

The monthly precipitation totals for each of Zone 7's precipitation stations for the 2011 Water Year are shown in Table 3.1-2. Table 3.1-3 shows historical monthly data from Livermore (Station 15E), the network station with the longest historical record. Figure 3.1-2, a graph of cumulative rainfall from Station 15E, presents data for the 2011 Water Year, along with the driest water year (1977), the calculated average water year, the wettest year (1983), and the 2010 Water Year for comparison.

Table 3.1-4 provides the daily pan evaporation measured at Lake Del Valle (Station CM_STA LDV-EV) during the 2011 Water Year, and Table 3.1-5 shows monthly pan evaporation data going back to the 1969 Water Year.

3.2 Groundwater Elevation and Quality Monitoring Program

3.2.1 Program Description

The Groundwater Elevation and Quality Monitoring Program includes the measurement of groundwater levels in monitoring and production wells, and the collection and analyses of groundwater samples. These hydrologic data are needed to assess groundwater supplies (i.e., quantity, quality, and trends). The program focuses on the Main Basin, where groundwater is pumped for municipal uses. Other Zone 7 programs utilize the data collected in this program, and the results are used in water resources management planning and decision making.

There were a total of 240 wells in the Zone 7 groundwater monitoring program during the 2011 Water Year (shown on Figure 3.2-1). Each well in the program was monitored and/or sampled to fulfill one or more specific objective. Table 3.2-1 lists all of the wells in the program, the objective(s) of each monitoring well, and the frequency of monitoring or sampling for each objective. The objectives are summarized below:

Water Level Monitoring – depth-to-water level measurements are taken in various wells in the basin at the frequency specified below:

- **Semi-Annual (SA)** - groundwater level measurements are made twice per year during seasonal extremes (i.e., spring highs and fall lows) for storage tracking.
- **Monthly (M)** – monthly water level measurements are used to monitor subsidence triggers, adjust recharge operations, and identify when semi-annual water level measurements should be scheduled.

Groundwater Basin Quality –sampling of groundwater at the specified frequency for major minerals and metals to track changes over time:

- **Annual (A)** – Sampling is performed annually from each of the wells in the program except as noted below. Also, additional sampling and testing may be performed by an outside contractor or property owner if not sampled by Zone 7 staff.

Del Valle Water Rights (WR) – monitoring of water levels and quality required for Arroyo Valle water rights.

Municipal Supply Well (Mu) – monitoring of municipal supply wells for water levels and quality.

Key Wells (Key) – index wells in each of the largest subbasins of the Main Basin. Since the Amador Sub-basin is the largest and most significant subbasin, it is split into the Amador West and Amador East Sub-basins. Starting in 2008, this objective was expanded to monitor conditions in upper and lower aquifers in each subbasin separately (see Section 3.2.2).

Salt Management Plan (SMP) – monitoring to identify salt quantity and migration in groundwater.

Well construction details for each of the wells in the program are shown in Table 3.2-2.

3.2.2 Program Changes and Notes for 2011 Water Year

The following items have changed from the 2010 Water Year or are items of note for the 2011 Water Year:

General Program Changes – During the 2010 Calendar Year, one nested monitoring well set (four wells total) was installed in the Main Basin as part of the Hydrostratigraphic Investigation at the Chain of Lakes Project (Zone 7, 2011a). The nested wells are part of an ongoing study to evaluate the use of Lakes C and D as viable aquifer recharge basins in comparison to Lake I. Starting in 2011, these four new wells (3S/1E 13P 5 to 8) were measured for water levels on a semi-annual basis and water quality on an annual basis as part of Zone 7's Groundwater Monitoring Program.

Well 3S/2E 8Q14 was dropped from the water quality monitoring program because it is no longer being sampled as part of the environmental investigation/cleanup that it was installed for.

Key Well Program – The three new replacement key wells (3S/1E 11G 1, 3S/1E 20C 8, and 3S/2E 8H 3) continued to serve as key wells during the 2011 Water Year.

