

TABLE ES-1

Historical Pumping at Impacted Saugus Formation Production Wells

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner -																					
Well Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
VWC-157	635	604	529	239	387	314	581	484	1,222	1,146	635	1,005	570	436	616	403	46	81	0	0	0
SCWC-Saugus1	0	0	0	0	0	0	0	0	31	0	0	1,690	437	1,226	1,333	0	410	451	0	0	0
SCWC-Saugus2	0	0	0	0	0	0	0	0	32	0	40	3,091	2,476	1,675	2,530	1,726	1,766	617	0	0	0
NCWD-11	729	870	715	754	1,159	1,278	2,209	2,371	1,265	1,280	1,252	1,034	428	730	614	522	353	81	14	0	0
Total	1,364	1,474	1,244	993	1,546	1,592	2,790	2,855	2,550	2,426	1,927	6,820	3,911	4,067	5,093	2,651	2,575	1,230	14	0	0

1991 through 1996 average = 4,186

Note:

All pumping volumes are listed in AF/yr.

TABLE ES-2

Annual Pumping Rates Specified by the Operational Plan for the Santa Clarita Valley's Groundwater Resources
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Aquifer	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
Operational Plan Pumping				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	7,500 to 25,000	21,000 to 25,000	21,000 to 35,000
Total	37,500 to 55,000	37,500 to 60,000	51,000 to 60,000	51,000 to 70,000
Modeled Pumping				
Alluvium	38,429	33,767	33,767	33,767
Saugus	10,679	15,760	24,346	34,096
Total	49,108	49,527	58,113	67,863

Notes:

All pumping volumes are listed in acre-feet.

The operational plan is defined in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

In the model simulations, total pumping is different than listed in this table when dry-year pumping conditions in one aquifer coincide with normal-year pumping conditions in the other aquifer (due to differences in the timing of dry conditions locally versus reduced deliveries of water imports from the State Water Project).

TABLE ES-3

Well Network for Sentinel Groundwater Quality Monitoring

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Production Well	Sentinel Monitoring Locations	New Monitoring Well Needed?	Actual or Target Depth Interval for Well Screen (ft bgs)	Well Name	TOT Distance from Production Well	Rationale, Comments
SCWC-Saugus1	Alluvium: New well in Magic Mountain Parkway north of Saugus1	Yes	40-60	AL-12A	1 year or less	Alluvial and Saugus HSU S-I monitoring is for a possible pathway to SCWC-Saugus1. Access constraints might require installation of these wells in the City of Santa Clarita right of way along Magic Mountain Parkway. There are currently no Saugus Formation monitoring wells within the delineated capture zone of SCWC-Saugus1. The Saugus wells for HSU S-III will be installed near the corner of San Fernando Road and Magic Mountain Parkway on land owned by the Newhall Land & Farming Company.
	Saugus (S-I unit): Adjacent to new alluvium well	Yes	170-180	AL-12B		
	Saugus (S-III unit): NLF land north of SCWC-Saugus1	Yes	230-250 (HSU S-I)	SG1-HSU1		
		Yes	490-520 (HSU S-III)	SG1-HSU3a		
		Yes	580-640 (HSU S-III)	SG1-HSU3b		
		Yes	750-770 (HSU S-III)	SG1-HSU3c		
SCWC-Saugus2	Alluvium: Existing well AL06	No	65-85	AL06	10 years	Alluvial monitoring is recommended to assess perchlorate near the SCWC-Saugus2 well. At MP-1, the port 2 screen correlates with the top of the screened intervals at SCWC-Saugus1 and SCWC-Saugus2. Port 4 is the uppermost port below a depth of 1,000 feet and below the zones containing perchlorate.
	Saugus: MP-1, ports 2 and 4	No	391.4-401.4 (HSU S-III)	MP-1 (port 2)		
		No	747.5-757.5 (HSU S-V)	MP-1 (port 4)		
NCWD-11	Alluvium: Existing well AL03	No	91-111	AL03	2 years	Alluvial monitoring is recommended because of the potential for the Alluvial Aquifer to be a pathway for perchlorate migration from the site to well NCWD-11. Additionally, movement within the Saugus Formation could be occurring from the site, which is the reason to install a Saugus sentinel well near the Alluvial sentinel well.
	Saugus: New well at AL03 location	Yes	280-320 (HSU S-III)	NC11-HSU3		

Notes:

TOT = time-of-travel

HSU = hydrostratigraphic unit (See *Draft Final Conceptual Hydrogeology Technical Memorandum for the Eastern Santa Clara Sub-basin Groundwater Study* [CH2M HILL, 2004b] for discussions of the locations and characteristics of the HSUs.)

TABLE ES-4
 Chemical Constituents and Sampling Frequency for the 97-005 Sentinel Monitoring Program
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Analytical Parameters	EPA Method	Frequency			
		Initial	Semiannual	Annual	Biannual
Organic Constituents					
Perchlorate	314.0	X	X		
Volatile Organic Compounds	524.2 ^a	X	X		
1,2,4-Trimethyl Benzene		X	X		
Methyl Tertiary Butyl Ether		X	X		
General Minerals (Cations and Anions)					
Aluminum	6010	X			X
Bicarbonate/Alkalinity	310.1	X			X
Calcium	6010	X			X
Chloride	300	X			X
Total Phosphorus	365.3	X			X
Potassium	7610	X			X
Iron	6010	X			X
Magnesium	6010	X			X
Manganese	6010	X			X
Sodium	7770	X			X
Sulfate	300	X		X	
Nitrate	352.1	X		X	
Ammonia	350.3	X			X

^aTentatively identified compounds will also be reported.

TABLE 1-1
 Historical Pumping at Impacted Saugus Formation Production Wells
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
VWC-157	635	604	529	239	387	314	581	484	1,222	1,146	635	1,005	570	436	616	403	46	81	0	0	0
SCWC-Saugus1	0	0	0	0	0	0	0	0	31	0	0	1,690	437	1,226	1,333	0	410	451	0	0	0
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NCWD-11	729	870	715	754	1,159	1,278	2,209	2,371	1,265	1,280	1,252	1,034	428	730	614	522	353	81	14	0	0
Total	1,364	1,474	1,244	993	1,546	1,592	2,790	2,855	2,550	2,426	1,927	6,820	3,911	4,067	5,093	2,651	2,575	1,230	14	0	0

1991 through 1996 average = 4,186

Note:
 All pumping volumes are listed in AF/yr.

TABLE 2-1

Recharge and Discharge Components of the Hydrologic Cycle in the Upper Santa Clara River Basin
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Recharge	Discharge
Surface Water	
Direct runoff of precipitation	Evapotranspiration of precipitation
Precipitation runoff from upstream watershed areas	Santa Clara River flow to Ventura County
Castaic Lake/Lagoon releases into Castaic Creek	Streamflow seepage to the Alluvial Aquifer
WRP discharges into the Santa Clara River	Evapotranspiration of applied irrigation water
Groundwater seepage into the Santa Clara River	
Irrigation return flows (agricultural and urban)	
Groundwater	
Infiltration of precipitation	Pumping
Infiltration of outdoor applied water (agricultural and urban)	Evapotranspiration of Alluvial Aquifer groundwater by riparian vegetation
Alluvial Aquifer subsurface inflow (Castaic Dam, Lang gage)	Alluvial Aquifer subsurface outflow (western study area boundary)
Streamflow seepage to Alluvial aquifer	Groundwater seepage into the Santa Clara River

Notes:

The two sources of water for agricultural and municipal water uses in the basin are groundwater pumping and imported water from the SWP.

Because SWP water is stored in Castaic Lake, which is outside the limits of the Alluvial and Saugus aquifers, it is not considered a part of the valley's hydrologic cycle while it is still in storage. However, SWP water that is land-applied or that is discharged from a WRP qualifies as a component of the hydrologic cycle. In addition, subsurface groundwater flow occurs into the Santa Clarita Valley beneath Castaic Creek through water seepage beneath Castaic Dam.

TABLE 2-2

Historical Hydrology in Northern California and the Santa Clarita Valley, 1950 through 2003

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Northern California Hydrology^a	Local Rainfall^b
1950	Below Normal	6.84
1951	Above Normal	12.42
1952	Wet	34.19
1953	Wet	4.88
1954	Above Normal	15.82
1955	Dry	13.91
1956	Wet	14.21
1957	Above Normal	22.85
1958	Wet	23.14
1959	Below Normal	9.81
1960	Dry	11.64
1961	Dry	8.82
1962	Below Normal	21.22
1963	Wet	12.79
1964	Dry	10.09
1965	Wet	32.28
1966	Below Normal	14.57
1967	Wet	23.23
1968	Below Normal	6.90
1969	Wet	32.42
1970	Wet	23.19
1971	Wet	13.75
1972	Below Normal	4.15
1973	Above Normal	19.79
1974	Wet	18.04
1975	Wet	10.92
1976	Critical	14.02
1977	Critical	20.87
1978	Above Normal	42.17
1979	Below Normal	21.47
1980	Above Normal	27.00
1981	Dry	13.42
1982	Wet	20.20
1983	Wet	39.07
1984	Wet	12.86

TABLE 2-2

Historical Hydrology in Northern California and the Santa Clarita Valley, 1950 through 2003

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Northern California Hydrology^a	Local Rainfall^b
1985	Dry	8.37
1986	Wet	18.02
1987	Dry	14.45
1988	Critical	16.92
1989	Dry	7.56
1990	Critical	6.98
1991	Critical	17.21
1992	Critical	32.03
1993	Above Normal	32.72
1994	Critical	10.27
1995	Wet	29.15
1996	Wet	15.88
1997	Wet	13.35
1998	Wet	30.73
1999	Wet	8.96
2000	Above Normal	14.04
2001	Dry	22.24
2002	Dry	7.90
2003	Above Normal	15.70

^aDefined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest.

