems serving water which carries constituent concentrations between the Upper and Short Term contaminant levels shall be approved only:

(1) If adequate progress is being demonstrated toward providing water of improved mineral quality.

(2) For other compelling reasons approved by the State Board.

(f) A community water system may apply to the State Board for a waiver from the monitoring frequencies specified in subsection (b), if the system has conducted at least three rounds of monitoring (three periods for groundwater sources or three years for approved surface water sources) and these analytical results are less than the MCLs. The water system shall specify the basis for its request. A system with a waiver shall collect a minimum of one sample per source while the waiver is in effect and the term of the waiver shall not exceed one compliance cycle (i.e., nine years).

(g) Nontransient-noncommunity and transient-noncommunity water systems shall monitor their sources or distribution system entry points representative of the effluent of source treatment for bicarbonate, carbonate, and hydroxide alkalinity, calcium, iron, magnesium, manganese, pH, specific conductance, sodium, and total hardness at least

once. In addition, nontransient-noncommunity water systems shall monitor for the constituents in Tables 64449-A and B at least once.

§64449.2. Waivers for Secondary MCL Compliance.

(a) If the average of four consecutive quarters of sample results for a constituent that does not have a primary MCL is not greater than three times the secondary MCL or greater than the State Notification Level, an existing community water system is eligible to apply for a nine-year waiver of a secondary MCL in Table 64449-A, for the following:

(1) An existing source; or

(2) A new source that is being added to the existing water system, as long as:

(A) The source is not being added to expand system capacity for further development; and

(B) The concentration of the constituent of concern in the new source would not cause the average value of the constituent's concentration at any point in the water delivered by the system to increase by more than 20%.

(b) To apply for a waiver of a secondary MCL, the community water system shall conduct and submit a study to the State Board within one year of violating the MCL that includes the following:

(1) The water system complaint log, maintained pursuant to section 64470(a), along with any other evidence of customer dissatisfaction, such as a log of calls to the county health department;

(2) An engineering report, prepared by an engineer registered in California with experience in drinking water treatment, that evaluates all reasonable alternatives and costs for bringing the water system into MCL compliance and includes a recommendation for the most cost-effective and feasible approach;

(3) The results of a customer survey distributed to all the water system's billed customers that has first been approved by the State Board based on whether it includes:

(A) Estimated costs to individual customers of the most cost-effective alternatives presented in the engineering report that are acceptable to the State Board based on its review of their effectiveness and feasibility;

(B) The query: "Are you willing to pay for *(identify constituent)* reduction treatment?";

(C) The query: "Do you prefer to avoid the cost of treatment and live with the current water quality situation?"

(D) The statement: "If you do not respond to this survey, (*insert system name*) will assume that you are in support of the reduction treatment recommended by the engineering report."

(4) A brief report (agenda, list of attendees, and transcript) of a public meeting held by the water system to which customers were invited, and at which both the tabulated results of the customer survey and the engineering report were presented with a request for input from the public.

(c) A community water system may apply for a waiver for iron and/or manganese if, in addition to meeting the requirements in Subsection (b), an average of four consecutive quarter results for the source has not exceeded a State Notification Level for iron and/or manganese. In addition, the system shall include sequestering, as follows:

(1) As one of the alternatives evaluated in the Engineering Report;

(2) In the customer survey as a query: "Are you willing to pay for iron and/or manganese sequestering treatment?"

(d) Unless 50% or more of the billed customers respond to the survey, the community water system shall conduct another survey pursuant to Subsections (b) or (c) within three months from the date of the survey by sending the survey out to either all the customers again, or only the customers that did not respond to the survey. The water system shall not be eligible for a waiver until it achieves at least a 50% response rate on the survey.

(e) If the customer survey indicates that the percentage of billed customers that voted for constituent reduction treatment and the number of billed customers that did not respond to the survey at all exceeds 50% of the total number of billed customers, the community water system shall install treatment, except as provided in Subsection (f), within three years from the date the system completed the customer survey, pursuant to a schedule established by the State Board.

(f) For iron and/or manganese MCL waiver applications, if the percentage of survey respondents that voted for constituent reduction treatment plus the percentage of survey respondents that voted for sequestering exceeds the percentage that voted to avoid the cost and maintain the current water quality situation, the community water system shall implement either constituent reduction treatment or sequestering, on the basis of which was associated with the higher percentage result. If the highest percentage result is for sequestering, the system shall submit a sequestering implementation and assessment plan to the State Board that includes:

(1) A description of the pilot testing or other type of evaluation performed to determine the most effective sequestering agent for use in the system's water;

(2) The sequestering agent feed rate and the equipment to be used to insure that the rate is maintained for each source;

(3) An operations plan; and

(4) The projected cost of sequestering including capital, operations and maintenance costs.

(g) To apply for renewal of a waiver for a subsequent nine years, the system shall request approval from the State Board at least six months prior to the end of the current waiver period. The renewal request shall include all monitoring and treatment operations data for the constituent for which the waiver had been granted and any related customer complaints submitted to the water system. Based on its review of the data and customer

complaints, the State Board may require the water system to conduct another customer survey pursuant to this section before making a determination on the waiver renewal.

§64449.4. Use of Sources that Exceed a Secondary MCL and Do Not Have a Waiver.
A source that exceeds one or more of the secondary MCLs in Table 64449-A and does not have a waiver may be used only if the source meets the requirements in Section 64414, and the community water system:

(a) Meters the source's monthly production and submits the results to the State Board by the 10th day of the next month;

(b) Counts any part of a day as a full day for purposes of determining compliance with Section 64414(c);

(c) As a minimum, conducts public notification by including information on the source's use (dates, constituent levels, and reasons) in the Consumer Confidence Report (Sections 64480 through 64483);

(d) Provides public notice prior to use of the source by electronic media, publication in a local newspaper, and/or information in the customer billing, if the situation is such that the water system can anticipate the use of the source (e.g., to perform water system maintenance); and

(e) Takes corrective measures such as flushing after the source is used to minimize any residual levels of the constituent in the water distribution system.

§64449.5. Distribution System Physical Water Quality.

(a) The water supplier shall determine the physical water quality in the distribution system. This determination shall be based on one or more of the following:

(1) Main flushing operations and flushing records.

(2) Consumer complaint records showing location, nature and duration of the physical water quality problem.

(3) Other pertinent data relative to physical water quality in the distribution system.

(b) If the State Board determines that a water system does not have sufficient data on physical water quality in the distribution system to make the determination required in paragraph (a), the water supplier shall collect samples for the following general physical analyses: color, odor, and turbidity. Samples shall be collected from representative points in the distribution system:

(1) For community water systems with 200 to 1,000 service connections: one sample per month.

(2) For community water systems with greater than 1,000 service connections: one sample for every four bacteriological samples required per month.

(3) For community water systems with less than 200 service connections: as established by the local health officer or the State Board.

(c) Odor samples required as a part of general physical analyses may be examined in the field as per Section 64415(b).

(d) The distribution system water of public water systems shall be free from significant amounts of particulate matter.

Article 18. Notification of Water Consumers and the State Board

§64463. General Public Notification Requirements.

(a) Each public (community, nontransient-noncommunity and transient-noncommunity) water system shall give public notice to persons served by the water system pursuant to this article.

(b) Each water system required to give public notice shall submit the notice to the State Board, in English, for approval prior to distribution or posting, unless otherwise directed by the State Board.

(c) Each wholesaler shall give public notice to the owner or operator of each of its retailer systems. A retailer is responsible for providing public notice to the persons it serves. If the retailer arranges for the wholesaler to provide the notification, the retailer shall notify the State Board prior to the notice being given.

(d) Each water system that has a violation of any of the regulatory requirements specified in section 64463.1(a), 64463.4(a), or 64463.7(a) in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system may limit distribution of the notice to only persons served by that portion of the system that is out of compliance, if the State Board has granted written approval on the basis of a review of the water system and the data leading to the violation or occurrence for which notice is being given.

(e) Each water system shall give new customers public notice of any acute violation as specified in section 64463.1(a) that occurred within the previous thirty days, any continuing violation, the existence of a variance or exemption, and/or any other ongoing occurrence that the State Board has determined poses a potential risk of adverse effects on human health [based on a review of estimated exposures and toxicological data associated with the contaminant(s)] and requires a public notice. Notice to new customers shall be given as follows:

(1) Community water systems shall give a copy of the most recent public notice prior to or at the time service begins; and

(2) Noncommunity water systems shall post the most recent public notice in conspicuous locations for as long as the violation, variance, exemption, or other occurrence continues.

§64463.1. Tier 1 Public Notice.

(a) A water system shall give public notice pursuant to this section and section 64465 if any of the following occurs:

(1) Violation of the total coliform MCL when:

(A) Fecal coliform or *E. coli* are present in the distribution system; or

(B) When any repeat sample tests positive for coliform and the water system fails to test for fecal coliforms or *E. coli* in the repeat sample;

(2) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL;

(3) Violation of a Chapter 17 treatment technique requirement resulting from a single exceedance of a maximum allowable turbidity level if:

(A) The State Board determines after consultation with the water system and a review of the data that a Tier 1 public notice is required; or

(B) The consultation between the State Board and the water system does not take place within 24 hours after the water system learns of the violation;

(4) Occurrence of a waterborne microbial disease outbreak, as defined in section 64651.91, or other waterborne emergency, a failure or significant interruption in water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that has the potential for adverse effects on human health as a result of short-term exposure;

(5) Other violation or occurrence that has the potential for adverse effects on human health as a result of short-term exposure, as determined by the State Board based on a review of all available toxicological and analytical data;

(6) Violation of the MCL for perchlorate or when a system is unable to resample within 48 hours of the system's receipt of the first sample showing an exceedance of the perchlorate MCL as specified in section 64432.3(d)(3);

(7) For chlorite:

(A) Violation of the MCL for chlorite;

(B) When a system fails to take the required sample(s) within the distribution system, on the day following an exceedance of the MCL at the entrance to the distribution system; or

(C) When a system fails to take a confirmation sample pursuant to section 64534.2(b)(4); or

(8) Violation of the MRDL for chlorine dioxide; or when a system fails to take the required sample(s) within the distribution system, on the day following an exceedance of the MRDL at the entrance to the distribution system.

(b) As soon as possible within 24 hours after learning of any of the violations in subsection (a) or being notified by the State Board that it has determined there is a potential for adverse effects on human health [pursuant to paragraph (a)(4), (5), or (6)], the water system shall:

(1) Give public notice pursuant to this section;

(2) Initiate consultation with the State Board within the same timeframe; and

(3) Comply with any additional public notice requirements that are determined by the consultation to be necessary to protect public health.