The following table lists the monitoring wells used for the Key Well Program in the 2011 Water Year:

Table: Key Wells for 2011 Water Year

SubBasin	Key Well Name	Aquifer	Previous Name	Well Number
Bernal	Key_Bern_U	Upper	Fairgrounds Key	3S/1E 20C 7
	Key_Bern_L	Lower		3S/1E 20C 8
Amador-West	Key_AmW_U	Upper	Mohr Ave Key	3S/1E 9P 5
	Key_AmW_L	Lower		3S/1E 9P10
Amador-East	Key_AmE_U	Upper		3S/1E 11G 1
	Key_AmE_L	Lower	Hagemann Key	3S/1E 12K 2
Mocho II	Key_Mo2_U	Upper	Livermore Key	3S/2E 8K 2
	Key_Mo2_L	Lower		3S/2E 8H 3

Arroyo De La Laguna Wells - Groundwater elevations remained high (above 280 ft) in the Bernal Upper Key Well (formerly the Fairgrounds Key Well) throughout the year; therefore, additional wells near the Arroyo De La Laguna were monitored to determine the volume of groundwater that overflowed from the basin. The overflow volumes are calculated as part of Zone 7's hydrologic inventory (Section 4.2.3).

DSRSD Samples – Zone 7 continued its data sharing agreement with DSRSD to obtain water levels and quality results from several of DSRSD's wells (listed in table below) installed to monitor the impacts, if any, from their facultative sludge lagoons and sludge disposal operations in Pleasanton.

Table: DSRSD Wells Included in 2011 Program

Well Number	DSRSD Well	Aquifer
3S/1E 6N 2	MW-3	Upper
3S/1E 6N 3	MW-4	Upper
3S/1E 6N 6	NE-76	Upper
3S/1E 7D 1	SW-75	Upper
3S/1E 7D 3	SE-70	Upper
3S/1W 1J 1	MW-1	Upper
3S/1W 12A 9	NW-75	Upper

Water levels were monitored by DSRSD and supplied to Zone 7. The results are included in Table 3.2-3 and discussed in Section 3.2.3.2. Groundwater samples from these wells were collected and analyzed by DSRSD, and the results were supplied to Zone 7. During one of these sampling events, DSRSD supplied Zone 7 with split samples for analysis by the Zone 7 laboratory. The results are included in Table 3.2-4 and discussed in Section 3.2.4.2.

High Salts in Mocho Wellfield – Particular attention has been paid to relatively rapid rises in TDS and hardness that occurred recently in some of the Mocho wellfield supply wells; however, during the 2011 Water Year TDS concentrations increased in Mocho 1 only, while decreasing in Mochos 2, 3, and 4. The progress of this ongoing investigation is discussed in Section 3.2.4.4.

Arroyo Las Positas Recharge – Natural recharge from the Arroyo Las Positas typically has high salt content (ranges from about 800 to above 1500 mg/L of TDS) and annually contributes about 1,400 tons of

salt to the Main Basin. In 2011, Zone 7 released relatively-low TDS State Water Project (SWP) water into the Arroyo Las Positas in an attempt to reduce the salt loading into the Main Basin from this arroyo. To assess the effectiveness of the salt mitigation strategy, Zone 7 developed a sampling program that included water sampling from the stream and nearby shallow groundwater monitoring wells. Preliminary results of this sampling are presented in Section 3.2.4.5.

DWR Samples – Historically DWR has asked for split samples from some of Zone 7’s program wells as part of their Water and Environment Monitoring Program. However, due to DWR budget cuts, they continue to suspend this program.