^bRecords are for the Newhall-Soledad rain gage (Station No. FC32CE), in inches. As shown on Figure 2-3, the median and average rainfall at this gage from 1950 through 2002 were 14.57 in/yr and 17.84 in/yr, respectively.

TABLE 2-3
 Annual Pumping Rates Specified by the Operational Plan for the Santa Clarita Valley's Groundwater Resources
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Aquifer	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
Operational Plan Pumping				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	7,500 to 25,000	21,000 to 25,000	21,000 to 35,000
Total	37,500 to 55,000	37,500 to 60,000	51,000 to 60,000	51,000 to 70,000
Modeled Pumping				
Alluvium	38,429	33,767	33,767	33,767
Saugus	10,679	15,760	24,346	34,096
Total	49,108	49,527	58,113	67,863

Notes:

All pumping volumes are listed in acre-feet.

The operational plan is defined in the documents titled *Urban Water Management Plan 2000* (Black & Veatch, 2000) and *Santa Clarita Valley Water Report 2003* (Luhdorff & Scalmanini Consulting Engineers, 2004).

In the model simulations, total pumping is different than listed in this table when dry-year pumping conditions in one aquifer coincide with normal-year pumping conditions in the other aquifer (due to differences in the timing of dry conditions locally versus reduced deliveries of water imports from the State Water Project).

TABLE 2-4

CALSIM II Calculated State Water Project Municipal and Industrial Allocations

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	OCAP Current EWA^a	OCAP Future EWA^a	2020 SWP Reliability^b
1950	0.88	0.91	0.79
1951	1.00	1.00	0.96
1952	1.00	1.00	1.00
1953	1.00	1.00	0.95
1954	1.00	1.00	0.96
1955	0.44	0.45	0.43
1956	1.00	1.00	1.00
1957	0.94	0.91	0.75
1958	1.00	1.00	1.00
1959	0.84	0.88	0.83
1960	0.51	0.55	0.56
1961	0.68	0.72	0.76
1962	0.93	0.98	0.87
1963	1.00	1.00	1.00
1964	0.84	0.74	0.73
1965	0.87	0.81	0.77
1966	1.00	1.00	0.92
1967	1.00	1.00	1.00
1968	0.89	0.90	0.85
1969	1.00	1.00	1.00
1970	1.00	1.00	0.95
1971	1.00	1.00	1.00
1972	0.76	0.75	0.65
1973	1.00	1.00	0.91
1974	1.00	1.00	1.00
1975	1.00	1.00	1.00
1976	0.78	0.75	0.65
1977	0.03	0.04	0.20
1978	1.00	1.00	1.00
1979	1.00	0.94	0.89
1980	1.00	0.91	0.85
1981	0.90	0.92	0.84
1982	1.00	1.00	1.00
1983	1.00	1.00	1.00
1984	0.66	1.00	0.99
1985	0.97	0.91	0.83
1986	0.74	0.70	0.78
1987	0.70	0.77	0.71
1988	0.12	0.17	0.23
1989	0.96	0.95	0.83
1990	0.24	0.27	0.28
1991	0.24	0.29	0.25
1992	0.39	0.43	0.29
1993	1.00	1.00	1.00

^aSource: USBR, 2004

^bSource: DWR, 2002

Notes:

EWA = Environmental Water Account

OCAP = Operating Criteria and Plan

TABLE 2-5
 State Water Project Allocations and Corresponding Saugus Formation Pumping for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	SWP Hydrology^a	SWP Allocations^b (%)	Simulated Saugus Pumping Conditions (AF/yr)
1	Above Normal	90	Normal (7,500-15,000)
2	Dry	90	Normal (7,500-15,000)
3	Wet	100	Normal (7,500-15,000)
4	Wet	100	Normal (7,500-15,000)
5	Wet	100	Normal (7,500-15,000)
6	Dry	95	Normal (7,500-15,000)
7	Wet	70	Normal (7,500-15,000)
8	Dry	75	Normal (7,500-15,000)
9	Critical	15	Dry Year 1 (15,000)
10	Dry	95	Normal (7,500-15,000)
11	Critical	25	Dry Year 1 (15,000)
12	Critical	30	Dry Year 2 (25,000)
13	Critical	45	Dry Year 3 (35,000)
14	Above Normal	100	Normal (7,500-15,000)
15	Critical	50	Dry Year 1 (15,000)
16	Wet	80	Normal (7,500-15,000)
17	Wet	100	Normal (7,500-15,000)
18	Wet	100	Normal (7,500-15,000)
19	Wet	100	Normal (7,500-15,000)
20	Wet	100	Normal (7,500-15,000)
21	Above Normal	90	Normal (7,500-15,000)
22	Dry	39	Dry Year 1 (15,000)
23	Dry	70	Normal (7,500-15,000)
24	Above Normal	90	Normal (7,500-15,000)
25	Below Normal	90	Normal (7,500-15,000)
26	Above Normal	100	Normal (7,500-15,000)
27	Wet	100	Normal (7,500-15,000)
28	Wet	100	Normal (7,500-15,000)
29	Above Normal	100	Normal (7,500-15,000)
30	Dry	45	Dry Year 1 (15,000)
31	Wet	100	Normal (7,500-15,000)
32	Above Normal	90	Normal (7,500-15,000)
33	Wet	100	Normal (7,500-15,000)
34	Below Normal	85	Normal (7,500-15,000)
35	Dry	55	Dry Year 1 (15,000)
36	Dry	70	Dry Year 2 (25,000)
37	Below Normal	95	Normal (7,500-15,000)
38	Wet	100	Normal (7,500-15,000)
39	Dry	75	Dry Year 1 (15,000)
40	Wet	80	Normal (7,500-15,000)
41	Below Normal	100	Normal (7,500-15,000)
42	Wet	100	Normal (7,500-15,000)
43	Below Normal	90	Normal (7,500-15,000)

TABLE 2-5
 State Water Project Allocations and Corresponding Saugus Formation Pumping for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	SWP Hydrology^a	SWP Allocations^b (%)	Simulated Saugus Pumping Conditions (AF/yr)
44	Wet	100	Normal (7,500-15,000)
45	Wet	100	Normal (7,500-15,000)
46	Wet	100	Normal (7,500-15,000)
47	Below Normal	75	Normal (7,500-15,000)
48	Above Normal	100	Normal (7,500-15,000)
49	Wet	100	Normal (7,500-15,000)
50	Wet	100	Normal (7,500-15,000)
51	Critical	75	Dry Year 1 (15,000)
52	Critical	4	Dry Year 2 (25,000)
53	Above Normal	100	Normal (7,500-15,000)
54	Below Normal	95	Normal (7,500-15,000)
55	Above Normal	90	Normal (7,500-15,000)
56	Dry	90	Normal (7,500-15,000)
57	Wet	100	Normal (7,500-15,000)
58	Wet	100	Normal (7,500-15,000)
59	Wet	100	Normal (7,500-15,000)
60	Dry	95	Normal (7,500-15,000)
61	Wet	70	Normal (7,500-15,000)
62	Dry	75	Normal (7,500-15,000)
63	Critical	15	Dry Year 1 (15,000)
64	Dry	95	Normal (7,500-15,000)
65	Critical	25	Dry Year 1 (15,000)
66	Critical	30	Dry Year 2 (25,000)
67	Critical	45	Dry Year 3 (35,000)
68	Above Normal	100	Normal (7,500-15,000)
69	Critical	50	Dry Year 1 (15,000)
70	Wet	80	Normal (7,500-15,000)
71	Wet	100	Normal (7,500-15,000)
72	Wet	100	Normal (7,500-15,000)
73	Wet	100	Normal (7,500-15,000)
74	Wet	100	Normal (7,500-15,000)
75	Above Normal	90	Normal (7,500-15,000)
76	Dry	39	Dry Year 1 (15,000)
77	Dry	70	Normal (7,500-15,000)
78	Above Normal	90	Normal (7,500-15,000)

^aDefined by water year, using DWR's Sacramento Valley Unimpaired Runoff Index: wet = wettest; critical = driest. SWP = State Water Project.