(c) A water system shall deliver the public notice in a manner designed to reach residential, transient, and nontransient users of the water system and shall use, as a minimum, one of the following forms:

(1) Radio or television;

(2) Posting in conspicuous locations throughout the area served by the water system;

(3) Hand delivery to persons served by the water system; or

(4) Other method approved by the State Board, based on the method's ability to inform water system users.

§64463.4. Tier 2 Public Notice.

(a) A water system shall give public notice pursuant to this section if any of the following occurs:

(1) Any violation of the MCL, MRDL, and treatment technique requirements, except:

(A) Where a Tier 1 public notice is required under section 64463.1; or

(B) Where the State Board determines that a Tier 1 public notice is required, based on potential health impacts and persistence of the violations;

(2) All violations of the monitoring and testing procedure requirements in sections 64421 through 64426.1, article 3 (Primary Standards – Bacteriological Quality), for which the State Board determines that a Tier 2 rather than a Tier 3 public notice is required, based on potential health impacts and persistence of the violations;

(3) Other violations of the monitoring and testing procedure requirements in this chapter, and chapters 15.5, 17 and 17.5, for which the State Board determines that a Tier 2 rather than a Tier 3 public notice is required, based on potential health impacts and persistence of the violations; or

(4) Failure to comply with the terms and conditions of any variance or exemption in place.

(b) A water system shall give the notice as soon as possible within 30 days after it learns of a violation or occurrence specified in subsection (a), except that the water system may request an extension of up to 60 days for providing the notice. This extension would be subject to the State Board's written approval based on the violation or

occurrence having been resolved and the State Board's determination that public health and welfare would in no way be adversely affected. In addition, the water system shall:

(1) Maintain posted notices in place for as long as the violation or occurrence continues, but in no case less than seven days;

(2) Repeat the notice every three months as long as the violation or occurrence continues. Subject to the State Board's written approval based on its determination that public health would in no way be adversely affected, the water system may be allowed to notice less frequently but in no case less than once per year. No allowance for reduced frequency of notice shall be given in the case of a total coliform MCL violation or violation of a Chapter 17 treatment technique requirement; and

(3) For turbidity violations pursuant to sections 64652.5(c)(2) and 64653(c), (d) and (f), as applicable, a water system shall consult with the State Board as soon as possible within 24 hours after the water system learns of the violation to determine whether a Tier 1 public notice is required. If consultation does not take place within 24 hours, the water system shall give Tier 1 public notice within 48 hours after learning of the violation.

(c) A water system shall deliver the notice, in a manner designed to reach persons served, within the required time period as follows:

(1) Unless otherwise directed by the State Board in writing based on its assessment of the violation or occurrence and the potential for adverse effects on public health and welfare, community water systems shall give public notice by;

(A) Mail or direct delivery to each customer receiving a bill including those that provide their drinking water to others (e.g., schools or school systems, apartment building owners, or large private employers), and other service connections to which water is delivered by the water system; and

(B) Use of one or more of the following methods to reach persons not likely to be reached by a mailing or direct delivery (renters, university students, nursing home patients, prison inmates, etc.):

1. Publication in a local newspaper;
2. Posting in conspicuous public places served by the water system, or on the Internet; or
3. Delivery to community organizations.

(2) Unless otherwise directed by the State Board in writing based on its assessment of the violation or occurrence and the potential for adverse effects on public health and welfare, noncommunity water systems shall give the public notice by:

(A) Posting in conspicuous locations throughout the area served by the water system; and

(B) Using one or more of the following methods to reach persons not likely to be reached by a public posting:

1. Publication in a local newspaper or newsletter distributed to customers;
2. E-mail message to employees or students;
3. Posting on the Internet or intranet; or

4. Direct delivery to each customer.

§64463.7. Tier 3 Public Notice.

(a) Each water system shall give public notice pursuant to this section if any of the following occurs:

(1) Monitoring violations;

(2) Failure to comply with a testing procedure, except where a Tier 1 public notice is required pursuant to section 64463.1 or the State Board determines that a Tier 2 public notice is required pursuant to section 64463.4; or

(3) Operation under a variance or exemption.

(b) Each water system shall give the public notice within one year after it learns of the violation or begins operating under a variance or exemption.

(1) The water system shall repeat the public notice annually for as long as the violation, variance, exemption, or other occurrence continues.

(2) Posted public notices shall remain in place for as long as the violation, variance, exemption, or other occurrence continues, but in no case less than seven days.

(3) Instead of individual Tier 3 public notices, a water system may use an annual report detailing all violations and occurrences for the previous twelve months, as long as the water system meets the frequency requirements specified in this subsection.

(c) Each water system shall deliver the notice in a manner designed to reach persons served within the required time period, as follows:

(1) Unless otherwise directed by the State Board in writing based on its assessment of the violation or occurrence and the potential for adverse effects on public health and welfare, community water systems shall give public notice by

(A) Mail or direct delivery to each customer receiving a bill including those that provide their drinking water to others (e.g., schools or school systems, apartment building owners, or large private employers), and other service connections to which water is delivered by the water system; and

(B) Use of one or more of the following methods to reach persons not likely to be reached by a mailing or direct delivery (renters, university students, nursing home patients, prison inmates, etc.):

1. Publication in a local newspaper;

2. Posting in conspicuous public places served by the water system, or on the Internet; or

3. Delivery to community organizations.

(2) Unless otherwise directed by the State Board in writing based on its assessment of the violation or occurrence and the potential for adverse effects on public health and welfare, noncommunity water systems shall give the public notice by:

(A) Posting in conspicuous locations throughout the area served by the water system; and

(B) Using one or more of the following methods to reach persons not likely to be reached by a posting:

1. Publication in a local newspaper or newsletter distributed to customers;
2. E-mail message to employees or students;
3. Posting on the Internet or intranet; or
4. Direct delivery to each customer.

(d) Community and nontransient-noncommunity water systems may use the Consumer Confidence Report pursuant to sections 64480 through 64483, to meet the initial and repeat Tier 3 public notice requirements in subsection 64463.7(b), as long as the Report meets the following:

(1) Is given no later than one year after the water system learns of the violation or occurrence;

(2) Includes the content specified in section 64465; and

(3) Is distributed pursuant to paragraph (b)(1) and (2) or subsection (c).

§64465. Public Notice Content and Format.

(a) Each public notice given pursuant to this article, except Tier 3 public notices for variances and exemptions pursuant to subsection (b), shall contain the following:

(1) A description of the violation or occurrence, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);

(2) The date(s) of the violation or occurrence;

(3) Any potential adverse health effects from the violation or occurrence, including the appropriate standard health effects language from appendices 64465-A through G;

(4) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in drinking water;

(5) Whether alternative water supplies should be used;

(6) What actions consumers should take, including when they should seek medical help, if known;

(7) What the water system is doing to correct the violation or occurrence;

(8) When the water system expects to return to compliance or resolve the occurrence;

(9) The name, business address, and phone number of the water system owner, operator, or designee of the water system as a source of additional information concerning the public notice;

(10) A statement to encourage the public notice recipient to distribute the public notice to other persons served, using the following standard language: "Please share this information with all the other people who drink this water, especially those who may not have received this public notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this public notice in a public place or distributing copies by hand or mail."; and

(11) For a water system with a monitoring and testing procedure violation, this language shall be included: "We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [*compliance period dates*], we *['did not monitor or test'* or *'did not complete all monitoring or testing']* for *[contaminant(s)]*, and therefore, cannot be sure of the quality of your drinking water during that time."

(b) A Tier 3 public notice for a water system operating under a variance or exemption shall include the elements in this subsection. If a water system has violated its variance or exemption conditions, the public notice shall also include the elements in subsection (a).

(1) An explanation of the reasons for the variance or exemption;

(2) The date on which the variance or exemption was issued;

(3) A brief status report on the steps the water system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(4) A notice of any opportunity for public input in the review of the variance or exemption.

(c) A public water system providing notice pursuant to this article shall comply with the following multilingual-related requirements:

(1) For a Tier 1 public notice:

(A) The notice shall be provided in English, Spanish, and the language spoken by any non-English-speaking group exceeding 10 percent of the persons served by the public water system, and the notice shall include a telephone number or address where such individuals may contact the public water system for assistance; and

(B) If any non-English-speaking group exceeds 1,000 persons served by the public water system, but does not exceed 10 percent served, the notice shall include information in the appropriate language(s) regarding the importance of the notice, and the telephone number or address where such individuals may contact the public water system to obtain a translated copy of the notice from the public water system or assistance in the appropriate language;

(2) For a Tier 2 or Tier 3 public notice:

(A) The notice shall contain information in Spanish regarding the importance of the notice, or contain a telephone number or address where Spanish-speaking residents may contact the public water system to obtain a translated copy of the notice or assistance in Spanish; and

(B) When a non-English speaking group other than Spanish-speaking exceeds 1,000 residents or 10 percent of the residents served by the public water system, the notice shall include:

1. Information in the appropriate language(s) regarding the importance of the notice; or

2. A telephone number or address where such residents may contact the public water system to obtain a translated copy of the notice or assistance in the appropriate language; and

(3) For a public water system subject to the Dymally-Alatorre Bilingual Services Act, Chapter 17.5, Division 7, of the Government Code (commencing with section 7290), meeting the requirements of this Article may not ensure compliance with the Dymally-Alatorre Bilingual Services Act.

(d) Each public notice given pursuant to this article shall:

(1) Be displayed such that it catches people's attention when printed or posted and be formatted in such a way that the message in the public notice can be understood at the eighth-grade level;

(2) Not contain technical language beyond an eighth-grade level or print smaller than 12 point; and

(3) Not contain language that minimizes or contradicts the information being given in the public notice.

Appendix 64465-A. Health Effects Language
Microbiological Contaminants.

Contaminant	***Health Effects Language***
Total Coliform	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.
Fecal coliform/*E. coli*	Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
Turbidity	Turbidity has no health effects. However, high levels of turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

Appendix 64465-B. Health Effects Language
Surface Water Treatment

Contaminant	***Health Effects Language***
Giardia lamblia Viruses Heterotrophic plate count bacteria *Legionella* *Cryptosporidium*	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

Appendix 64465-C. Health Effects Language
Radioactive Contaminants.