3.2.3 Groundwater Levels for 2011 Water Year

3.2.3.1 Overview

In general, the 2011 Upper Main Basin groundwater levels in the Key Wells mirrored the 2010 Upper levels throughout the water year, and ended the year at approximately the same levels they ended the 2010 Water Year (+/- 4 ft). The Lower Main Basin groundwater levels rose from last year’s levels (five to eight feet), except in the Amador East Subbasin where it ended the Water Year 14 feet below 2010’s year-end level. In general, water levels in the Key Wells changed as follows from the 2010 Water Year:

**Table: Groundwater Elevation Change in Key Wells
Since Fall of 2010 Water Year**

Subbasin	Upper Aquifer	Lower Aquifer
Bernal	Up 1’	Up 8’
Amador West	Up <1’	Up 5’
Amador East	Down <1’	Down 14’
Mocho II	Up 4’	Up 6’

Figure 3.2-2 shows long-term hydrographs from each of the eight Key Wells. Figure 3.2-3 shows graphs of groundwater elevations in the Key Wells and subbasin inflow/outflow volumes over the last two years. Water levels in the Key Wells in subbasins pumped by Zone 7 (Bernal and Amador) indicated that water levels were 40 to 112 ft above historical lows at the end of the 2011 Water Year (see Section 4.2.4 for a discussion on operational storage, which is based on groundwater elevation above historical lows). Water levels in the Key Wells in the Mocho II subbasin, primarily pumped by California Water Service, were 90 to 105 ft above historical lows at the end of the 2011 Water Year.

Table 3.2-3 contains a tabulation of spring and fall groundwater elevations for all program wells and includes a comparison with water levels of the previous fall. The groundwater elevations and gradients for the upper and lower aquifers are discussed in detail in Sections 3.2.3.2 and 3.2.3.3 below. Groundwater quality of the upper and lower aquifers is described in Sections 3.2.4.2 and 3.2.4.3, respectively.

3.2.3.2 Upper Aquifer Zone

Figure 3.2-4 and Figure 3.2-5 show groundwater contours in the upper aquifer for the Spring and Fall 2011 water measurement events, respectively. Both of these figures include water levels from mining area ponds, located in the central and southern portions of the Amador Subbasin, which are believed to be connected with the upper aquifer. The mining companies are actively pumping into or pumping from some of these ponds, creating a groundwater mound or depression, respectively (Section 3.5). Also much of the upper aquifer gravels in the mining area have been excavated and backfilled with relatively impervious fine-grained soil.

As is usually the case, 2011 water levels varied with seasonal recharge and extraction; generally the highest water levels were found at the end of the rainy season and lowest at the end of the high demand summer/fall seasons. The groundwater gradient in the Upper Aquifer was generally from east to west towards the Bernal Subbasin, then to the south where groundwater flows out of the Main Basin. The gradient in the upper aquifer generally ranged from 0.005 to 0.025 with isolated areas of flatter or steeper gradients, especially near subbasin boundaries.

For the first half of the 2011 Water Year (Fall 2010 to Spring 2011), groundwater elevation changes varied significantly (-12 to +18 ft) throughout the Main Basin. For the second half of the 2011 Water Year (Spring 2010 to Fall 2011), water levels in the Main Basin also varied significantly, but not as much as the first half of the water year (-9 to +7 ft). As is usually the case, water levels in the mining area varied (-6 ft to +7 ft) depending on mining dewatering activities. Overall Main Basin water levels ended the year at approximately the same level they began the year, with some variation (+4 to -9 ft) depending on proximity to streams, wells, and mining operations.

For the entire water year, water levels in wells near the Arroyo De La Laguna remained below the elevation at which basin overflow occurs (approximately 295 feet above MSL). Consequently, there was no basin overflow from the upper aquifer into the Arroyo De La Laguna during the 2011 Water Year.