^bDefined from simulations performed by CLWA (Kennedy/Jenks Consultants, 2003) and USBR (2004) using the CALSIM II model. This condition is for the year 2020 level of development. In any given year, the allocation may be made up, in part, of carryover water from the prior year.

TABLE 2-6

Simulated Annual Groundwater Pumping from the Saugus Formation

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Owner	Well Name	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
NCWD	11	811	811	811	811
	12	1,315	2,044	2,044	2,044
	13	1,315	2,044	2,044	2,044
Total Pumping (NCWD)		3,441	4,899	4,899	4,899
NLF	156	369	369	369	369
Total Pumping (NLF)		369	369	369	369
SCWC	Saugus1	1,772	1,772	1,772	1,772
	Saugus2	1,772	1,772	1,772	1,772
Total Pumping (SCWC)		3,544	3,544	3,544	3,544
VWC	159	50	50	50	50
	160 (Municipal)	500	830	830	830
	160 (Val. Ctry Club)	500	500	500	500
	201	100	100	3,577	3,577
	205	1,000	2,734	3,827	3,827
	206	1,175	2,734	3,500	3,500
Total Pumping (VWC)		3,325	6,948	12,284	12,284
To Be Determined	Future #1	0	0	3,250	3,250
	Future #2	0	0	0	3,250
	Future #3	0	0	0	3,250
	Future #4	0	0	0	3,250
Total Pumping (Future)		0	0	3,250	13,000
Total Saugus Formation Pumping		10,679	15,760	24,346	34,096

Notes:

All pumping volumes are listed in acre-feet.

Wells VWC-157 and NCWD-7, 8, 9, and 10 are assumed to no longer operate in the future.

NCWD = Newhall County Water District
NLF = Newhall Land and Farming Company
SCWC = Santa Clarita Water Company
VWC = Valencia Water Company
Val. Ctry Club = Valencia Country Club

TABLE 2-7

Allocation of Pumping by Layer for Wells Completed in the Saugus Formation

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	Model Layer	Depth to Open Interval (feet)		Length of Open Interval in Model Layer (feet)	Kh (ft/day)	T in Open Interval (ft ² /day)	Percentage of Yield from Model Layer
		Top	Bottom				
NCWD-11	2	200	1,075	300	10	3,000	72.3
	3			500	2	1,000	24.1
	4			75	2	150	3.6
NCWD-12	2	485	1,280	15	10	150	8.8
	3			500	2	1,000	58.5
	4			280	2	560	32.7
NCWD-13	2	420	750	80	10	800	61.5
	3			250	2	500	38.5
NLF-156	2	320	1,800	180	10	1,800	21.8
	3			500	6.5	3,250	39.4
	4			500	4	2,000	24.2
	5			300	4	1,200	14.5
SCWC-Saugus1	2	490	1,620	10	10	100	1.8
	3			500	6.5	3,250	59.9
	4			500	4	2,000	36.8
	5			20	4	80	1.5
SCWC-Saugus2	2	490	1,591	10	10	100	1.7
	3			500	6.5	3,250	56.9
	4			500	4	2,000	35.0
	5			91	4	364	6.4
VWC-159	3	662	1,900	338	0.025	8.45	27.3
	4			500	0.025	12.5	40.4
	5			400	0.025	10	32.3
VWC-160	3	950	2,000	50	6.5	325	7.6
	4			500	4	2,000	46.2
	5			500	4	2,000	46.2
VWC-201	3	540	1,670	460	6.5	2,990	52.7
	4			500	4	2,000	35.3
	5			170	4	680	12.0
VWC-205	3	820	1,930	180	6.5	1,170	23.9
	4			500	4	2,000	40.9
	5			430	4	1,720	35.2
VWC-206	3	500	2,000	500	6.5	3,250	44.8
	4			500	4	2,000	27.6
	5			500	4	2,000	27.6

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Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Owner - Well Name	Model Layer	Depth to Open Interval (feet)		Length of Open Interval in Model Layer (feet)	Kh (ft/day)	T in Open Interval (ft²/day)	Percentage of Yield from Model Layer
		Top	Bottom				
Future Wells	3	820	1,930	180	6.5	1,170	23.9
Near VWC-206	4			500	4	2,000	40.9
(Assumed)	5			430	4	1,720	35.2

Notes:

Wells VWC-157 and NCWD-7, 8, 9, and 10 are assumed to no longer operate in the future.

Kh = horizontal hydraulic conductivity

T = transmissivity

ft/day = feet per day

ft²/day = square feet per day

TABLE 2-8

Allocation of Pumping by Month for Agricultural and Urban Production Wells

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Month	Percent of Annual Water Use, Agricultural	Percent of Annual Water Use, Urban	Percent of May through October Water Use, Urban
January	3.75	5.2	
February	5.10	3.7	
March	6.60	5.2	
April	9.10	6.6	
May	10.55	8.7	13.2
June	11.40	10.4	15.8
July	14.10	13.0	19.7
August	12.95	13.6	20.6
September	10.20	10.9	16.6
October	7.50	9.3	14.1
November	5.00	7.1	
December	3.75	6.3	
Total	100.0	100.0	100.0

TABLE 2-9

Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 78-year Simulation

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Model Year	Based on Historical Year	Local Rainfall^a	Alluvial Aquifer Pumping under the Operational Pumping Plan (AF/yr)^{b,c}
1	1980	27.00	35,000-40,000
2	1981	13.42	35,000-40,000
3	1982	20.20	35,000-40,000
4	1983	39.07	35,000-40,000
5	1984	12.86	35,000-40,000
6	1985	8.37	30,000-35,000
7	1986	18.02	35,000-40,000
8	1987	14.45	35,000-40,000
9	1988	16.92	35,000-40,000
10	1989	7.56	30,000-35,000
11	1990	6.98	30,000-35,000
12	1991	17.21	30,000-35,000
13	1992	32.03	35,000-40,000
14	1993	32.72	35,000-40,000
15	1994	10.27	30,000-35,000
16	1995	29.15	35,000-40,000
17	1996	15.88	35,000-40,000
18	1997	13.35	35,000-40,000
19	1998	30.73	35,000-40,000
20	1999	8.96	30,000-35,000
21	2000	14.04	35,000-40,000
22	2001	22.24	35,000-40,000
23	2002	7.90	30,000-35,000
24	2003	15.70	35,000-40,000
25	1950	6.84	30,000-35,000
26	1951	12.42	35,000-40,000
27	1952	34.19	35,000-40,000
28	1953	4.88	30,000-35,000
29	1954	15.82	35,000-40,000
30	1955	13.91	35,000-40,000
31	1956	14.21	35,000-40,000
32	1957	22.85	35,000-40,000
33	1958	23.14	35,000-40,000
34	1959	9.81	30,000-35,000
35	1960	11.64	30,000-35,000
36	1961	8.82	30,000-35,000
37	1962	21.22	30,000-35,000
38	1963	12.79	35,000-40,000
39	1964	10.09	30,000-35,000
40	1965	32.28	35,000-40,000
41	1966	14.57	35,000-40,000
42	1967	23.23	35,000-40,000
43	1968	6.90	30,000-35,000

TABLE 2-9

Local Hydrology and Corresponding Pumping from the Alluvial Aquifer for the 78-year Simulation
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Model Year	Based on Historical Year	Local Rainfall^a	Alluvial Aquifer Pumping under the Operational Pumping Plan (AF/yr)^{b,c}
44	1969	32.42	35,000-40,000
45	1970	23.19	35,000-40,000
46	1971	13.75	35,000-40,000
47	1972	4.15	30,000-35,000
48	1973	19.79	35,000-40,000
49	1974	18.04	35,000-40,000
50	1975	10.92	30,000-35,000
51	1976	14.02	35,000-40,000
52	1977	20.87	35,000-40,000
53	1978	42.17	35,000-40,000
54	1979	21.47	35,000-40,000
55	1980	27.00	35,000-40,000
56	1981	13.42	35,000-40,000
57	1982	20.20	35,000-40,000
58	1983	39.07	35,000-40,000
59	1984	12.86	35,000-40,000
60	1985	8.37	30,000-35,000
61	1986	18.02	35,000-40,000
62	1987	14.45	35,000-40,000
63	1988	16.92	35,000-40,000
64	1989	7.56	30,000-35,000
65	1990	6.98	30,000-35,000
66	1991	17.21	30,000-35,000
67	1992	32.03	35,000-40,000
68	1993	32.72	35,000-40,000
69	1994	10.27	30,000-35,000
70	1995	29.15	35,000-40,000
71	1996	15.88	35,000-40,000
72	1997	13.35	35,000-40,000
73	1998	30.73	35,000-40,000
74	1999	8.96	30,000-35,000
75	2000	14.04	35,000-40,000
76	2001	22.24	35,000-40,000
77	2002	7.90	30,000-35,000
78	2003	15.70	35,000-40,000

^aFrom records at Newhall-Soledad rain gage (Station No. FC32CE).