Contaminant	***Health Effects Language***
Gross Beta particle activity	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Strontium-90	Some people who drink water containing strontium-90 in excess of the MCL over many years may have an increased risk of getting cancer.
Tritium	Some people who drink water containing tritium in excess of the MCL over many years may have an increased risk of getting cancer.
Gross Alpha particle activity	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Combined Radium 226/228	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
Total Radium (for nontransient noncommunity water systems)	Some people who drink water containing radium 223, 224, or 226 in excess of the MCL over many years may have an increased risk of getting cancer.
Uranium	Some people who drink water containing uranium in excess of the MCL over many years may have kidney problems or an increased risk of getting cancer.

Appendix 64465-D. Health Effects Language
Inorganic Contaminants.

Contaminant	***Health Effects Language***
Aluminum	Some people who drink water containing aluminum in excess of the MCL over many years may experience short-term gastrointestinal tract effects**.**
Antimony	Some people who drink water containing antimony in excess of the MCL over many years may experience increases in blood cholesterol and decreases in blood sugar.
Arsenic	Some people who drink water containing arsenic in excess of the MCL over many years may experience skin damage or circulatory system problems, and may have an increased risk of getting cancer.
Asbestos	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
Barium	Some people who drink water containing barium in excess of the MCL over many years may experience an increase in blood pressure.
Beryllium	Some people who drink water containing beryllium in excess of the MCL over many years may develop intestinal lesions.
Cadmium	Some people who drink water containing cadmium in excess of the MCL over many years may experience kidney damage.
Chromium	Some people who use water containing chromium in excess of the MCL over many years may experience allergic dermatitis.
Copper	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time may experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years may suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.
Cyanide	Some people who drink water containing cyanide in excess of the MCL over many years may experience nerve damage or thyroid problems.
Fluoride	*For the Consumer Confidence Report:* Some people who drink water containing fluoride in excess of the federal MCL of 4 mg/L over many years may get bone disease, including pain and tenderness of the bones. Children who drink water containing fluoride in excess of the state MCL of 2 mg/L may get mottled teeth. *For a Public Notice:* This is an alert about your drinking water and a cosmetic dental problem that might affect children under nine years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/L) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). The drinking water provided by your community water system [*name*] has a fluoride concentration of [*insert value*] mg/L. Dental fluorosis may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from

	the gums. Children under nine should be provided with alternative sources of drinking water or water that has been treated to remove the fluoride to avoid the possibility of staining and pitting of their permanent teeth. You may also want to contact your dentist about proper use by young children of fluoride-containing products. Older children and adults may safely drink the water. Drinking water containing more than 4 mg/L of fluoride can increase your risk of developing bone disease. For more information, please call [*water system contact name*] of [*water system name*] at [*phone number*]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call the State Board's Residential Water Treatment Device Registration Unit at (916) 449-5600.
Lead	Infants and children who drink water containing lead in excess of the action level may experience delays in their physical or mental development. Children may show slight deficits in attention span and learning abilities. Adults who drink this water over many years may develop kidney problems or high blood pressure.
Mercury	Some people who drink water containing mercury in excess of the MCL over many years may experience mental disturbances, or impaired physical coordination, speech and hearing.
Nickel	Some people who drink water containing nickel in excess of the MCL over many years may experience liver and heart effects.
Nitrate	Infants below the age of six months who drink water containing nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant's blood to carry oxygen. Symptoms include shortness of breath and blueness of the skin. High nitrate levels may also affect the oxygen-carrying ability of the blood of pregnant women.
Nitrite	Infants below the age of six months who drink water containing nitrite in excess of the MCL may become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blueness of the skin.
Perchlorate	Perchlorate has been shown to interfere with uptake of iodide by the thyroid gland, and to thereby reduce the production of thyroid hormones, leading to adverse effects associated with inadequate hormone levels. Thyroid hormones are needed for normal prenatal growth and development of the fetus, as well as for normal growth and development in the infant and child. In adults, thyroid hormones are needed for normal metabolism and mental function.
Selenium	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years may experience hair or fingernail losses, numbness in fingers or toes, or circulation system problems.

Thallium	Some people who drink water containing thallium in excess of the MCL over many years may experience hair loss, changes in their blood, or kidney, intestinal, or liver problems.

Appendix 64465-E. Health Effects Language
Volatile Organic Contaminants.

Contaminant	***Health Effects Language***
Benzene	Some people who use water containing benzene in excess of the MCL over many years may experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
Carbon Tetrachloride	Some people who use water containing carbon tetrachloride in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer.
1,2-Dichlorobenzene	Some people who drink water containing 1,2-dichlorobenzene in excess of the MCL over many years may experience liver, kidney, or circulatory system problems.
1,4-Dichlorobenzene	Some people who use water containing 1,4-dichlorobenzene in excess of the MCL over many years may experience anemia, liver, kidney, or spleen damage, or changes in their blood.
1,1-Dichloroethane	Some people who use water containing 1,1-dichloroethane in excess of the MCL over many years may experience nervous system or respiratory problems.
1,2-Dichloroethane	Some people who use water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
1,1-Dichloroethylene	Some people who use water containing 1,1-dichloroethylene in excess of the MCL over many years may experience liver problems.
cis-1,2-Dichloroethylene	Some people who use water containing cis-1,2-dichloroethylene in excess of the MCL over many years may experience liver problems.
trans-1,2-Dichloroethylene	Some people who drink water containing trans-1,2-dichloroethylene in excess of the MCL over many years may experience liver problems.
Dichloromethane	Some people who drink water containing dichloromethane in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer.
1,2-Dichloropropane	Some people who use water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
1,3-Dichloropropene	Some people who use water containing 1,3-dichloropropene in excess of the MCL over many years may have an increased risk of getting cancer.
Ethylbenzene	Some people who use water containing ethylbenzene in excess of the MCL over many years may experience liver or kidney problems.

Methyl-tert-butyl ether	Some people who use water containing methyl-tert-butyl ether in excess of the MCL over many years may have an increased risk of getting cancer.
Monochlorobenzene	Some people who use water containing monochlorobenzene in excess of the MCL over many years may experience liver or kidney problems.
Styrene	Some people who drink water containing styrene in excess of the MCL over many years may experience liver, kidney, or circulatory system problems.
1,1,2,2-Tetrachloroethane	Some people who drink water containing 1,1,2,2-tetrachloroethane in excess of the MCL over many years may experience liver or nervous system problems.
Tetrachloroethylene	Some people who use water containing tetrachloroethylene in excess of the MCL over many years may experience liver problems, and may have an increased risk of getting cancer.
1,2,4-Trichlorobenzene	Some people who use water containing 1,2,4-trichlorobenzene in excess of the MCL over many years may experience adrenal gland changes.
1,1,1,-Trichloroethane	Some people who use water containing 1,1,1-trichloroethane in excess of the MCL over many years may experience liver, nervous system, or circulatory system problems.
1,1,2-Trichloroethane	Some people who use water containing 1,1,2- trichloroethane in excess of the MCL over many years may experience liver, kidney, or immune system problems.
Trichloroethylene (TCE)	Some people who use water containing trichloroethylene in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer.
Toluene	Some people who use water containing toluene in excess of the MCL over many years may experience nervous system, kidney, or liver problems.
Trichlorofluoro-methane	Some people who use water containing trichlorofluoromethane in excess of the MCL over many years may experience liver problems.
1,1,2-Trichloro-1,2,2-trifluoroethane	Some people who use water containing 1,1,2-trichloro-1,2,2-tri~~ch~~fluoroethane in excess of the MCL over many years may experience liver problems.
Vinyl Chloride	Some people who use water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
Xylenes	Some people who use water containing xylenes in excess of the MCL over many years may experience nervous system damage.

Appendix 64465-F. Health Effects Language
Synthetic Organic Contaminants.

Contaminant	***Health Effects Language***
2,4-D	Some people who use water containing the weed killer 2,4-D in excess of the MCL over many years may experience kidney, liver, or adrenal gland problems.
2,4,5-TP (Silvex)	Some people who drink water containing Silvex in excess of the MCL over many years may experience liver problems.
Alachlor	Some people who use water containing alachlor in excess of the MCL over many years may experience eye, liver, kidney, or spleen problems, or experience anemia, and may have an increased risk of getting cancer.
Atrazine	Some people who use water containing atrazine in excess of the MCL over many years may experience cardiovascular system problems or reproductive difficulties.
Bentazon	Some people who drink water containing bentazon in excess of the MCL over many years may experience prostate and gastrointestinal effects.
Benzo(a)pyrene [PAH]	Some people who use water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
Carbofuran	Some people who use water containing carbofuran in excess of the MCL over many years may experience problems with their blood, or nervous or reproductive system problems.
Chlordane	Some people who use water containing chlordane in excess of the MCL over many years may experience liver or nervous system problems, and may have an increased risk of getting cancer.
Dalapon	Some people who drink water containing dalapon in excess of the MCL over many years may experience minor kidney changes.
Dibromochloro-propane (DBCP)	Some people who use water containing DBCP in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
Di (2-ethylhexyl) adipate	Some people who drink water containing di(2-ethylhexyl) adipate in excess of the MCL over many years may experience weight loss, liver enlargement, or possible reproductive difficulties.
Di (2-ethylhexyl) phthalate	Some people who use water containing di(2-ethylhexyl) phthalate well in excess of the MCL over many years may experience liver problems or reproductive difficulties, and may have an increased risk of getting cancer.
Dinoseb	Some people who drink water containing dinoseb in excess of the MCL over many years may experience reproductive difficulties.
Dioxin (2,3,7,8-TCDD)	Some people who use water containing dioxin in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.