3.2.3.3 Lower Aquifer Zone

Figure 3.2-6 and Figure 3.2-7 show groundwater contours in the lower aquifer of the Main Basin for Spring and Fall 2011, respectively. These maps show a depression around several municipal or domestic wells that were pumping around the time of the Spring and Fall measurements. The groundwater gradient within the Mocho II and Amador Subbasins in the Lower Aquifer ranged from 0.001 to 0.05 with groundwater flowing generally westward along the longitudinal axis of the Livermore-Amador Valley. In the Bernal Subbasin, the gradient (typically less than 0.006) was slightly towards the north and east towards the Hopyard and Mocho Wellfields. Typically, the lowest elevations correspond to the municipal pumping wellfields in those subbasins.

There are two major subsurface structural features that act as partial barriers to the lateral movement of groundwater and cause groundwater to cascade in the Lower Aquifer.

1. Groundwater elevations in the Mocho II Subbasin were 118 ft higher than those across the Livermore Fault (the boundary with the Amador Subbasin).

2. Groundwater elevations in the Dublin/Camp/Bishop Subbasins were 20 to 40 ft higher than those across the Main Basin Boundary to the south (a.k.a., the Parks Boundary).

For the first half of the 2011 Water Year (Fall 2010 to Spring 2011), water levels rose (up to about 38 ft) due to recharge from the upper aquifer and reduced municipal pumping that occurs during the winter months. For the second half of the water year (Spring to Fall 2011), water levels dropped (up to 86 ft) throughout the lower aquifer, particularly in the Mocho II Subbasin due to the municipal pumping that occurred during the summer months. Overall, from the beginning to end of the water year (Fall 2010 to Fall 2011), water levels generally rose in the Bernal and Amador Subbasins (up to 32 ft), while dropping significantly (up to 61 ft) in portions of the Mocho II Subbasin. The drop in the Mocho II Subbasin was primarily from California Water Service pumping.

Figure 3.2-8 shows the difference between groundwater elevations measured in the lower aquifer in Fall 2011 and historical lows. At the end of the water year, water levels in the central and western Main Basin remained 40 to 95 ft above historical lows. Further to the southwest, in the central and southern portions of the Bernal Subbasin, water levels remain at greater than 100 feet above historical lows. Only SFPUC is using this part of the basin for municipal supply (supplying Castlewood). In the eastern part of the Main Basin (Mocho II Subbasin), where California Water Service wells are located, the end of year groundwater levels were 80 to 160 feet above their respective historical lows (see Section 4.2.4 for a discussion on operational storage, which is based on groundwater elevation above historical lows). Zone 7's objective of maintaining groundwater levels above historical lows in all parts of the Main Basin was met in 2011.

3.2.4 Groundwater Quality for 2011 Water Year

3.2.4.1 Overview

Other than localized contamination from toxic sites (discussed in Section 5.3.3), the main constituents of concern for meeting the Livermore Basin groundwater quality objectives are total dissolved solids (TDS) and nitrate. Whereas the TDS objectives are based on drinking water aesthetics and State "recommended" secondary MCLs, the nitrate objective is the State's primary MCL for drinking water, which is human health-based. Boron is a groundwater parameter of interest for the valley's agriculture and golf communities because of its potential for impact on certain irrigated crops and turf. Hardness is another groundwater parameter that influences Zone 7's ability to meet its delivered water quality target. Although routinely analyzed for, this parameter is not tracked separately from TDS because it is generally proportional to the TDS values found in the Main Basin's groundwater. The following are Zone 7's groundwater quality objectives for these four constituents:

- TDS (Main Basin): Ambient or 500 mg/L, whichever is lower
- TDS (Fringe Basins): Ambient or 1,000 mg/L, whichever is lower
- Nitrate (as NO₃): 45mg/L
- Boron: 1.0 mg/L (an agricultural supply target)
- Hardness (as CaCO₃): 300 mg/L (threshold for "very hard")

Concentrations and spatial distribution of the tracked constituents are presented in the following figures and tables:

- Table 3.2-4 contains the groundwater quality data collected from network wells during the 2011 Water Year.
- Figure 3.2-9 and Figure 3.2-12 show maps of total dissolved solids (TDS) concentrations for the upper and lower aquifers, respectively.
- Figure 3.2-10 and Figure 3.2-13 show maps of nitrate concentrations for the upper and lower aquifers, respectively.
- Figure 3.2-11 and Figure 3.2-14 show maps of boron concentrations for the upper and lower aquifers, respectively.
- Figure 3.2-15 and Figure 3.2-16 show historical graphs of TDS concentrations in the Key Wells.
- Figure 3.2-17 to Figure 3.2-20 show groundwater hydro-chemographs (with water level, TDS, nitrate, and boron) from wells in each of the major subbasins.

In general, concentrations for these constituents remained the same as the 2010 concentrations. The specific results for the constituents are discussed below by aquifer zone.

3.2.4.2 Upper Aquifer Zone

TDS

In the upper aquifer, TDS concentrations depend primarily on location relative to a source of recharge water, the water quality of the recharge water, and groundwater depth. Over the last 30 years there has been a general upward trend in TDS concentrations, particularly in the western portion of the Main Basin. Concentrations in the eastern and central portions of the valley, particularly near the high recharge reaches of the Arroyo Mocho and Arroyo del Valle (see Section 3.3), have stayed relatively low, especially during times of significant stream recharge.

The TDS content in groundwater is lowest in the areas adjacent to the artificial stream recharge reaches on the Arroyo Valle, southeast of the mining area, where it is generally less than 500 mg/L of TDS. There are three main regions where TDS concentrations exceed 1,000 mg/L (Figure 3.2-9):

1. In the southern portion of the Dublin Subbasin, extending through the central portion of the Bernal Subbasin. This high TDS area is most likely due to the combination of the concentrating effects of urban irrigation, leaching of buried lacustrine sediments, and historical wastewater and sludge practices.
2. Along the northern to northeastern portion of the groundwater basin extending the full length of the Camp-Amador Subbasin boundary. This feature is most likely due to poor quality water from the marine sediments to the east and north recharging along the Arroyo Las Positas. Irrigation, with recycled water in particular, is another source of high TDS water that is recharging the upper aquifer in this region.

3. For the 2011 Water Year (and occasionally in the past) two wells along the southwestern boundary of the Main Basin (3S/1E 20Q 2 and 29P 2) have TDS concentrations above 1,000 mg/L. It is speculated that the TDS may be entering the Main Basin as runoff and/or subsurface inflow from the neighboring Livermore Uplands to the south.

The TDS concentration in mining area pond C1 appears to be slightly higher than those in surrounding ponds. This is due to the salt-concentrating effects of evaporation in combination with low infiltration of the surrounding, lower-salt groundwater.

NITRATE

Nitrate (measured as nitrate ion [NO₃]) is detected in the upper aquifer at concentrations above 45 mg/L (the Basin Plan Objective) (orange and red areas in Figure 3.2-10) in the following locations:

1. There is a plume that extends from the western portion of the Mocho I and eastern portion of the Mocho II Subbasins to the northeastern portion of the Amador Subbasin. Portions of this nitrate plume date back to at least the 1960s; however, over the last few years this plume has developed into two zones with concentrations above the MCL: in the Mocho I Subbasin up to 55.8 mg/L and in the Mocho II Subbasin up to 69.97 mg/L. Their causes are believed to be both natural (i.e., buried native vegetation) and artificial (i.e., existing and historical wastewater disposal, and fertilizer and livestock manure leaching). There are over 100 septic tanks still in use near the proximal end of the plume.
2. Southern portion of the Mocho I Subbasin south of Tesla Road (maximum concentration 91.67 mg/L in 2011, 121.34 mg/L in 2010). This high nitrate concentration is based on a single monitoring well and is believed to be related to the overlying agricultural land use and/or a leaky annular well seal.
3. May Subbasin near May School Rd (119.13 mg/L in 2010). This was the highest nitrate concentration detected in the basin in 2010, but the well was not sampled during the 2011 Water Year. It will be sampled in the 2012 Water Year. In 2008 as part of a one-time water quality study in this area, Zone 7 sampled and analyzed several domestic wells in the area to determine the extent of nitrate contamination. These results (presented in the 2008 annual report, *Zone 7, 2009*) suggested that the nitrate appeared to be relatively localized with the highest concentration in the vicinity of 2S/2E 28D 2. The source of high nitrate was not identified; however, it likely comes from agricultural land use in that area and/or a leaky annular well seal.
4. Camp Subbasin in the eastern portion of Dublin (maximum concentration 60.23 mg/L in 2011, 64.66 mg/L in 2010). This may be a remnant of past dairy operations in the area that were discontinued long ago.
5. Southern portion of the Mocho II Subbasin along Mines Road. The nitrate concentration in 3S/2E 26J 2 remained above the MCL in 2011 at 59.34 mg/L (88.57 mg/L in 2010) after it had dropped below the MCL to 24.76 mg/L in 2009. This high nitrate concentration is believed to be related to the overlying agricultural land use and/or a leaky annular well seal.

In 2009, nitrate in 3S/1E 22D 2 (in the southern portion of the Amador West Subbasin) was measured to be above the MCL (47.39 mg/L), however, the concentration dropped to 40.17 mg/L in this well during 2010 and remained below the MCL in 2011 at 43.44 mg/L.

BORON

While there is no MCL for boron, it does typically become a problem for irrigated crops when it exceeds 1 or 2 mg/L, depending on the crop. Boron exists at elevated concentrations (up to 31.2 mg/L) in the upper aquifer in the following areas of the groundwater basin (Figure 3.2-11):

1. There is a plume of elevated boron concentrations that extends along the Dublin-Bernal and Camp-Amador boundaries. The highest localized concentration of boron in this area was detected near the center of this area in 3S/1E 4J 5 at a concentration of 14 mg/L in 2011 (16 mg/L in 2010).
2. Boron was also detected in the eastern portion of the valley in the May, Spring, Mocho I, and Mocho II Subbasins. The highest concentration detected was in the northern portion of this area in 2S/2E 27P 2 at 31.2 mg/L in 2011 (30 mg/L in 2010).

During a one-time study in 2008 (see discussion under “Nitrate” above), boron was detected in one well (2S/2E 21R 3) in the North Livermore area at 7.47 mg/L; however, since this well is not in Zone 7’s annual monitoring program, this well has not been sampled since 2008.

The source of boron is unknown but may be from natural alkali/marine sediments. It should be noted that the boron detected in the western portion of the basin is primarily along the Arroyo Las Positas and lower Arroyo Mocho. It is likely that some of the source of this boron may be from the high-boron groundwater in the eastern portion of the Valley that has discharged into the Arroyo Las Positas in the North Livermore area and flowed downstream to the Arroyo Mocho, recharging into the Amador Subbasin along the way.

3.2.4.3 Lower Aquifer Zone

TDS

Water quality in the majority of the lower aquifer of the Main Basin is generally of good quality, containing less than 500 mg/L TDS; however, in the Bernal Subbasin and around the margins of the Amador and Mocho II Subbasins, the lower aquifer contains groundwater with higher TDS concentrations (up to about 902 mg/L in 2011, see Figure 3.2-12; up to 971 mg/L in 2010). This is most likely due to deep percolation of high TDS water from the upper aquifer and subsurface inflow of high TDS water from marine sediments in the north.

Over the last few years, TDS concentrations have been increasing anomalously in wells located in and around the Mocho Wellfield. Zone 7 staff is investigating whether these increases are due to poorly constructed wells in the area or consequences of natural “leaky” aquitards that separate the upper aquifers with poorer water quality and the lower aquifers which are being pumped. Additional sampling and water

level measurements were conducted in 2009 and 2010 to investigate the cause for the increase. The results are discussed below in Section 3.2.4.4.