^bAlluvial pumping rates listed in this column are the rates that will occur under the operational plan for the Valley if the 1950 through 2003 local hydrology repeats itself in the future.

^cAlluvial pumping is set at the dry-year rate in years 12, 37, and 66 because each of these years is the first nondrought year that occurs after a multi-year drought ends.

TABLE 2-10

Recent and Simulated Future Annual Groundwater Pumping Volumes from the Alluvial Aquifer

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Name	Location	Historical Pumping			UWMP Pumping	
		2001	2002	2003	Normal Years	Dry Years
NCWD-Castaic 1	Castaic Valley	345	385	561	385	345
NCWD-Castaic 2	Castaic Valley	166	0	123	166	125
NCWD-Castaic 3	Castaic Valley	0	0	0	0	0
NCWD-Castaic 4	Castaic Valley	100	47	56	100	45
NCWD-Pinetree 1	Mint Canyon	164	0	0	164	0
NCWD-Pinetree 2	Mint Canyon	0	0	0	0	0
NCWD-Pinetree 3	Mint Canyon	566	544	525	545	525
NCWD-Pinetree 4	Mint Canyon	300	5	0	300	0
NCWD Total		1,641	981	1,265	1,660	1,040
NLF-161	Downstream of Valencia WRP	496	485	2,021	485	485
NLF-B10	Downstream of Valencia WRP	1,240	534	344	344	344
NLF-B11	Downstream of Valencia WRP	205	232	271	232	232
NLF-B5	Downstream of Valencia WRP	1,680	2,280	1,582	1,582	1,582
NLF-B6	Downstream of Valencia WRP	1,312	2,175	1,766	1,766	1,766
NLF-B7	Downstream of Valencia WRP	474	584	402	584	584
NLF-C	Downstream of Valencia WRP	1,319	1,720	1,373	1,373	1,373
NLF-C3	Downstream of Valencia WRP	93	192	186	192	192
NLF-C4	Downstream of Valencia WRP	1,028	809	764	809	809
NLF-C5	Downstream of Valencia WRP	680	850	622	850	850
NLF-C6	Downstream of Valencia WRP	231	241	108	241	241
NLF-C7	Downstream of Valencia WRP	741	866	443	866	866
NLF-C8	Downstream of Valencia WRP	286	593	408	594	594
NLF-C9	Downstream of Valencia WRP	7	1	0	0	0
NLF-E	Castaic Valley	1,691	16	28	16	16
NLF-E2	Castaic Valley	141	55	14	55	55
NLF-E4	Downstream of Valencia WRP	0	0	0	0	0
NLF-E5	Downstream of Valencia WRP	172	679	537	679	679
NLF-E9	Downstream of Valencia WRP	238	814	47	814	814
NLF-G45	Downstream of Valencia WRP	291	283	60	283	283
NLF-S3	Downstream of Valencia WRP	0			0	0
NLF-W4	San Francisquito Canyon	46	1	0	0	0
NLF-W5	San Francisquito Canyon	276	104	23	107	107
NLF-X3	Downstream of Valencia WRP	12	0	0	0	0
NLF Total		12,659	13,514	10,999	11,872	11,872
SCWD-Clark	Bouquet Canyon	696	782	712	782	700
SCWD-Guida	Bouquet Canyon	1,047	1,320	1,230	1,320	1,230
SCWD-Honby	Above Saugus WRP	721	696	874	696	870
SCWD-Lost Canyon 2	Mint Canyon	741	730	644	741	640
SCWD-Lost Canyon 2A	Mint Canyon	1,034	905	593	1,034	590
SCWD-Mitchell #5A	Mint Canyon	407	143	19	0	0
SCWD-Mitchell #5B	Mint Canyon	0	150	0	557	0
SCWD-N. Oaks Central	Mint Canyon	822	1,646	1,641	822	1,640
SCWD-N. Oaks East	Mint Canyon	1,234	448	485	1,234	485
SCWD-N. Oaks West	Mint Canyon	898	1,123	31	898	0
SCWD-Sand Canyon	Mint Canyon	930	705	195	930	195
SCWD-Sierra	Mint Canyon	846	87	0	846	0
SCWD-Stadium	Above Saugus WRP	565	778	0	800	800
SCWD Total		9,941	9,513	6,424	10,660	7,150

TABLE 2-10

Recent and Simulated Future Annual Groundwater Pumping Volumes from the Alluvial Aquifer

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Well Name	Location	Historical Pumping			UWMP Pumping	
		2001	2002	2003	Normal Years	Dry Years
VWC-D	Castaic Valley	645	772	687	690	690
VWC-I	San Francisquito Canyon	0	0	0	0	0
VWC-K2	Downstream of Saugus WRP	669	955	364	0	0
VWC-L2	Downstream of Saugus WRP	349	490	71	0	0
VWC-N	Downstream of Saugus WRP	591	700	622	620	620
VWC-N3	Downstream of Saugus WRP	226	857	255	0	0
VWC-N4	Downstream of Saugus WRP	458	909	248	0	0
VWC-N7	Downstream of Saugus WRP				1,160	1,160
VWC-N8	Downstream of Saugus WRP				1,160	1,160
VWC-Q2	Downstream of Saugus WRP	923	1,167	1,451	985	985
VWC-S6	Downstream of Saugus WRP	1,490	1,320	2,134	865	865
VWC-S7	Downstream of Saugus WRP	564	419	1,095	865	865
VWC-S8	Downstream of Saugus WRP	327	190	409	865	865
VWC-T2	Above Saugus WRP	900	696	1,014	460	460
VWC-T4	Above Saugus WRP	690	831	799	460	460
VWC-U3	Above Saugus WRP	956	572	823	0	0
VWC-U4	Above Saugus WRP	942	796	934	935	935
VWC-U6	Above Saugus WRP	0	0	0	825	825
VWC-W10	San Francisquito Canyon	182	0		0	0
VWC-W11	San Francisquito Canyon	806	939	764	600	600
VWC-W6	San Francisquito Canyon	0	0	36	865	865
VWC-W9	San Francisquito Canyon				350	350
VWC Total		10,718	11,613	11,706	11,705	11,705
Robinson Ranch	Mint Canyon				932	400
WHR (All Wells)	Castaic Valley	1,604	1,602	2,273	1,600	1,600
Total Alluvial Aquifer Pumping		36,563	37,223	32,667	38,429	33,767

Notes:

All pumping volumes are listed in AF/yr.

Wells that are not listed are assumed to not be pumping in the future.