Diquat	Some people who drink water containing diquat in excess of the MCL over many years may get cataracts.
Endothall	Some people who drink water containing endothall in excess of the MCL over many years may experience stomach or intestinal problems.
Endrin	Some people who drink water containing endrin in excess of the MCL over many years may experience liver problems.
Ethylene dibromide (EDB)	Some people who use water containing ethylene dibromide in excess of the MCL over many years may experience liver, stomach, reproductive system, or kidney problems, and may have an increased risk of getting cancer.
Glyphosate	Some people who drink water containing glyphosate in excess of the MCL over many years may experience kidney problems or reproductive difficulties.
Heptachlor	Some people who use water containing heptachlor in excess of the MCL over many years may experience liver damage and may have an increased risk of getting cancer.
Heptachlor epoxide	Some people who use water containing heptachlor epoxide in excess of the MCL over many years may experience liver damage, and may have an increased risk of getting cancer.
Hexachlorobenzene	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years may experience liver or kidney problems, or adverse reproductive effects, and may have an increased risk of getting cancer.
Hexachlorocyclo-pentadiene	Some people who use water containing hexachlorocyclopentadiene in excess of the MCL over many years may experience kidney or stomach problems.
Lindane	Some people who drink water containing lindane in excess of the MCL over many years may experience kidney or liver problems.
Methoxychlor	Some people who drink water containing methoxychlor in excess of the MCL over many years may experience reproductive difficulties.
Molinate (Ordram)	Some people who use water containing molinate in excess of the MCL over many years may experience reproductive effects.
Oxamyl [Vydate]	Some people who drink water containing oxamyl in excess of the MCL over many years may experience slight nervous system effects.
PCBs [Polychlorinated biphenyls]	Some people who drink water containing PCBs in excess of the MCL over many years may experience changes in their skin, thymus gland problems, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
Pentachlorophenol	Some people who use water containing pentachlorophenol in excess of the MCL over many years may experience liver or kidney problems, and may have an increased risk of getting cancer.
Picloram	Some people who drink water containing picloram in excess of the MCL over many years may experience liver problems.

Simazine	Some people who use water containing simazine in excess of the MCL over many years may experience blood problems.
Thiobencarb	Some people who use water containing thiobencarb in excess of the MCL over many years may experience body weight and blood effects.
Toxaphene	Some people who use water containing toxaphene in excess of the MCL over many years may experience kidney, liver, or thyroid problems, and may have an increased risk of getting cancer.
1,2,3-Trichloropropane	Some people who drink water containing 1,2,3-trichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.

Appendix 64465-G. Health Effects Language
Disinfection Byproducts, Byproduct Precursors, and Disinfectant Residuals

Contaminant	***Health Effects Language***
TTHMs [Total Trihalomethanes]	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience liver, kidney, or central nervous system problems, and may have an increased risk of getting cancer.
Haloacetic Acids	Some people who drink water containing halocetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
Bromate	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
Chloramines	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
Chlorine	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
Chlorite	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
Chlorine dioxide (2 consecutive daily samples at the entry point to the distribution system that are greater than the MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today are the result of exceedances at the treatment facility

	only, not within the distribution system that delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers.
Chlorine dioxide (one or more distribution system samples are above the MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today include exceedances of the State standard within the distribution system that delivers water to consumers. These violations may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.
Control of DBP precursors (TOC)	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.

Appendix 64465-H. Health Effects Language
Other Treatment Techniques

Contaminant	***Health Effects Language***
Acrylamide	Some people who drink water containing high levels of acrylamide over a long period of time may experience nervous system or blood problems, and may have an increased risk of getting cancer.
Epichlorohydrin	Some people who drink water containing high levels of epichlorohydrin over a long period of time may experience stomach problems, and may have an increased risk of getting cancer.

§64466. Special Notice for Unregulated Contaminant Monitoring Results.
Water systems required to monitor pursuant to section 64450 (Unregulated Chemicals – Monitoring) and/or Federal Register 64(180), p 50556-50620, September 17, 1999, shall notify persons served by the water system of the availability of the results, as follows:

(a) No later than 12 months after the results are known;

(b) Pursuant to sections 64463.7(c) and (d)(1) and (3); and

(c) Include a contact and telephone number where information on the results may be obtained.

Article 19. Records, Reporting and Recordkeeping

§64469. Reporting Requirements.

(a) Analytical results of all sample analyses completed in a calendar month shall be reported to the State Board no later than the tenth day of the following month.

(b) Analytical results of all sample analyses completed by water wholesalers in a calendar month shall be reported to retail customers and the State Board no later than the tenth day of the following month.

(c) Analytical results shall be reported to the State Board electronically using the Electronic Deliverable Format as defined in The Electronic Deliverable Format [EDF] Version 1.2i Guidelines & Restrictions dated April 2001 and Data Dictionary dated April 2001.

(d) Within 10 days of giving initial or repeat public notice pursuant to Article 18 of this Chapter, except for notice given under section 64463.7(d), each water system shall submit a certification to the State Board that it has done so, along with a representative copy of each type of public notice given.

§64470. Recordkeeping.

(a) A water supplier shall maintain records on all water quality and system water outage complaints received, both verbal and written, and corrective action taken. These records shall be retained for a period of five years for State Board review.

(b) A water supplier shall retain, on or at a convenient location near the water utility premises, records as indicated below:

(1) Records of microbiological analyses and turbidity analyses from at least the most recent five years and chemical analyses from at least the most recent 10 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided the following information is included:

(A) The date, place, and time of sampling; and identification of the person who collected the sample;

(B) Identification of the sample as a routine sample, check sample, raw or finished water or other special sample;

(C) Date of report;

(D) Name of the laboratory and either the person responsible for performing the analysis or the laboratory director;

(E) The analytical technique or method used; and

(F) The results of the analysis.

(2) Records and resultant corrective actions shall be kept not less than three years following the final action taken to correct a particular violation;

(3) Copies of any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the water supplier, a private consultant or any local, state or federal agency, for not less than 10 years following completion of the sanitary survey involved;

(4) Variances or exemptions granted to the system, for not less than five years following the expiration of such variance or exemption;

(5) Copies of any Tier 1, Tier 2, and Tier 3 public notices, for not less than three years; and

(6) Copies of monitoring plans developed pursuant to sections 64416, 64422, and 64534.8 for the same period of time as the records of analyses taken under the plan are required to be kept pursuant to paragraph (1).

Article 20. Consumer Confidence Report

§64480. Applicability and Distribution.

(a) Except as provided in subsection (b), each community and nontransient-noncommunity (NTNC) water system shall prepare and deliver the first Consumer Confidence Report by July 1, 2001, and subsequent reports by July 1 annually thereafter. The first Consumer Confidence Report shall contain data collected during, or prior to, calendar year 2000, as prescribed by section 64481(d)(1). Each Consumer Confidence Report thereafter shall contain data collected during, or prior to, the previous calendar year.

(b) A new community or NTNC water system shall deliver its first Consumer Confidence Report by July 1 of the year after its first full calendar year in operation and subsequent reports by July 1 annually thereafter.

(c) A community or NTNC water system that sells water to another community or NTNC water system shall deliver the applicable information required in section 64481 to the purchasing system by no later than April 1 of each year or on a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties.

§64481. Content of the Consumer Confidence Report.

(a) A Consumer Confidence Report shall contain information on the source of the water delivered, including:

(1) The type of water delivered by the water system (e.g., surface water, ground water) and the commonly used name (if any) and location of the body (or bodies) of water; and

(2) If a source water assessment has been completed, notification that the assessment is available, how to obtain it, the date it was completed or last updated, and a

brief summary of the system's vulnerability to potential sources of contamination, using language provided by the State Board if the State Board conducted the assessment.

(b) For any of the following terms used in the Consumer Confidence Report, the water system shall provide the specified language below:

(1) Regulatory Action Level: "The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow."

(2) Maximum Contaminant Level or MCL: "The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water."

(3) Maximum Contaminant Level Goal or MCLG: "The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency."

(4) Public Health Goal or PHG: "The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency."

(5) Primary Drinking Water Standard or PDWS: "MCLs, MRDLs, and treatment techniques for contaminants that affect health, along with their monitoring and reporting requirements."

(6) Treatment technique: "A required process intended to reduce the level of a contaminant in drinking water."

(7) Variances and exemptions: "State Board permission to exceed an MCL or not comply with a treatment technique under certain conditions."

(8) Maximum residual disinfectant level or MRDL: "The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants."

(9) Maximum residual disinfectant level goal or MRDLG: "The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants."

(c) If any of the following are detected, information for each pursuant to subsection (d) shall be included in the Consumer Confidence Report:

(1) Contaminants subject to an MCL, regulatory action level, MRDL, or treatment technique (regulated contaminants), as specified in sections 64426.1, 64431, 64442, 64443, 64444, 64448, 64449, 64533, 64533.5, 64536, 64536.2, 64653 and 64678;

(2) Contaminants specified in 40 Code of Federal Regulations part 141.40 (7-1-2007 edition) for which monitoring is required (unregulated contaminants);

(3) Microbial contaminants detected as provided under subsection (e); and

(4) Sodium and hardness.

(d) For contaminants identified in subsection (c), the water system shall include in the Consumer Confidence Report one table or several adjacent tables that have been developed pursuant to this subsection. Any additional monitoring results that a water system chooses to include in its Consumer Confidence Report shall be displayed separately.

(1) The data in the table(s) shall be derived from data collected to comply with U.S. Environmental Protection Agency (USEPA) and State Board monitoring and analytical requirements during calendar year 2000 for the first Consumer Confidence Report and subsequent calendar years thereafter. Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) shall include the date and results of the most recent sampling and the Consumer Confidence Report shall include a brief statement indicating that the data presented in the table(s) are from the most recent testing done in accordance with the regulations. No data older than 9 years need be included.

(2) For detected regulated contaminants referenced in subsection (c)(1), the table(s) shall include:

(A) The MCL expressed as a number equal to or greater than 1.0;

(B) For a primary MCL, the public health goal (PHG) in the same units as the MCL; or if no PHG has been set for the contaminant, the table shall include the USEPA maximum contaminant level goal in the same units as the MCL;

(C) For a detected contaminant that does not have an MCL, the table(s) shall indicate whether there is a treatment technique or specify the regulatory action level or MRDL (and MRDLG) applicable to that contaminant, and the Consumer Confidence Report shall include the appropriate language specified in subsection (b);

(D) For detected contaminants subject to an MCL, except turbidity and total coliforms, the sample result(s) collected at compliance monitoring sampling points shall be reported in the same units as the MCL as follows:

1. When compliance is determined by the results of a single sample, an initial sample averaged with one or two confirmation sample(s), or an average of four quarterly or six monthly samples, results shall be reported as follows:

A. For a single sampling point, or multiple sampling points for which data is being individually listed on the Consumer Confidence Report: the sample result and, if more than one sample was collected, the average and range of the sample results;

B. For multiple sampling points, each of which has been sampled only once and for which data is being summarized together on the Consumer Confidence Report: the average and range of the sample results. If the waters from the sampling points are entering the distribution system at the same point, a flow-weighted average may be reported; and

C. For multiple sampling points, one or more of which has been sampled more than once and for which data is being summarized together on the Consumer Confidence Report: the average of the individual sampling point averages and range of all the sample results. If the waters from the sampling points are entering the distribution system at the same point, a flow-weighted average may be reported.