NITRATE

Nitrate was only detected above the MCL in the eastern portion of the Mocho II Subbasin (Figure 3.2-13). While smaller in extent, the general location of this plume mirrors the nitrate plume in the upper aquifer, suggesting that some of the nitrate in the upper aquifer has migrated into the lower aquifer. For the 2011 Water Year, the highest concentration of nitrate in a lower aquifer well was 50.93 mg/L in 3S/2E 16A 3 (53.14 mg/L in 2010).

BORON

In general, boron is not a problem in the lower aquifer where detections are typically less than 1 mg/L. However, boron was detected above 2 mg/L in three lower aquifer wells in the 2011 Water Year as follows (Figure 3.2-14):

1. Boron was detected in one well in the eastern portion of the Mocho II Subbasin: 2.64 mg/L in monitoring well 3S/2E 23E 2 (2.3 mg/L in 2010).
2. Boron was also detected above 2 mg/L in two monitoring wells near the Hopyard 9 Well in the northern portion of the Bernal Basin: 2.63 mg/L in 3S/1E 17D 4 (2.4 mg/L in 2010) and 2.47 mg/L in 3S/1E 17D11 (2.5 mg/L in 2010). However, concentrations in Hopyard 9 have always been below 0.6 mg/L.

The source of boron is unconfirmed, but may be from localized natural alkali/marine sediments or may have migrated from a shallower zone.

3.2.4.4 Increasing Salts Near Mocho Wellfield

During the 2008 and 2009 Water Years, TDS concentrations increased in several deep monitoring wells and the municipal wells in the Mocho Wellfield. In 2010 and 2011, the TDS concentrations have stabilized or decreased slightly in most wells in the Mocho Wellfield. Figure 3.2-21, which shows TDS, nitrate, and boron concentrations in the four Mocho municipal wells, illustrates how TDS concentrations increased dramatically in Mochos 3 and 4 as compared to those in Mochos 1 and 2 in 2008. The figure also shows that historically, especially from 1983 to 1985, before Mochos 3 and 4 were constructed, TDS concentrations in Mochos 1 and 2 have been higher than they are now, but decreased throughout the latter part of the 1980s, and have remained fairly constant since then. The TDS concentrations in the Mocho municipal wells have stabilized or decreased since 2010.

Zone 7's ongoing investigation efforts include:

- Analyzing drawdown data that is being collected from Upper Aquifer monitoring wells and from nearby abandoned wells as the Mocho wells are routinely operated;

- Comparing individual characteristic constituents of the water being produced from the Mocho wells with those found in upper aquifer monitoring wells; and
- Preparing detailed stratigraphic cross-sections through the area of interest to identify whether discontinuities exist in the confining layer(s) that is believed to separate the Upper Aquifer Zone from the Lower Aquifer Zones.

The preliminary conclusion is that higher TDS groundwater in the overlying upper aquifer zone, which the Mocho Wells were designed to exclude, is migrating vertically to the lower aquifer via one or more potential pathways. This preliminary conclusion is based on:

- Higher TDS concentrations in the lower aquifer appear to be limited to Mochos 3 and 4, and are not exhibiting a plume-like distribution, and
- Historically, higher TDS concentrations appear to occur when there is a downward vertical gradient (i.e., when the groundwater elevation in the upper aquifer is higher than the lower aquifer) (Figure 3.2-21).

Potential pathways for the vertical migration being investigated are:

- Direct conduits caused by improperly sealed abandoned wells in the immediate area of the Mochos 3 and 4 sites;
- Poor annular seals in Mocho Wells 3 and 4;
- Increased leakage through the semi-confining layer(s) which separate the Upper Aquifer Zone from the Lower Aquifer Zone caused by the induced head difference across it when the wells are pumping.