NCWD = Newhall County Water District

NLF = Newhall Land and Farming Company

SCWC = Santa Clarita Water Company

VWC = Valencia Water Company

WHR = Wayside Honor Rancho, owned by LACWWD

TABLE 2-11

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
2	4.76	1.66	5.50	0.46	0.00	0.00	0.00	0.00	0.00	0.58	3.62	0.22	16.80
3	3.33	1.21	9.50	1.09	0.13	0.00	0.00	0.00	1.02	0.25	5.34	2.95	24.82
4	8.67	6.85	13.07	4.61	0.20	0.00	0.00	1.17	1.85	1.74	5.04	5.13	48.33
5	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.00	0.05	0.16	3.87	8.13	12.55
6	0.78	1.20	1.04	0.14	0.07	0.00	0.06	0.00	0.12	0.54	5.11	0.70	9.76
7	5.84	6.65	5.39	0.88	0.00	0.00	0.05	0.00	1.78	0.68	1.55	0.24	23.06
8	2.10	0.61	1.69	0.14	0.00	0.00	0.09	0.02	0.00	3.47	3.84	4.80	16.76
9	3.27	3.39	1.16	3.98	0.09	0.00	0.00	0.00	0.10	0.00	0.92	7.14	20.05
10	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
11	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
12	1.11	5.72	11.33	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	5.95	24.61
13	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
14	17.11	11.73	4.27	0.00	0.00	0.65	0.00	0.00	0.00	0.57	0.75	1.00	36.08
15	0.48	5.31	2.33	0.42	0.00	0.00	0.00	0.00	0.00	0.78	0.71	1.94	11.97
16	21.98	1.93	8.30	0.72	0.26	0.76	0.00	0.00	0.00	0.00	0.00	2.33	36.28
17	2.97	6.73	2.08	0.13	0.68	0.00	0.00	0.00	0.00	1.30	1.06	8.70	23.65
18	6.67	0.23	0.00	0.00	0.00	0.00	0.05	0.00	0.53	0.00	3.73	6.72	17.93
19	3.49	22.00	3.98	2.28	5.50	0.06	0.00	0.00	0.21	0.33	1.36	1.39	40.60
20	2.08	0.65	3.00	3.78	0.00	0.48	0.00	0.00	0.01	0.00	0.00	0.05	10.05
21	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
22	5.96	9.79	3.70	1.88	0.00	0.00	0.00	0.00	0.00	0.36	3.33	1.08	26.10
23	1.08	1.10	0.26	0.05	0.05	0.00	0.00	0.00	0.01	0.00	2.48	4.25	9.27
24	0.00	9.88	2.73	2.42	0.05	0.00	0.00	0.00	0.09	0.10	0.63	2.57	18.47
25	2.58	1.69	1.27	0.86	0.01	0.00	0.00	0.00	0.32	0.36	0.73	0.21	8.03
26	2.96	0.93	1.16	1.69	0.09	0.00	0.00	0.05	0.00	0.49	1.33	5.88	14.57
27	17.68	0.61	10.30	1.80	0.00	0.00	0.00	0.00	0.12	0.00	4.52	5.09	40.12
28	0.80	0.02	0.21	1.64	0.69	0.00	0.00	0.00	0.00	0.00	2.32	0.04	5.73
29	6.38	3.36	4.86	0.12	0.00	0.00	0.00	0.00	0.00	0.00	2.38	1.47	18.56
30	5.69	1.69	0.21	3.38	1.91	0.00	0.00	0.00	0.00	0.00	1.43	2.01	16.32
31	7.55	1.00	0.00	5.90	1.82	0.00	0.11	0.00	0.00	0.15	0.00	0.15	16.68
32	7.22	2.71	3.05	1.16	1.06	0.25	0.00	0.00	0.00	2.68	0.40	8.30	26.81
33	2.11	10.42	5.82	7.18	0.00	0.00	0.00	0.00	0.04	1.35	0.23	0.00	27.15
34	3.70	5.47	0.00	0.59	0.00	0.00	0.00	0.00	0.08	0.00	0.00	1.68	11.51
35	4.17	2.21	0.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	4.96	0.07	13.66
36	1.88	0.00	0.76	0.33	0.09	0.00	0.07	0.00	0.11	0.00	4.12	2.99	10.35
37	3.86	19.44	1.53	0.00	0.02	0.00	0.00	0.00	0.00	0.05	0.00	0.00	24.90
38	0.99	3.63	4.10	2.23	0.06	0.43	0.00	0.00	0.77	0.50	2.29	0.01	15.01
39	2.95	0.00	1.88	2.41	0.04	0.12	0.00	0.00	0.00	0.52	1.47	2.48	11.84
40	0.25	0.07	1.65	9.14	0.00	0.02	0.26	0.16	0.95	0.00	17.49	7.89	37.88
41	1.42	1.55	0.33	0.00	0.09	0.00	0.00	0.00	0.09	0.11	7.56	5.95	17.10

TABLE 2-11

Simulated Monthly Precipitation at the Newhall County Water District Rain Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	6.76	0.22	3.23	5.41	0.19	0.00	0.00	0.00	0.50	0.00	9.36	1.58	27.26
43	0.86	0.93	2.91	0.97	0.07	0.00	0.00	0.38	0.00	0.39	0.35	1.24	8.10
44	19.53	13.89	0.82	1.16	0.05	0.05	0.18	0.00	0.00	0.00	2.32	0.05	38.04
45	0.94	6.63	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.13	8.86	6.33	27.21
46	1.23	1.41	0.48	0.94	0.15	0.00	0.00	0.00	0.47	0.50	0.38	10.57	16.14
47	0.00	0.12	0.00	0.02	0.05	0.05	0.00	0.06	0.00	0.05	3.45	1.08	4.87
48	5.19	11.74	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.15	1.83	1.03	23.22
49	10.58	0.02	4.30	0.06	0.00	0.00	0.02	0.00	0.00	1.17	0.12	4.89	21.17
50	0.28	3.02	6.04	2.96	0.00	0.00	0.00	0.00	0.00	0.39	0.04	0.09	12.81
51	0.00	7.39	1.47	0.46	0.15	0.35	0.01	0.00	3.40	0.22	2.09	0.90	16.45
52	5.75	0.12	2.15	0.00	5.27	0.00	0.00	2.68	0.02	0.05	0.06	8.40	24.49
53	10.74	13.23	17.10	2.72	0.00	0.00	0.00	0.00	1.23	0.01	2.70	1.76	49.49
54	12.44	3.20	6.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.89	1.19	23.75
55	10.36	14.63	4.84	0.36	0.40	0.00	0.00	0.00	0.00	0.00	0.00	1.36	31.95
56	4.76	1.66	5.50	0.46	0.00	0.00	0.00	0.00	0.00	0.58	3.62	0.22	16.80
57	3.33	1.21	9.50	1.09	0.13	0.00	0.00	0.00	1.02	0.25	5.34	2.95	24.82
58	8.67	6.85	13.07	4.61	0.20	0.00	0.00	1.17	1.85	1.74	5.04	5.13	48.33
59	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.00	0.05	0.16	3.87	8.13	12.55
60	0.78	1.20	1.04	0.14	0.07	0.00	0.06	0.00	0.12	0.54	5.11	0.70	9.76
61	5.84	6.65	5.39	0.88	0.00	0.00	0.05	0.00	1.78	0.68	1.55	0.24	23.06
62	2.10	0.61	1.69	0.14	0.00	0.00	0.09	0.02	0.00	3.47	3.84	4.80	16.76
63	3.27	3.39	1.16	3.98	0.09	0.00	0.00	0.00	0.10	0.00	0.92	7.14	20.05
64	0.89	4.13	1.30	0.30	0.00	0.00	0.00	0.00	0.62	0.86	0.37	0.00	8.47
65	2.89	4.23	0.22	0.48	0.88	0.00	0.00	0.00	0.00	0.00	0.63	0.01	9.34
66	1.11	5.72	11.33	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	5.95	24.61
67	3.28	16.64	9.73	0.15	0.34	0.00	0.30	0.00	0.00	1.55	0.00	7.25	39.24
68	17.11	11.73	4.27	0.00	0.00	0.65	0.00	0.00	0.00	0.57	0.75	1.00	36.08
69	0.48	5.31	2.33	0.42	0.00	0.00	0.00	0.00	0.00	0.78	0.71	1.94	11.97
70	21.98	1.93	8.30	0.72	0.26	0.76	0.00	0.00	0.00	0.00	0.00	2.33	36.28
71	2.97	6.73	2.08	0.13	0.68	0.00	0.00	0.00	0.00	1.30	1.06	8.70	23.65
72	6.67	0.23	0.00	0.00	0.00	0.00	0.05	0.00	0.53	0.00	3.73	6.72	17.93
73	3.49	22.00	3.98	2.28	5.50	0.06	0.00	0.00	0.21	0.33	1.36	1.39	40.60
74	2.08	0.65	3.00	3.78	0.00	0.48	0.00	0.00	0.01	0.00	0.00	0.05	10.05
75	1.21	9.43	3.15	2.10	0.00	0.00	0.00	0.31	0.00	1.13	0.00	0.00	17.33
76	5.96	9.79	3.70	1.88	0.00	0.00	0.00	0.00	0.00	0.36	3.33	1.08	26.10
77	1.08	1.10	0.26	0.05	0.05	0.00	0.00	0.00	0.01	0.00	2.48	4.25	9.27
78	0.00	9.88	2.73	2.42	0.05	0.00	0.00	0.00	0.09	0.10	0.63	2.57	18.47

TABLE 2-12

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175
2	594	98	339	240	107	18	18	12	338	321	258	394	2,739
3	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
4	1,922	16,971	2,755	2,576	958	523	639	512	0	0	0	0	26,855
5	0	596	405	240	143	166	228	411	154	220	904	578	4,044
6	483	461	274	215	77	0	0	0	12	179	221	301	2,224
7	483	1,138	488	283	107	6	0	12	6	12	80	129	2,744
8	117	117	65	31	12	0	0	0	0	0	258	516	1,116
9	222	209	506	117	77	68	0	0	0	0	12	25	1,236
10	50	111	60	25	6	0	0	0	102	94	34	18	499
11	212	276	230	46	46	5	0	0	0	27	36	147	1,025
12	162	775	879	736	145	142	14	0	45	69	62	263	3,291
13	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115
14	14,709	5,336	1,194	530	239	110	54	10	64	145	264	281	22,937
15	388	493	497	319	163	80	20	7	37	102	193	941	3,239
16	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104
17	666	896	730	315	151	46	7	0	54	154	307	510	3,836
18	517	346	140	85	33	5	4	50	66	240	566	809	2,859
19	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074
20	92	85	204	224	197	107	80	46	52	54	31	80	1,252
21	117	117	65	31	12	0	0	0	0	0	258	516	1,116
22	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
23	50	111	60	25	6	0	0	0	102	94	34	18	499
24	666	896	730	315	151	46	7	0	54	154	307	510	3,836
25	83	198	184	126	105	83	51	54	56	53	43	42	1,078
26	49	40	66	91	98	84	79	72	57	71	47	53	807
27	9,629	636	7,091	2,114	895	326	153	138	86	97	178	313	21,656
28	300	282	271	237	165	134	102	86	85	83	74	68	1,888
29	145	278	404	356	181	108	110	99	91	90	80	75	2,017
30	103	156	157	128	153	99	78	76	74	68	66	62	1,220
31	69	85	130	137	139	98	86	80	77	76	67	69	1,113
32	67	55	78	90	93	80	78	78	76	79	66	71	910
33	66	329	743	4,550	825	283	130	108	95	145	146	116	7,536
34	246	351	189	127	111	92	84	86	83	69	68	68	1,575
35	68	67	70	69	70	68	65	65	60	58	316	164	1,140
36	124	91	38	38	36	32	28	33	22	19	19	119	597
37	139	1,904	791	449	329	169	97	82	80	84	82	82	4,287
38	85	142	145	131	104	86	79	74	66	65	62	58	1,096
39	69	50	51	62	66	54	53	53	54	45	43	41	640
40	30	23	25	46	43	36	31	34	37	35	1,305	3,300	4,944
41	1,765	1,014	778	450	308	115	68	54	45	63	91	523	5,274