2. When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location:

A. The highest running annual average of the monitoring location and the range of sample results or, if monitoring locations are summarized together for the Consumer Confidence Report, the highest running annual average of any of the monitoring locations and the range of sample results from all the monitoring locations; and

B. For TTHM and HAA5 monitored pursuant to section 64534.2(d): the highest locational running annual average (LRAA) for TTHM and HAA5 and the range of individual sample results for all monitoring locations. If more than one location exceeds the TTHM or HAA5 MCL, include the LRAA for all locations that exceed the MCL.

3. When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all monitoring location averages: the highest running annual average and the range of sample results from all the sampling points.

4. When compliance with the MCL is determined on the basis of monitoring after treatment installed to remove a contaminant: the average level detected in the water entering the distribution system and the range of sample results; and

5. If an MCL compliance determination was made in the year for which sample results are being reported and that determination was based on an average of results from both the previous and reporting years, then the compliance determination average shall be reported, but the range shall be based only on results from the year for which data is being reported.

(E) For turbidity:

1. When it is reported pursuant to the requirements of section 64652.5 (filtration avoidance): the highest value; and

2. When it is reported pursuant to section 64653 (filtration): the highest single measurement based on compliance reporting and the lowest monthly percentage of samples meeting the turbidity limits specified in section 64653 for the filtration technology being used;

(F) For lead and copper: the 90th percentile value of the most recent round of sampling, the number of sites sampled, and the number of sampling sites exceeding the action level;

(G) For total coliform:

1. The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

2. The highest monthly percentage of positive samples for systems collecting at least 40 samples per month.

(H) For fecal coliform or *E. coli*: the total number of positive samples during the year; and

(I) The likely source(s) of any detected contaminants having an MCL, MRDL, regulatory action level, or treatment technique. If the water system lacks specific information on the likely source, the table(s) shall include one or more of the typical

sources for that contaminant listed in appendix 64481-A or 64481-B that are most applicable to the system.

(3) The table(s) shall clearly identify any data indicating violations of MCLs, regulatory action levels, MRDLs, or treatment techniques and the Consumer Confidence Report shall give information on each violation including the length of the violation, potential adverse health effects (PDWS only), and actions taken by the system to address the violation. To describe the potential health effects, the system shall use the relevant language pursuant to appendices 64465-A through H; and

(4) For detected unregulated contaminants for which monitoring is required (except *Cryptosporidium*), the table(s) shall contain the average and range at which the contaminant was detected.

(e) If the system has performed any monitoring for *Cryptosporidium* that indicates that *Cryptosporidium* may be present in the source water or the finished water, the Consumer Confidence Report shall include a summary of the monitoring results and an explanation of their significance.

(f) If the system has performed any monitoring for radon that indicates that radon is present in the finished water, the Consumer Confidence Report shall include the monitoring results and an explanation of their significance.

(g) For the year covered by the report, the Consumer Confidence Report shall note any violations of paragraphs (1) through (7) and give related information, including any potential adverse health effects, and the steps the system has taken to correct the violation.

(1) Monitoring and reporting of compliance data.

(2) Filtration, disinfection, and recycled provisions prescribed by sections 64652, 64652.5, 64653, 64653.5(b), or 64654. For systems that have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes that constitutes a violation, the Consumer Confidence Report shall include the health effects language pursuant to appendix 64465-B as part of the explanation of potential adverse health effects.

(3) One or more actions prescribed by the lead and copper requirements in sections 64673, 64674, 64683 through 64686, and 64688. To address potential adverse health effects, the Consumer Confidence Report shall include the applicable language pursuant to appendix 64465-D for lead, copper, or both.

(4) Treatment technique requirements for Acrylamide and Epichlorohydrin in section 64448; to address potential adverse health effects, the Consumer Confidence Report shall include the relevant language from appendix 64465-H.

(5) Recordkeeping of compliance data.

(6) Special monitoring requirements prescribed by section 64449(b)(2) and (g).

(7) Terms of a variance, an exemption, or an administrative or judicial order.

(h) If a system is operating under the terms of a variance or an exemption issued under section 116430 or 116425 of the Health and Safety Code, the Consumer Confidence Report shall contain:

(1) An explanation of the reasons for the variance or exemption;

(2) The date on which the variance or exemption was issued;

(3) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(4) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.

(i) A Consumer Confidence Report shall contain the language in paragraphs (1) through (4).

(1) "The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity."

(2) "Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.

Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities."

(3) "In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health."

(4) "Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791)."

(j) A Consumer Confidence Report shall prominently display the following language: "Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791)."

(k) A Consumer Confidence Report shall include the telephone number of the owner, operator, or designee of the water system as a source of additional information concerning the report.

(l) A Consumer Confidence Report shall contain information in Spanish regarding the importance of the report or contain a telephone number or address where Spanish-speaking residents may contact the system to obtain a translated copy of the report or assistance in Spanish. For each non-English speaking group other than Spanish-speaking that exceeds 1,000 residents or 10% of the residents in a community, the Consumer Confidence Report shall contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(m) A Consumer Confidence Report shall include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

Appendix 64481-A.
Typical Origins of Contaminants with Primary MCLs, MRDLs Regulatory Action Levels, and Treatment Techniques

Contaminant	*Major origins in drinking water*
Microbiological	
Total coliform bacteria	Naturally present in the environment
Fecal coliform and *E. coli*	Human and animal fecal waste
Turbidity	Soil runoff
Surface water treatment	
Giardia lamblia	Naturally present in the environment
Viruses	
Heterotrophic plate count bacteria	
Legionella	
Cryptosporidium	
Radioactive	
Gross Beta particle activity	Decay of natural and man-made deposits
Strontium-90	Decay of natural and man-made deposits
Tritium	Decay of natural and man-made deposits
Gross Alpha particle activity	Erosion of natural deposits
Combined Radium 226/228	Erosion of natural deposits
Total Radium (for nontransient noncommunity water systems)	Erosion of natural deposits
Uranium	Erosion of natural deposits
Inorganic	
Aluminum	Erosion of natural deposits; residue from some surface water treatment processes
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes
Asbestos	Internal corrosion of asbestos cement water mains; erosion of natural deposits
Barium	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits

Beryllium	Discharge from metal refineries, coal-burning factories, and electrical, aerospace, and defense industries
Cadmium	Internal corrosion of galvanized pipes; erosion of natural deposits; discharge from electroplating and industrial chemical factories, and metal refineries; runoff from waste batteries and paints
Chromium	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Copper	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Cyanide	Discharge from steel/metal, plastic and fertilizer factories
Fluoride	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Lead	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Mercury	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and cropland
Nickel	Erosion of natural deposits; discharge from metal factories
Nitrate	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Nitrite	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Perchlorate	Perchlorate is an inorganic chemical used in solid rocket propellant, fireworks, explosives, flares, matches, and a variety of industries. It usually gets into drinking water as a result of environmental contamination from historic aerospace or other industrial operations that used or use, store, or dispose of perchlorate and its salts.
Selenium	Discharge from petroleum, glass, and metal refineries; erosion of natural deposits; discharge

	from mines and chemical manufacturers; runoff from livestock lots (feed additive)
Thallium	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Synthetic organic

2,4-D	Runoff from herbicide used on row crops, range land, lawns, and aquatic weeds
2,4,5-TP (Silvex)	Residue of banned herbicide
Acrylamide	Added to water during sewage/wastewater treatment
Alachlor	Runoff from herbicide used on row crops
Atrazine	Runoff from herbicide used on row crops and along railroad and highway right-of-ways
Bentazon	Runoff/leaching from herbicide used on beans, peppers, corn, peanuts, rice, and ornamental grasses
Benzo(a)pyrene [PAH]	Leaching from linings of water storage tanks and distribution mains
Carbofuran	Leaching of soil fumigant used on rice and alfalfa, and grape vineyards
Chlordane	Residue of banned insecticide
Dalapon	Runoff from herbicide used on right-of-ways, and crops and landscape maintenance
Dibromochloropropane (DBCP)	Banned nematocide that may still be present in soils due to runoff/leaching from former use on soybeans, cotton, vineyards, tomatoes, and tree fruit
Di(2-ethylhexyl) adipate	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	Discharge from rubber and chemical factories; inert ingredient in pesticides
Dinoseb	Runoff from herbicide used on soybeans, vegetables, and fruits
Dioxin [2,3,7,8-TCDD]	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	Runoff from herbicide use for terrestrial and aquatic weeds
Endothall	Runoff from herbicide use for terrestrial and aquatic weeds; defoliant
Endrin	Residue of banned insecticide and rodenticide
Epichlorohydrin	Discharge from industrial chemical factories; impurity of some water treatment chemicals
Ethylene dibromide (EDB)	Discharge from petroleum refineries; underground gas tank leaks; banned nematocide that may still be present

	in soils due to runoff and leaching from grain and fruit crops
Glyphosate	Runoff from herbicide use
Heptachlor	Residue of banned insecticide
Heptachlor epoxide	Breakdown of heptachlor
Hexachlorobenzene	Discharge from metal refineries and agricultural chemical factories; byproduct of chlorination reactions in wastewater
Hexachlorocyclopentadiene	Discharge from chemical factories
Lindane	Runoff/leaching from insecticide used on cattle, lumber, and gardens
Methoxychlor	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, and livestock
Molinate [Ordram]	Runoff/leaching from herbicide used on rice
Oxamyl [Vydate]	Runoff/leaching from insecticide used on field crops, fruits and ornamentals, especially apples, potatoes, and tomatoes
Pentachlorophenol	Discharge from wood preserving factories, cotton and other insecticidal/herbicidal uses
Picloram	Herbicide runoff
Polychlorinated biphenyls [PCBs]	Runoff from landfills; discharge of waste chemicals
Simazine	Herbicide runoff
Thiobencarb	Runoff/leaching from herbicide used on rice
Toxaphene	Runoff/leaching from insecticide used on cotton and cattle
1,2,3-Trichloropropane	Discharge from industrial and agricultural chemical factories; leaching from hazardous waste sites; used as cleaning and maintenance solvent, paint and varnish remover, and cleaning and degreasing agent; byproduct during the production of other compounds and pesticides.