TABLE 2-12

Simulated Monthly Streamflows in the Santa Clara River at the Lang Gage

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	757	489	1,028	2,295	1,880	729	212	104	89	73	255	487	8,397
43	300	247	276	180	72	32	32	30	25	133	208	851	2,384
44	13,797	2,856	1,005	489	320	147	98	98	46	318	392	399	19,966
45	461	550	1,168	465	290	169	74	60	58	27	501	1,338	5,161
46	614	524	556	397	262	167	70	25	5	30	200	420	3,270
47	332	250	131	90	50	22	32	6	0	0	11	58	983
48	153	1,717	950	471	226	71	18	12	8	3	8	44	3,679
49	608	229	392	190	129	49	17	6	0	3	19	87	1,728
50	53	90	228	181	104	31	15	3	0	0	0	0	704
51	0	110	63	39	33	12	0	0	1	0	0	0	258
52	28	7	28	19	60	5	0	0	0	0	0	0	147
53	744	9,486	11,412	1,696	2,736	1,154	418	209	101	264	422	86	28,730
54	1,254	433	1,113	506	246	190	178	111	125	90	120	558	4,925
55	1,310	7,449	1,213	568	218	78	6	0	37	274	467	553	12,175
56	594	98	339	240	107	18	18	12	338	321	258	394	2,739
57	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
58	1,922	16,971	2,755	2,576	958	523	639	512	0	0	0	0	26,855
59	0	596	405	240	143	166	228	411	154	220	904	578	4,044
60	483	461	274	215	77	0	0	0	12	179	221	301	2,224
61	483	1,138	488	283	107	6	0	12	6	12	80	129	2,744
62	117	117	65	31	12	0	0	0	0	0	258	516	1,116
63	222	209	506	117	77	68	0	0	0	0	12	25	1,236
64	50	111	60	25	6	0	0	0	102	94	34	18	499
65	212	276	230	46	46	5	0	0	0	27	36	147	1,025
66	162	775	879	736	145	142	14	0	45	69	62	263	3,291
67	336	534	429	398	117	84	16	5	108	144	498	1,446	4,115
68	14,709	5,336	1,194	530	239	110	54	10	64	145	264	281	22,937
69	388	493	497	319	163	80	20	7	37	102	193	941	3,239
70	1,211	1,421	954	802	268	156	62	8	6	1	27	189	5,104
71	666	896	730	315	151	46	7	0	54	154	307	510	3,836
72	517	346	140	85	33	5	4	50	66	240	566	809	2,859
73	18,997	8,508	3,837	961	667	347	81	91	70	139	190	186	34,074
74	92	85	204	224	197	107	80	46	52	54	31	80	1,252
75	117	117	65	31	12	0	0	0	0	0	258	516	1,116
76	333	1,420	785	283	238	0	0	0	0	95	178	855	4,188
77	50	111	60	25	6	0	0	0	102	94	34	18	499
78	666	896	730	315	151	46	7	0	54	154	307	510	3,836

TABLE 2-13

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805
2	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
3	0	0	0	0	0	667	842	735	0	0	0	0	2,244
4	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
8	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
9	0	0	809	341	900	0	0	0	0	0	0	0	2,050
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	66	66
13	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
14	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
15	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
16	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611
17	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
18	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884
19	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802
20	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
21	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086
22	0	0	0	0	0	667	842	735	0	0	0	0	2,244
23	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
25	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
28	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
30	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
31	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
32	0	0	0	0	0	667	842	735	0	0	0	0	2,244
33	0	0	0	0	0	667	842	735	0	0	0	0	2,244
34	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
35	0	0	0	0	0	0	0	0	0	0	0	0	0
36	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
37	0	0	0	0	0	667	842	735	0	0	0	0	2,244
38	0	0	0	0	0	0	0	0	0	0	0	0	0
39	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
40	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
41	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853

TABLE 2-13

Simulated Monthly Water Releases from Castaic Lagoon to Castaic Creek

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
42	0	0	0	0	0	667	842	735	0	0	0	0	2,244
43	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
45	0	0	0	0	0	667	842	735	0	0	0	0	2,244
46	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
47	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	667	842	735	0	0	0	0	2,244
49	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
50	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
51	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
52	0	0	0	0	0	667	842	735	0	0	0	0	2,244
53	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
54	0	0	0	0	0	667	842	735	0	0	0	0	2,244
55	0	0	0	0	0	834	1,052	919	0	0	0	0	2,805
56	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
57	0	0	0	0	0	667	842	735	0	0	0	0	2,244
58	0	0	0	0	0	1,168	1,473	1,287	0	0	0	0	3,928
59	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0
61	105	0	0	1,490	46	0	0	0	0	0	0	0	1,641
62	105	0	0	1,490	46	0	0	0	0	0	212	0	1,853
63	0	0	809	341	900	0	0	0	0	0	0	0	2,050
64	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	66	66
67	0	0	580	3,052	667	127	24	0	0	0	0	0	4,450
68	0	140	186	3,031	1,901	635	341	337	813	0	0	341	7,725
69	210	0	0	2,979	93	0	0	0	0	0	0	0	3,282
70	0	0	0	0	0	1,668	2,104	1,839	0	0	0	0	5,611
71	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632
72	0	0	8,701	873	0	0	0	0	0	0	0	310	9,884
73	1,186	19,545	10,747	4,566	7,561	47	1,370	436	464	302	652	926	47,802
74	612	691	0	3,187	1,191	149	0	0	0	0	0	0	5,830
75	0	660	855	0	2,087	3,484	0	0	0	0	0	0	7,086
76	0	0	0	0	0	667	842	735	0	0	0	0	2,244
77	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	4,961	671	0	0	0	0	0	0	0	5,632

TABLE 2-14

Water Demands and Indoor Water Use under Full Build-out Conditions (Excluding Newhall Ranch)

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year 2000 Actual (AF/yr)	Full Build-out Conditions (AF/yr)	Comments
Annual Urban Water Use Outside Newhall Ranch		
60,988	123,038	<p>Year 2000 value is retail purveyor demand plus other demands in Tables III-6 and IV-1 of the <i>Santa Clarita Valley Water Report 2000</i> (Luhdorff & Scalmanini Consulting Engineers, 2001).</p> <p>Year 2045 value is from Table 2.5-4 of the <i>Newhall Ranch Draft Additional Analysis</i> (Impact Sciences, Inc., 2001). Consists of 89,805 AF/yr Development Monitoring System (DMS)^a demand, plus 55,995 AF/yr additional urban demand, minus 14,480 AF/yr conservation, minus 5,193 AF/yr agricultural uses and 3,089 AF/yr “other” uses. Does not include 4,500 AF/yr for aquifer storage and recovery (ASR) or the 17,680 AF/yr demand for the Newhall Ranch Specific Plan.</p>
Annual Indoor Water Use Outside Newhall Ranch (Equal to LACSD WRP Influent Volumes)		
18,723	40,313 (average year)	<p>The year 2000 volume is from the Saugus and Valencia WRPs for the period January 2000 through December 2000. The long-term current generated effluent volume is based on the influent volume estimated from water balance calculations performed for the chloride mass balance analysis. The effluent volume is 32.8 percent of the total urban water production of 123,038 AF/yr, which includes other uses.</p>

^aDMS water demands are demands associated with future build-out of developments identified in Los Angeles County’s DMS for the Santa Clarita Valley.