Volatile organic

Benzene	Discharge from plastics, dyes and nylon factories; leaching from gas storage tanks and landfills
Carbon tetrachloride	Discharge from chemical plants and other industrial activities
1,2-Dichlorobenzene	Discharge from industrial chemical factories
1,4-Dichlorobenzene	Discharge from industrial chemical factories

1,1-Dichloroethane	Extraction and degreasing solvent; used in manufacture of pharmaceuticals, stone, clay and glass products; fumigant
1,2-Dichloroethane	Discharge from industrial chemical factories
1,1-Dichloroethylene	Discharge from industrial chemical factories
cis-1,2-Dichloroethylen	Discharge from industrial chemical factories; major biodegradation byproduct of TCE and PCE groundwater contamination
trans-1,2-Dichloroethylene	Discharge from industrial chemical factories; minor biodegradation byproduct of TCE and PCE groundwater contamination
Dichloromethane	Discharge from pharmaceutical and chemical factories; insecticide
1,2-Dichloropropane	Discharge from industrial chemical factories; primary component of some fumigants
1,3-Dichloropropene	Runoff/leaching from nematocide used on croplands
Ethylbenzene	Discharge from petroleum refineries; industrial chemical factories
Methyl-tert-butyl ether (MTBE)	Leaking underground storage tanks; discharge from petroleum and chemical factories
Monochlorobenzene	Discharge from industrial and agricultural chemical factories and drycleaning facilities
Styrene	Discharge from rubber and plastic factories; leaching from landfills
1,1,2,2-Tetrachloroethane	Discharge from industrial and agricultural chemical factories; solvent used in production of TCE, pesticides, varnish and lacquers
Tetrachloroethylene (PCE)	Discharge from factories, dry cleaners, and auto shops (metal degreaser)
1,2,4-Trichlorobenzene	Discharge from textile-finishing factories
1,1,1-Trichloroethan	Discharge from metal degreasing sites and other factories; manufacture of food wrappings
1,1,2-Trichloroethan	Discharge from industrial chemical factories
Trichloroethylene (TCE)	Discharge from metal degreasing sites and other factories
Toluene	Discharge from petroleum and chemical factories; underground gas tank leaks
Trichlorofluoromethane	Discharge from industrial factories; degreasing solvent; propellant and refrigerant
1,1,2-Trichloro-1,2,2-Trifluoroethane	Discharge from metal degreasing sites and other factories; drycleaning solvent; refrigerant

Vinyl chloride	Leaching from PVC piping; discharge from plastics factories; biodegradation byproduct of TCE and PCE groundwater contamination
Xylenes	Discharge from petroleum and chemical factories; fuel solvent

Disinfection Byproducts, Disinfection Byproduct Precursors, and Disinfectant Residuals

Total trihalomethanes (TTHM)	Byproduct of drinking water disinfection
Haloacetic acids (five) (HAA5)	Byproduct of drinking water disinfection
Bromate	Byproduct of drinking water disinfection
Chloramines	Drinking water disinfectant added for treatment
Chlorine	Drinking water disinfectant added for treatment
Chlorite	Byproduct of drinking water disinfection
Chlorine dioxide	Drinking water disinfectant added for treatment
Control of disinfection byproduct precursors (Total Organic Carbon)	Various natural and manmade sources

Appendix 64481-B.
Typical Origins of Contaminants with Secondary MCLs

Contaminant	*Major origins in drinking water*
Aluminum	Erosion of natural deposits; residual from some surface water treatment processes
Color	Naturally-occurring organic materials
Copper	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Foaming Agents (MBAS)	Municipal and industrial waste discharges
Iron	Leaching from natural deposits; industrial wastes
Manganese	Leaching from natural deposits
Methyl-tert-butyl ether (MTBE)	Leaking underground storage tanks; discharge from petroleum and chemical factories;
Odor---Threshold	Naturally-occurring organic materials
Silver	Industrial discharges
Thiobencarb	Runoff/leaching from rice herbicide
Turbidity	Soil runoff

Zinc	Runoff/leaching from natural deposits; industrial wastes
Total dissolved solids	Runoff/leaching from natural deposits
Specific Conductance	Substances that form ions when in water; seawater influence
Chloride	Runoff/leaching from natural deposits; seawater influence
Sulfate	Runoff/leaching from natural deposits; industrial wastes

§64482. Required Additional Health Information.

(a) A system that detects arsenic at levels above 0.005 mg/L, but below or equal to the MCL, shall include the following in its Consumer Confidence Report: "While your drinking water meets the federal and state standard for arsenic, it does contain low levels of arsenic. The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The U.S. Environmental Protection Agency continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems."

(b) A system that detects nitrate at levels above 5 mg/L (as nitrogen), but below the MCL, shall include the following in its Consumer Confidence Report: "Nitrate in drinking water at levels above 10 mg/L is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 10 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies. If you are caring for an infant, or you are pregnant, you should ask advice from your health care provider. If a system cannot demonstrate to the State Board with at least five years of the most current monitoring data that its nitrate levels are stable, it shall also add the following language to the preceding statement on nitrate: "Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity."

(c) A system that detects lead above the action level in more than 5%, and up to and including 10%, of sites sampled, shall include the following in its Consumer Confidence Report: "Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and/or flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the USEPA Safe Drinking Water Hotline (1-800-426-4791)."

§64483. Consumer Confidence Report Delivery and Recordkeeping.

(a) Each water system shall mail or directly deliver one copy of the Consumer Confidence Report to each customer.

(b) The system shall make a good faith effort to reach consumers who are served by the water system but are not bill-paying customers, such as renters or workers, using a mix of methods appropriate to the particular system such as: Posting the Consumer Confidence Reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the Consumer Confidence Report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; and delivery to community organizations.

(c) No later than the date the water system is required to distribute the Consumer Confidence Report to its customers, each water system shall mail a copy of the report to the State Board, followed within 3 months by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the State Board.

(d) No later than the date the water system is required to distribute the Consumer Confidence Report to its customers, each privately-owned water system shall mail a copy of the report to the California Public Utilities Commission.

(e) Each water system shall make its Consumer Confidence Report available to the public upon request.

(f) Each water system serving 100,000 or more persons shall post its current year's Consumer Confidence Report on a publicly-accessible site on the Internet.

(g) Each water system shall retain copies of its Consumer Confidence Reports for no less than 3 years.

CHAPTER 15.5 DISINFECTANT RESIDUALS, DISINFECTION BYPRODUCTS, AND DISINFECTION BYPRODUCT PRECURSORS

Article 1. General Requirements and Definitions

§64530. Applicability of this Chapter.

(a) Community water systems and nontransient noncommunity water systems that treat their water with a chemical disinfectant in any part of the treatment process or which provide water that contains a chemical disinfectant shall comply with the requirements of

Management Practice Implementation and Assessment

8. Dischargers must implement management practices and assessment, as necessary, to improve and protect water quality, protect beneficial uses, achieve compliance with applicable water quality objectives, achieve the numeric targets, numeric interim quantifiable milestones, and numeric limits established in this Order. Management practices implementation and assessment must be documented in the appropriate section of the Farm Plan (e.g., irrigation and nutrient management practices and assessment must be documented in the INMP section of the Farm Plan). Dischargers must report on management practice implementation and assessment in the ACF, as described in the MRP.

CEQA Mitigation Measure Implementation, Monitoring, and Reporting

9. Impacts and mitigation measures identified in CEQA Mitigation Monitoring and Reporting Program are set forth in the Final Environmental Impact Report (FEIR) at Appendix D, which is incorporated by reference. Mitigation measures identified in the FEIR for this Order and required to be implemented as described in Appendix D, will substantially reduce environmental effects of the project. The mitigation measures included in this Order have eliminated or substantially lessened all significant effects on the environment, where feasible. Where noted, some of the mitigation measures are within the responsibility and jurisdiction of other public agencies. Such mitigation measures can and should be adopted, as applicable, by those other agencies.

10. Dischargers must report on mitigation measure implementation electronically in the Annual Compliance Form (ACF), as described in the MRP. Draft mitigation monitoring and reporting is available for review in the FEIR.

Part 2, Section C.1. Groundwater Protection

1. Dischargers may not be subject to all provisions of **Part 2, Section C.1** if they are members in good standing with the third-party alternative compliance pathway program included within **Part 2, Section C.2**.

Phasing

2. Ranches are assigned the Groundwater Phase Area of the groundwater basin where the ranch is located based on the relative level of water quality and beneficial use impairment and risk to water quality. All ranches are assigned a Groundwater Phase Area of 1, 2, or 3. Groundwater Phase 1 areas represent greater water quality impairment and higher risk to water quality relative to Groundwater Phase 2 and 3 areas.

3. The requirements and implementation schedules for groundwater protection are based on the groundwater phase areas, listed in **Table C.1-1** and shown on the maps in **Figure C.1-1**.

4. In the event that a ranch spans multiple Groundwater Phase areas, the ranch will be assigned the earlier phase. For example, a ranch that spans both Groundwater Phase 1 and Groundwater Phase 2 areas will be assigned to Groundwater Phase 1.

5. The Groundwater Phase Area assigned to each ranch will be displayed on the ranch eNOI in GeoTracker.

Irrigation and Nutrient Management Plan

6. Dischargers must develop and implement an Irrigation and Nutrient Management Plan (INMP) that addresses both groundwater and surface water. This section applies to the groundwater related INMP requirements and the surface water related INMP requirements are contained within **Part 2, Section C.3** of this Order. The INMP is a section of the Farm Plan and must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request. Summary information from the INMP must be submitted in the INMP Summary report. At a minimum, the elements of the INMP related to groundwater protection must include:

    a. Monitoring and recordkeeping necessary to submit complete and accurate reports, including the ACF, Total Nitrogen Applied (TNA) report, and INMP Summary report.
    b. Planning and management practice implementation and assessment that results in compliance with the fertilizer nitrogen application limits in **Table C.1-2** and the nitrogen discharge targets and limits in **Table C.1-3**.
    c. Descriptions of all irrigation, nutrient, and salinity management practices implemented and assessed on the ranch.
    d. When INMP certification is required, e.g., as a follow-up action or as a consequence for not meeting the quantifiable milestones and time schedules below, the INMP certification shall include the following:

    The person signing this Irrigation and Nitrogen Management Plan (INMP) certifies, under penalty of law, that the INMP was prepared under his/her direction and supervision, that the information and data reported is to the best of his/her knowledge and belief, true, accurate, and complete, and that he/she is aware that there are penalties for knowingly submitting false information. The qualified professional signing the INMP may rely on the

information and data provided by the Discharger and is not required to independently verify the information and data.

The qualified professional signing the INMP below further certifies that he/she used sound irrigation and nitrogen management planning practices to develop irrigation and nitrogen application recommendations and that the recommendations are informed by applicable training to minimize nitrogen loss to surface water and groundwater. The qualified professional signing the INMP is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by the Discharger in a manner that is inconsistent with the INMP's recommendations for nitrogen application. This certification does not create any liability or claims for environmental violations.