TABLE 2-15

Treated Water Discharges from the Saugus and Valencia WRPs to the Santa Clara River under Full Build-out Conditions
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Month	Treated Water Volume (2000) ^a	Treated Water Volume (Full Build-out Conditions) ^b	Percent of Annual Outdoor Demand	Reclaimed Volume under Full Build-out Conditions (Before Maintaining Existing Streamflows)	Reclaimed Volume under Full Build-out Conditions (After Maintaining Existing Streamflows)	WRP Discharges to River under Full Build-out Conditions ^c	Month
January	1,503	3,237	3.75	637	637	2,600	January
February	1,443	3,106	5.10	867	867	2,239	February
March	1,528	3,290	6.60	1,122	1,122	2,168	March
April	1,505	3,240	9.10	1,547	1,547	1,693	April
May	1,569	3,379	10.55	1,794	1,794	1,585	May
June	1,543	3,322	11.40	1,938	1,781	1,541	June
July	1,606	3,459	14.10	2,397	1,854	1,605	July
August	1,649	3,550	12.95	2,202	1,902	1,648	August
September	1,593	3,430	10.20	1,734	1,734	1,696	September
October	1,631	3,512	7.50	1,275	1,275	2,237	October
November	1,546	3,329	5.00	850	850	2,479	November
December	1,607	3,459	3.75	637	637	2,822	December
Total Annual	18,723	40,313	100.0	17,000	16,000	24,313	Total Annual

^aValues shown are the actual volume of treated water discharged to the Santa Clara River from the Saugus and Valencia WRPs during calendar year 2000. (See also Table 2-14.)

^bValues shown are the combined treated water volumes estimated to be produced by the Saugus and Valencia WRPs for full build-out conditions in the Santa Clarita Valley. These values do not include the future Newhall Ranch WRP, which will be operated by LACSD.

^cValues shown do not include discharges of treated water to the river from the future Newhall Ranch WRP. These volumes are 10 AF in November, 138 AF in December, and 138 AF in January. During the other nine months of the year, this WRP will not discharge treated water to the river (see the *Newhall Ranch Draft Additional Analysis* [Impact Sciences, Inc., 2001] for further details). The combined total discharge from the Saugus, Valencia, and Newhall Ranch WRPs is summarized in Table 2-16 of this report.

Note:

All units are in acre-feet, unless otherwise indicated.

TABLE 2-16

Simulated Monthly Treated Wastewater Discharges from Santa Clarita Valley WRPs under Full Build-out Conditions
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

WRP	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Saugus	493	487	500	490	503	466	457	508	586	555	514	596	6,155
Valencia	2,107	1,752	1,668	1,203	1,082	1,075	1,148	1,140	1,110	1,682	1,965	2,226	18,158
Newhall	138	0	0	0	0	0	0	0	0	0	10	138	286
Total	2,738	2,239	2,168	1,693	1,585	1,541	1,605	1,648	1,696	2,237	2,489	2,960	24,599

Note:

Wastewater discharge volumes are listed in acre-feet.

TABLE 2-17
 Simulated Annual Groundwater Budget
 Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Precipitation Infiltration	Infiltration of Applied Water	Streambed Infiltration	Subsurface Inflow	Total Recharge	Pumping	Groundwater Discharge to Streams	ET	Subsurface Outflow at County Line	Total Discharge	Change in Groundwater Storage	Cumulative Change in Groundwater Storage		
0	to	1	41,053	13,970	39,953	17,871	112,847	49,119	21,649	17,524	18,464	106,756	6,091	6,091
1	to	2	11,601	13,970	3,373	18,632	47,576	49,035	10,147	10,469	18,136	87,788	-40,212	-34,120
2	to	3	51,672	13,970	28,415	18,444	112,501	49,035	10,925	12,319	18,585	90,863	21,638	-12,483
3	to	4	181,820	13,970	89,448	16,985	302,223	49,035	36,265	29,506	19,056	133,861	168,361	155,879
4	to	5	687	13,970	527	18,253	33,437	49,119	16,665	23,150	18,225	107,158	-73,721	82,158
5	to	6	2	13,970	535	18,927	33,434	44,372	9,497	13,286	18,171	85,326	-51,891	30,266
6	to	7	42,574	13,970	19,998	18,619	95,161	49,035	11,479	14,376	18,568	93,458	1,703	31,969
7	to	8	11,415	13,970	2,484	19,419	47,288	49,035	7,923	10,419	18,277	85,654	-38,366	-6,397
8	to	9	27,363	13,970	10,507	19,743	71,583	54,214	6,664	10,234	18,507	89,618	-18,036	-24,433
9	to	10	0	13,970	523	20,113	34,606	44,372	4,739	8,041	18,359	75,510	-40,904	-65,336
10	to	11	0	13,970	1,472	20,347	35,789	49,446	2,584	5,612	18,354	75,996	-40,208	-105,544
11	to	12	50,580	13,970	28,173	19,613	112,336	58,025	3,061	8,476	18,563	88,125	24,211	-81,334
12	to	13	130,074	13,970	80,760	17,850	242,654	72,600	14,234	18,462	18,728	124,024	118,630	37,296
13	to	14	112,433	13,970	51,561	17,509	195,472	49,035	24,221	29,084	18,797	121,137	74,335	111,632
14	to	15	414	13,970	1,979	18,575	34,939	49,446	7,788	16,616	18,157	92,007	-57,068	54,563
15	to	16	113,543	13,970	60,100	17,636	205,250	49,035	29,255	26,983	18,745	124,018	81,232	135,795
16	to	17	45,609	13,970	21,594	18,204	99,376	49,119	15,122	21,342	18,635	104,218	-4,842	130,954
17	to	18	16,967	13,970	5,320	18,758	55,015	49,035	11,851	16,757	18,242	95,885	-40,870	90,084
18	to	19	137,727	13,970	59,717	17,397	228,810	49,035	27,143	31,249	18,923	126,350	102,460	192,544
19	to	20	13	13,970	4,717	18,586	37,286	49,035	14,305	20,865	18,200	102,405	-65,119	127,425
20	to	21	14,095	13,970	4,962	19,294	52,321	49,119	11,194	14,485	18,342	93,139	-40,818	86,607
21	to	22	58,364	13,970	35,154	18,639	126,127	54,116	12,710	19,337	18,655	104,818	21,309	107,917
22	to	23	0	13,970	523	19,557	34,050	44,372	8,105	13,129	18,311	83,916	-49,866	58,051
23	to	24	19,602	13,970	5,065	19,867	58,504	49,035	8,138	10,710	18,375	86,258	-27,754	30,297
24	to	25	0	13,970	524	20,258	34,752	44,441	5,486	7,896	18,418	76,240	-41,489	-11,192
25	to	26	3,053	13,970	518	20,406	37,947	49,035	4,033	6,132	18,386	77,587	-39,639	-50,832
26	to	27	135,033	13,970	73,747	18,014	240,763	49,035	16,024	17,254	18,639	100,951	139,812	88,980
27	to	28	0	13,970	536	18,764	33,270	44,372	9,238	15,229	18,125	86,963	-53,693	35,287
28	to	29	20,048	13,970	4,960	19,518	58,496	49,119	7,646	10,808	18,326	85,898	-27,402	7,885
29	to	30	9,397	13,970	2,999	19,929	46,296	54,116	4,726	8,252	18,339	85,433	-39,138	-31,253
30	to	31	11,022	13,970	2,348	20,308	47,647	49,035	4,024	7,140	18,409	78,609	-30,962	-62,215
31	to	32	62,138	13,970	37,429	19,568	133,105	49,035	6,854	11,497	18,820	86,205	46,900	-15,315
32	to	33	63,939	13,970	36,375	18,890	133,174	49,119	11,471	19,025	18,678	98,293	34,881	19,566
33	to	34	244	13,970	2,395	20,199	36,808	44,372	6,943	11,585	18,375	81,275	-44,466	-24,900
34	to	35	1,555	13,970	524	20,530	36,579	49,446	3,767	7,507	18,404	79,124	-42,545	-67,445
35	to	36	32	13,970	4,852	20,690	39,543	58,025	303	5,882	18,401	82,610	-43,067	-110,512
36	to	37	52,098	13,970	24,510	19,931	110,509	44,441	4,564	10,236	18,620	77,860	32,648	-77,864
37	to	38	4,170	13,970	616	20,483	39,239	49,035	2,503	6,237	18,378	76,152	-36,913	-114,777
38	to	39	362	13,970	2,463	20,816	37,610	49,446	719	4,966	18,418	73,549	-35,938	-150,716
39	to	40	122,459	13,970	74,037	19,276	229,741	49,035	8,546	10,468	18,766	86,814	142,927	-7,789
40	to	41	12,997	13,970	4,096	19,066	50,129	49,119	8,998	13,953	18,220	90,290	-40,161	-47,950
41	to	42	64,499	13,970	40,945	18,797	138,210	49,035	10,243	16,890	18,577	94,745	43,465	-4,484
42	to	43	0	13,970	536	19,752	34,258	44,372	6,577	12,461	18,301	81,711	-47,454	-51,938
43	to	44	123,377	13,970	53,751	18,022	209,121	49,035	17,543	21,442	18,640	106,660	102,461	50,523
44	to	45	64,250	13,970	39,379	18,423	136,022	49,119	13,271	20,449	18,544	101,383	34,639	85,163
45	to	46	8,541	13,970	2,217	19,103	43,830	49,035	10,232	18,196	18,249	95,712	-51,882	33,281
46	to	47	0	13,970	533	19,897	34,399	44,372	6,746	10,372	18,334	79,823	-45,424	-12,143