Qualified professional certification:
"I, _____, certify this INMP in accordance with the statement above."

_____ (Signature)

The discharger additionally agrees as follows:

"I, _____, Discharger, have provided information and data to the certifier above that is, to the best of my knowledge and belief, true, accurate, and complete, that I understand that the certifier may rely on the information and data provided by me and is not required to independently verify the information and data, and that I further understand that the certifier is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by me in a manner that is inconsistent with the INMP's recommendations for nitrogen application. I further understand that the certification does not create any liability for claims for environmental violations."

Quantifiable Milestones and Time Schedules

7. As shown in **Table C.1-2**, the fertilizer nitrogen application limits go into effect during the second year of the this Order (December 31, 2023).

8. As shown in **Table C.1-3**, the nitrogen discharge targets go in to effect during the second year of this Order (December 31, 2023) and nitrogen discharge limits go in to effect during the fifth year of this Order (December 31, 2027).

Fertilizer Nitrogen Application Limits

9. Dischargers must not apply fertilizer nitrogen (**A_{FER}**) at rates greater than the limits in **Table C.1-2.** Compliance with fertilizer nitrogen application limits is assessed for each specific crop reported in the TNA report or INMP Summary report.

Nitrogen Discharge Targets and Limits

10. This Order requires Dischargers to submit information on nitrogen applied (**A**) and nitrogen removed (**R**). This Order also establishes nitrogen discharge targets and limits based on the calculation of nitrogen applied minus nitrogen removed (**A-R**) using the formulas below. Nitrogen must not be discharged at rates greater than the targets and limits in **Table C.1-3**. Compliance with nitrogen discharge targets and limits is assessed annually for the entire ranch in the INMP Summary report through one of the **three compliance pathways** shown below. Compliance with all pathways is not required.

    Compliance Pathway 1:

    A_{FER} + (C x A_{COMP}) + (O x A_{ORG}) + A_{IRR} – R = Nitrogen Discharge

    OR

    Compliance Pathway 2:

    A_{FER} + (C x A_{COMP}) + (O x A_{ORG}) = R

    OR

    Compliance Pathway 3:

    A_{FER} + (C x A_{COMP}) + (O x A_{ORG}) – R = Nitrogen Discharge

    In all formulas, R = R_{HARV} + R_{SEQ} + $R_{SCAVENGE}$ + R_{TREAT} + R_{OTHER}

    a. **A_{FER}** is the amount of fertilizer nitrogen applied in pounds per acre.
    b. **C** is the compost discount factor used to represent the amount of compost nitrogen mineralized during the year that the compost was applied.
    c. **A_{COMP}** is the total amount of compost nitrogen applied in pounds per acre.
    d. **O** is the organic fertilizer discount factor used to represent the amount of nitrogen mineralized during the first 12 weeks in the year it was applied.
    e. **A_{ORG}** is the total amount of organic fertilizer or amendment nitrogen applied in pounds per acre.

f. **A_{IRR}** is the amount of nitrogen applied in the irrigation water estimated from the volume required for crop evapotranspiration (ET) in pounds per acre.
g. **R** is the amount of nitrogen removed from the field through harvest, sequestration, or other removal methods, in pounds per acre.
h. **R_{HARV}** is the amount of nitrogen removed from the field through harvest or other removal of crop material.
i. **R_{SEQ}** is the amount of nitrogen removed from the field through sequestration in woody materials of permanent or semi-permanent crops.
j. **$R_{SCAVENGE}$** is the amount of nitrogen removed from the field through nitrogen scavenging cover crops and/or nitrogen scavenging high carbon amendments during the wet/rainy season.
k. **R_{TREAT}** is the amount of nitrogen removed from the ranch through a quantifiable treatment method (e.g., bioreactor).
l. **R_{OTHER}** is the amount of nitrogen removed from the ranch through other methods not previously quantified.

11. The Central Coast Water Board encourages the use of irrigation water nitrogen as a method of reducing the amount of fertilizer nitrogen applied to crops. The use of irrigation water nitrogen is typically referred to as “pump and fertilize” and is incentivized through compliance pathway 2 and 3 in **Table C.1-3**. The amount of irrigation water nitrogen is not used in the compliance calculation in these compliance pathways. The amount of irrigation water nitrogen must be reported regardless of the compliance pathway.

12. The Central Coast Water Board encourages the use of compost to improve soil health, nutrient and carbon sequestration, and water holding capacity consistent with the state’s Healthy Soils Initiative. All compost nitrogen (**A_{COMP}**) applied to the ranch must be reported in the TNA report or INMP Summary report; however, the use of compost is incentivized through the option for Dischargers to use a compost “discount” factor (**C**). Dischargers may use the compost discount factor provided by the Central Coast Water Board in the MRP or may determine their own discount factor. The discounted compost nitrogen must, at a minimum, represent the amount of compost mineralized during the year the compost was applied to the ranch. If the Discharger uses their own compost discount factor, they must maintain records of the method used to determine the compost discount factor in the Farm Plan, and these records must be submitted to the Central Coast Water Board upon request.

13. The Central Coast Water Board encourages the use of organic fertilizers and amendments to improve soil health, nutrient and carbon sequestration, and water holding capacity consistent with the state’s Healthy Soils Initiative. All organic fertilizer and amendment nitrogen (**A_{ORG}**) applied to the ranch must be reported in the TNA report or INMP Summary report; however, the use of organic fertilizers and amendments is incentivized through the option for Dischargers to

use an organic fertilizer "discount" factor (**O**). Dischargers may use the organic fertilizer discount factor associated with the products C:N ratio, provided by the Central Coast Water Board in the MRP. The discounted organic fertilizer nitrogen must, at a minimum, represent the amount of organic fertilizer mineralized during the first 12 weeks the organic fertilizer was applied to the ranch. The Discharger must maintain records of the organic products used and their associated C:N ratios in the Farm Plan, and these records must be submitted to the Central Coast Water Board upon request. The following products are not eligible to receive an organic fertilizer discount: a) products with no organic compounds (long chain carbon) molecules, such as conventional fertilizer, slow release fertilizers, b) products that do not depend on microbial mineralization to release nitrogen to mineral form to make it available for crop uptake, c) products without C:N ratio information available, and d) organic liquid fertilizers that are in the liquid and/or emulsified form.

14. The amount of **crop material** removed through harvest or other methods ($\mathbf{R_{HARV}}$) must be calculated using the formula described below. Dischargers must either use the crop-specific conversion coefficient values found in the MRP or develop their own conversion coefficient values following the approved method in the MRP. If Dischargers develop their own conversion coefficient, they must maintain information on the method used in the Farm Plan, and these records must be submitted to the Central Coast Water Board upon request.

    R_{HARV} = Conversion Coefficient x Material Removed

    a. The **Conversion Coefficient** is a crop-specific coefficient used to convert from units of material removed per acre to units of nitrogen removed per acre.
    b. **Material Removed** is the amount of nitrogen-containing material removed from the field, in units of pounds per acre.

15. The amount of nitrogen removed through **sequestration** in woody material of permanent or semi-permanent crops ($\mathbf{R_{SEQ}}$) must be estimated by the Discharger. Dischargers must maintain records detailing how they estimated the amount of nitrogen sequestered in their permanent crops. These records must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request.

16. The Central Coast Water Board encourages Dischargers to implement best management practices that reduce nitrogen leaching in the wet/rainy season. Dischargers may claim a nitrogen scavenging credit ($\mathbf{R_{SCAVENGE}}$) provided by the Central Coast Water Board in the MRP, one time per year for each ranch acre where nitrogen scavenging cover crops or nitrogen scavenging high carbon amendments are utilized during the wet/rainy season. The total acres receiving

the nitrogen scavenging credit may not exceed the ranch acres. Dischargers electing to claim the nitrogen scavenging credit must ensure that their cover crop and/or high carbon amendment best management practice meets the definitions of a nitrogen scavenging cover crop and/or nitrogen scavenging high carbon amendment, as noted in the MRP and Definitions. Substantiating records for this credit must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request.

17. The Central Coast Water Board encourages Dischargers to develop and implement innovative methods for removing nitrogen from the environment to improve water quality. Dischargers may use treatment methods (e.g., bioreactors) to remove nitrogen from groundwater or surface water and may count this towards their nitrogen removal (**R**) value if they are able to quantify the amount of nitrogen removed from ranch discharge to groundwater or surface water. This quantified removal through treatment or other innovative methods must be reported as $\mathbf{R_{TREAT}}$. Dischargers electing to account for this nitrogen removal must monitor the volume and concentration of water entering and exiting their treatment system and calculate the amount of nitrogen removed. These records must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request.

18. If Dischargers remove additional nitrogen through means other than removing crop material ($\mathbf{R_{HARV}}$), sequestration ($\mathbf{R_{SEQ}}$), scavenging credit ($\mathbf{R_{SCAVENGE}}$), or treatment methods ($\mathbf{R_{TREAT}}$), they must quantify and report this additional removal as $\mathbf{R_{OTHER}}$. Dischargers must maintain records detailing how they calculated $\mathbf{R_{OTHER}}$. These records must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request.

19. The discharge of nitrogen in excess of the nitrogen discharge **targets** in **Table C.1-3** may result in additional requirements, including obtaining additional education, INMP certification by a qualified professional, implementing additional or improved management practices, and increased monitoring and/or reporting.

20. The discharge of nitrogen in excess of the nitrogen discharge **limits** in **Table C.1-3** may result in additional requirements, including obtaining additional education, INMP certification by a qualified professional, implementing additional or improved management practices, increased monitoring and reporting, and/or progressive enforcement actions.

21. Dischargers who apply more fertilizer nitrogen ($\mathbf{A_{FER}}$) than the fertilizer nitrogen application limits in **Table C.1-2** to any specific crop **and** who are able to demonstrate compliance with the **final** nitrogen discharge limits, as shown in **Table C.1-3**, are exempt from the fertilizer nitrogen application limit.

22. Dischargers who can quantifiably demonstrate that their ranches pose no threat to surface water quality or groundwater quality may submit a technical report to the Executive Officer for review. If approved, the Discharger is not required to conduct the nitrogen application (**A**) or removal (**R**) monitoring and reporting or to submit the INMP Summary report, regardless of what Groundwater Phase area the ranch is in. The technical report must demonstrate that nitrogen applied at the ranch does not percolate below the root zone in an amount that could degrade groundwater and does not migrate to surface water through discharges, including drainage, runoff, or sediment erosion. Dischargers must provide the Executive Officer with annual updates to confirm that the exemption is still applicable. Failure to provide sufficient annual updates confirming that the exemption is still applicable will result in an immediate reinstatement of the requirement to submit the INMP Summary report for applicable Dischargers. Dischargers electing to use this approach are still eligible to participate in the third-party alternative compliance pathway for groundwater protection.