TABLE 2-17
 Simulated Annual Groundwater Budget
 Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Year	Precipitation Infiltration	Infiltration of Applied Water	Streambed Infiltration	Subsurface Inflow	Total Recharge	Pumping	Groundwater Discharge to Streams	ET	Subsurface Outflow at County Line	Total Discharge	Change in Groundwater Storage	Cumulative Change in Groundwater Storage
47 to 48	43,414	13,970	18,560	19,505	95,448	49,035	8,927	12,755	18,638	89,355	6,094	-6,050
48 to 49	32,966	13,970	13,527	19,953	80,416	49,119	8,497	12,634	18,666	88,916	-8,499	-14,549
49 to 50	839	13,970	1,856	20,451	37,117	44,372	5,528	8,992	18,434	77,326	-40,209	-54,758
50 to 51	9,990	13,970	2,645	20,684	47,289	54,116	3,517	6,845	18,455	82,933	-35,643	-90,401
51 to 52	49,961	13,970	25,027	20,153	109,112	62,702	3,319	9,913	18,755	94,689	14,423	-75,978
52 to 53	188,493	13,970	69,633	17,584	289,679	49,119	22,292	27,398	18,933	117,742	171,937	95,959
53 to 54	46,125	13,970	20,155	18,290	98,539	49,035	15,148	24,661	18,522	107,366	-8,827	87,132
54 to 55	89,718	13,970	39,953	17,979	161,620	49,035	20,589	29,655	18,624	117,903	43,716	130,848
55 to 56	11,601	13,970	3,373	19,267	48,211	49,035	11,347	18,242	18,316	96,940	-48,729	82,119
56 to 57	51,672	13,970	28,415	19,203	113,260	49,119	11,982	18,862	18,806	98,769	14,491	96,610
57 to 58	181,820	13,970	89,448	17,106	302,343	49,035	32,399	38,747	19,048	139,229	163,114	259,725
58 to 59	687	13,970	527	18,350	33,534	49,035	16,623	29,046	18,213	112,917	-79,383	180,342
59 to 60	2	13,970	535	19,266	33,773	44,372	10,576	17,223	18,266	90,437	-56,664	123,678
60 to 61	42,574	13,970	19,998	18,987	95,529	49,119	12,553	18,152	18,704	98,527	-2,998	120,680
61 to 62	11,415	13,970	2,484	19,754	47,622	49,035	9,005	13,268	18,366	89,674	-42,052	78,628
62 to 63	27,363	13,970	10,507	20,014	71,853	54,116	7,752	12,812	18,539	93,219	-21,366	57,262
63 to 64	0	13,970	523	20,416	34,909	44,372	5,755	10,119	18,437	78,683	-43,774	13,488
64 to 65	0	13,970	1,472	20,680	36,121	49,522	3,569	7,254	18,475	78,820	-42,698	-29,210
65 to 66	50,580	13,970	28,173	19,854	112,576	58,025	4,004	10,335	18,623	90,989	21,588	-7,622
66 to 67	130,074	13,970	80,760	17,898	242,702	72,452	13,502	21,223	18,686	125,863	116,839	109,216
67 to 68	112,433	13,970	51,561	17,536	195,499	49,035	23,462	32,532	18,803	123,833	71,667	180,883
68 to 69	414	13,970	1,979	18,661	35,024	49,522	8,596	18,842	18,226	95,186	-60,162	120,721
69 to 70	113,543	13,970	60,100	17,647	205,261	49,035	29,552	30,176	18,761	127,523	77,737	198,459
70 to 71	45,609	13,970	21,594	18,166	99,339	49,035	15,740	23,534	18,602	106,911	-7,572	190,886
71 to 72	16,967	13,970	5,320	18,777	55,034	49,035	12,551	18,552	18,264	98,402	-43,368	147,518
72 to 73	137,727	13,970	59,717	17,442	228,856	49,119	28,296	34,847	19,001	131,263	97,592	245,111
73 to 74	13	13,970	4,717	18,592	37,292	49,035	14,986	23,059	18,220	105,299	-68,007	177,103
74 to 75	14,095	13,970	4,962	19,254	52,281	49,035	11,783	15,930	18,311	95,059	-42,779	134,324
75 to 76	58,364	13,970	35,154	18,654	126,142	54,116	13,385	20,958	18,673	107,132	19,010	153,334
76 to 77	0	13,970	523	19,646	34,139	44,441	8,624	14,082	18,380	85,527	-51,388	101,946
77 to 78	19,602	13,970	5,065	19,899	58,536	49,035	8,607	11,515	18,393	87,550	-29,014	72,932
Minimum	0	13,970	518	16,985	33,270	44,372	303	4,966	18,125	73,549	-79,383	-150,716
Maximum	188,493	13,970	89,448	20,816	302,343	72,600	36,265	38,747	19,056	139,229	171,937	259,725
Average	42,498	13,970	21,480	19,092	97,040	49,823	11,520	16,262	18,498	96,105	935	44,866
Median	19,602	13,970	5,193	19,153	58,500	49,035	9,822	14,430	18,446	92,573	-28,384	36,292

Note:
 All flow volumes are listed in AF/yr.

TABLE 3-1

Well Network for Sentinel Groundwater Quality Monitoring

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Production Well	Sentinel Monitoring Locations	New Monitoring Well Needed?	Actual or Target Depth Interval for Well Screen (ft bgs)	Well Name	TOT Distance from Production Well	Rationale, Comments
SCWC-Saugus1	Alluvium: New well in Magic Mountain Parkway north of Saugus1	Yes	40-60	AL-12A	1 year or less	Alluvial and Saugus HSU S-I monitoring is for a possible pathway to SCWC-Saugus1. Access constraints might require installation of these wells in the City of Santa Clarita right of way along Magic Mountain Parkway. There are currently no Saugus Formation monitoring wells within the delineated capture zone of SCWC-Saugus1. The Saugus wells for HSU S-III will be installed near the corner of San Fernando Road and Magic Mountain Parkway on land owned by the Newhall Land & Farming Company.
	Saugus (S-I unit): Adjacent to new alluvium well	Yes	170-180	AL-12B		
	Saugus (S-III unit): NLF land north of SCWC-Saugus1	Yes	230-250 (HSU S-I)	SG1-HSU1		
		Yes	490-520 (HSU S-III)	SG1-HSU3a		
		Yes	580-640 (HSU S-III)	SG1-HSU3b		
		Yes	750-770 (HSU S-III)	SG1-HSU3c		
SCWC-Saugus2	Alluvium: Existing well AL06	No	65-85	AL06	10 years	Alluvial monitoring is recommended to assess perchlorate near the SCWC-Saugus2 well. At MP-1, the port 2 screen correlates with the top of the screened intervals at SCWC-Saugus1 and SCWC-Saugus2. Port 4 is the uppermost port below a depth of 1,000 feet and below the zones containing perchlorate.
	Saugus: MP-1, ports 2 and 4	No	391.4-401.4 (HSU S-III)	MP-1 (port 2)		
		No	747.5-757.5 (HSU S-V)	MP-1 (port 4)		
NCWD-11	Alluvium: Existing well AL03	No	91-111	AL03	2 years	Alluvial monitoring is recommended because of the potential for the Alluvial Aquifer to be a pathway for perchlorate migration from the site to well NCWD-11. Additionally, movement within the Saugus Formation could be occurring from the site, which is the reason to install a Saugus sentinel well near the Alluvial sentinel well.
	Saugus: New well at AL03 location	Yes	280-320 (HSU S-III)	NC11-HSU3		

Notes:

TOT = time-of-travel

HSU = hydrostratigraphic unit (See *Draft Final Conceptual Hydrogeology Technical Memorandum for the Eastern Santa Clara Sub-basin Groundwater Study* [CH2M HILL, 2004b] for discussions of the locations and characteristics of the HSUs.)

TABLE 3-2
 Chemical Constituents and Sampling Frequency for the 97-005 Sentinel Monitoring Program
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California

Analytical Parameters	EPA Method	Frequency			
		Initial	Semiannual	Annual	Biannual
Organic Constituents					
Perchlorate	314.0	X	X		
Volatile Organic Compounds	524.2 ^a	X	X		
1,2,4-Trimethyl Benzene		X	X		
Methyl Tertiary Butyl Ether		X	X		
General Minerals (Cations and Anions)					
Aluminum	6010	X			X
Bicarbonate/Alkalinity	310.1	X			X
Calcium	6010	X			X
Chloride	300	X			X
Total Phosphorus	365.3	X			X
Potassium	7610	X			X
Iron	6010	X			X
Magnesium	6010	X			X
Manganese	6010	X			X
Sodium	7770	X			X
Sulfate	300	X		X	
Nitrate	352.1	X		X	
Ammonia	350.3	X			X

^aTentatively identified compounds will also be reported.