23. Dischargers who can quantifiably demonstrate that their ranch is achieving the **final** nitrogen discharge limits , as shown in **Table C.1-3,** are not required to submit the nitrogen removal (**R**) reporting in the INMP Summary report, regardless of what Groundwater Phase area the ranch is in. Example situations where this may apply include participation in an approved third-party program that certifies that the Discharger is meeting the final discharge limit and will continue to do so for the duration of the Discharger's participation in the approved third-party program, or by submitting a technical report, subject to Executive Officer review, that quantifies the amount of nitrogen discharge based on the volume and nitrogen concentration of all discharges from the ranch. In these situations, confirmation of membership in the approved third-party program or Executive Officer approval of a submitted technical report constitute compliance with the nitrogen removed (**R**) reporting requirement in the INMP Summary report. This exemption only applies to removal (**R**) in the INMP Summary report; all other requirements, including the TNA report, still apply as described in this Order. Dischargers must provide the Executive Officer with annual updates to confirm that the exemption is still applicable. Failure to provide sufficient annual updates confirming that the exemption is still applicable will result in an immediate reinstatement of the requirement to submit the nitrogen removal (R) reporting information in the INMP Summary report for applicable Dischargers. Dischargers electing to use this approach are still eligible to participate in the third-party alternative compliance pathway for groundwater protection.

24. Dischargers, groups of dischargers or commodity groups who can quantify the amount of nitrogen discharged from their ranch or for specific crops or via specific management practices by directly monitoring it at the points of discharge can propose an alternative monitoring methodology to comply with the nitrogen

discharge targets and limits, in lieu of using the A-R compliance formulas. Example situations where this may apply includes greenhouse, nursery, container production or intensive crop production where irrigation and drain water is captured and allows for direct monitoring of discharges. For these types of situations, it may be easier to monitor nitrogen discharge than to calculate the amount of nitrogen removed at harvest for each one of the many different crops and plants being grown. Dischargers must submit a request to the Executive Officer with a technical report of the methodology proposed to quantify nitrogen discharges. The methodology must include enough information to quantify the amount of nitrogen discharged and confirm compliance with the nitrogen discharge targets and limits, as shown in **Table C.1-3 or Table C.2-2** (for Dischargers participating in the Third-Party Alternative Compliance Pathway Program for Groundwater Protection described in **Part 2, Section C.2)**. Acceptable methodologies must include direct measurements of the volume and nitrogen concentration of the water discharged from each ranch per acre and year. Executive Officer approval of the method(s) must be granted before the discharger begins reporting nitrogen discharge based on the proposed methodology. Dischargers who obtain Executive Officer approval to directly monitor their nitrogen discharge from their ranches will not be required to submit nitrogen removal (R) reporting in the INMP Summary report. Dischargers electing to use this approach are still eligible to participate in the third-party alternative compliance pathway program for groundwater protection.

25. The initial 2027 nitrogen discharge limits, as shown in **Table C.1-3** will be re-evaluated based on Discharger reported nitrogen applied and removed data, new science, and management practice implementation and assessment before becoming effective.

Monitoring and Reporting

26. Dischargers must report on management practice implementation and assessment electronically in the **ACF**, as described in the MRP.

27. Dischargers must record and report total nitrogen applied to all crops grown on the ranch, electronically in the TNA report form, as described in the MRP.

28. Dischargers must track and record the following elements of the INMP Summary report that are not included in the TNA report: total nitrogen removed from the ranch and information on irrigation water application and discharge volumes. Dischargers must submit this information electronically in the INMP Summary report form as described in the MRP.

29. The INMP Summary report contains the same nitrogen application information as the TNA report, plus additional information related to nitrogen removed and irrigation management. **Therefore, the INMP Summary report satisfies the**

TNA report requirement and an additional TNA report is not required to be submitted when the INMP Summary report is submitted to the Central Coast Water Board.

30. Dischargers must conduct **irrigation well monitoring and reporting prior to the start of groundwater quality trend monitoring and reporting**, either individually or as part of a third-party effort, as described in the MRP.

31. Dischargers must conduct **on-farm domestic well monitoring and reporting**, either individually or as part of a third-party effort, as described in the MRP.

32. Dischargers must conduct **groundwater quality trend monitoring and reporting**, either individually or as part of a third-party effort, as described in the MRP. This requirement applies to all Dischargers enrolled in this Order, regardless of how many wells are currently present on their ranch.

    a. Dischargers who elect to perform groundwater quality trend monitoring and reporting as part of a **third-party** effort must form or join a third-party. The third-party must submit a work plan for Executive Officer review by the dates and covering the areas specified in the MRP unless it is associated with the Third-Party Alternative Compliance Pathway for Groundwater Protection described in **Part 2, Section C.2**. The work plan must be approved by the Executive Officer prior to implementation. Once approved by the Executive Officer, the work plan must be implemented.
    b. Dischargers who elect to perform groundwater quality trend monitoring and reporting individually must submit a work plan for Executive Officer review, by the date specified in the MRP, based on their ranch location. The work plan must be approved by the Executive Office prior to implementation. The work plan must describe how the ranch-level groundwater quality trend monitoring program will evaluate groundwater quality trends over time and assess the impacts of agricultural discharges on groundwater quality. Once approved by the Executive Officer, the work plan must be implemented. Dischargers without a well on their property may comply with individual ranch-level groundwater quality trend monitoring and reporting requirements by implementing one of the options specified in the MRP.

33. When required by the Executive Officer based on groundwater quality data or significant and repeated exceedance of the nitrogen discharge targets or limits, Dischargers must complete **ranch-level groundwater discharge monitoring and reporting**, either individually or as part of a third-party effort as described in the MRP. Water Board staff will coordinate with Dischargers prior to the Executive Officer invoking this requirement to determine if non-compliance is the result of unforeseen or uncontrollable circumstances and to provide the Discharger with 90-day advanced notice of the forthcoming requirement. When ranch-level groundwater discharge monitoring and reporting is required, a work

plan, including a SAP and QAPP, must be submitted for Executive Officer review prior to implementation. Once approved by the Executive Officer, the work plan must be implemented. Ranch-level groundwater discharge monitoring may be discontinued with the approval of the Executive Officer when the Discharger comes into compliance with the nitrogen discharge targets or limits, or the discharge has otherwise ceased.

Part 2, Section C.2. Third-Party Alternative Compliance Pathway for Groundwater Protection

1. Dischargers that are members in good standing in the third-party alternative compliance pathway program are subject to the provisions of this **Part 2, Section C.2**, unless otherwise stated. For purposes of this section, such Dischargers are referred to as "participating Dischargers."

   Participating dischargers:

   a. Are not subject to fertilizer nitrogen application limits in **Table C.1-2**, which are enforceable by the Central Coast Water Board.
   b. Are not subject to nitrogen discharge limits in **Table C.1-3**, which are enforceable by the Central Coast Water Board.
   c. Are subject to targets, which if exceeded result in consequences outlined in this **Part 2, Section C.2**.
   d. Are not subject to ranch-level groundwater discharge monitoring and reporting.
   e. Are generally provided more time to achieve fertilizer nitrogen application targets and nitrogen discharge targets, relative to non-participating dischargers.

2. Prior to the initiation of the work plan process outlined below and in the MRP for this third-party alternative compliance pathway program, entities wishing to implement the third-party alternative compliance pathway program described in this **Part 2, Section C.2** must submit a third-party alternative compliance pathway program proposal consistent with the third-party program requirements outlined in **Part 2, Section A** of this Order, as well as the request for proposal process and associated third-party program expectations document forthcoming after Order adoption. For purposes of this section, the entity approved to implement the third-party alternative compliance pathway is referred to as the approved third-party alternative compliance pathway program administrator.

3. Participating Dischargers must develop and implement an Irrigation and Nutrient Management Plan (INMP) that addresses groundwater. The INMP is a section of the Farm Plan and must be maintained in the Farm Plan and submitted to the Central Coast Water Board upon request. Summary information from the INMP must be submitted in the INMP Summary report. At a minimum, the elements of

APPENDIX G-4

Stream Channel Cross Sections

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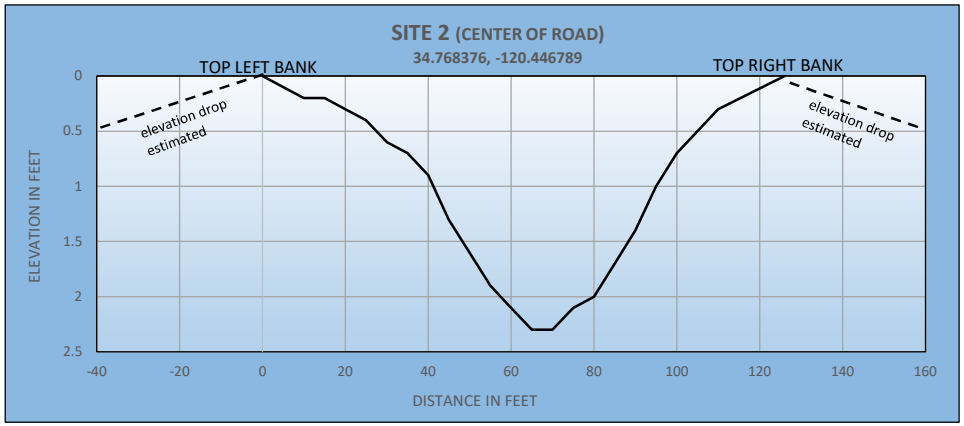
SITE 2

-20	
0	0
5	0.1
10	0.2
15	0.2
20	0.3
25	0.4
30	0.6
35	0.7
40	0.9
45	1.3
50	1.6
55	1.9
60	2.1
65	2.3
70	2.3
75	2.1
80	2
85	1.7
90	1.4
95	1
100	0.7
110	0.3
126	0
136	



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27	0.2
36	0.5
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55	1.3
60	1.7
65	1.8
67	1.9
70	2.4
72	2.5
74	2.5
78	2.5
80	2.1
83	2
85	1.8
90	1.5
95	1.1
100	0.9
105	0.5
110	0.2
117	0
140