Completion of the investigation is anticipated for Summer 2012. The results and conclusions will be summarized in a technical memorandum and addressed in the Annual Report of the Groundwater Management Program for Water Year 2012. Also planned for 2012, is the destruction (sealing) of all abandoned and improperly sealed wells in the immediate vicinity of the Mocho Wellfield.

3.2.4.5 Arroyo Las Positas Recharge

From June to October 2011 Zone 7 released relatively-low TDS SWP water into the Arroyo Las Positas in an attempt to reduce the salt loading into the Main Basin from this arroyo. To assess the effectiveness of this strategy, Zone 7 developed a sampling program that included water sampling from the stream and from nearby shallow groundwater monitoring wells. Samples were taken in June 2011, September 2011, December 2011, and January 2012 and were analyzed by Zone 7's laboratory for major minerals and metals. The samples were also analyzed by Zymax Forensics in Escondido, California for Oxygen 18 and Dueterium, a relatively inexpensive set of analyses that can provide a good "fingerprint" for source water from higher altitudes like SWP water. Initial results from the ALP recharge study suggest that while the low TDS water from the SWP did make it down into the lower reaches of the Arroyo, none of this water

has yet been detected in any of the groundwater monitoring wells. An additional sampling event is planned for July 2012 to continue this investigation. The results of this investigation will be presented in 2013.

3.3 Surface Water Monitoring Program

3.3.1 Program Description

The objectives of Zone 7's Surface Water Monitoring Program are to:

- **Surface Water Flow Monitoring** – Quantify inflow and outflow of surface water entering and leaving the groundwater basin. Also, to quantify the portions recharging the groundwater basin's aquifers and the amounts being discharged from the groundwater basin by the gravel quarries' dewatering operations;
- **Surface Water Quality Monitoring** - Provide a record of water quality for the basin's recharge and discharge waters with which the groundwater basin's annual salt loading is calculated;
- **Del Valle Water Rights** - Satisfy the requirements of Zone 7's and Alameda County Water District's "water rights" for the Arroyo Valle. This involves quarterly sampling and continuous flow monitoring at two surface water stations; and
- **NPDES Permitting** - Monitor Zone 7's treated water discharges at the Del Valle Water Treatment Plant (DVWTP), and Patterson Pass Water Treatment Plant (PPWTP) (as required by National Pollutant Discharge Elimination System (NPDES) No. CAG382001, Order No. R2-2003-0062). Samples are taken above and below existing treatment plant discharge points during the first significant rainfall event of the season.

The Surface Water Monitoring Program focuses on the four main gaining and losing streams that impact the groundwater basin (i.e., Arroyo Valle, Arroyo Mocho, Arroyo Las Positas, and Arroyo De La Laguna), and the diversions and accretions that affect the flows into or from each of them. The program utilizes a network of telemetered recorder stations, meters, and staff gage sites (Figure 3.3-1 and Table 3.3-1) to compute the quantity of water flowing past each station. Once per year, water samples are collected from all ten recorder sites and four NPDES sites in the program and submitted to Zone 7's laboratory for analysis of metals and minerals; the same parameters that are routinely analyzed for in the Groundwater Monitoring Program.

3.3.2 2011 Results

3.3.2.1 General

The 2011 Surface Water Monitoring Program included ten surface water recorder stations (Table 3.3-2). Monthly total flows for the 2011 Water Year from the recording stations are presented in Table 3.3-3. All stations were maintained throughout the year and all records have been reviewed and archived as part of

Table 3.2-1
 Zone 7 Water Agency - Groundwater Monitoring Program
 Program Wells with Measurement Frequency
 2011 Water Year

<i>SITE INFORMATION</i>				<i>Levels</i>		<i>Quality</i>			<i>Levels and Quality</i>		
<i>State Name</i>	<i>Well Name</i>	<i>Subbasin</i>	<i>Aq</i>	<i>Freq</i>	<i>WR</i>	<i>Freq</i>	<i>Mu</i>	<i>WR</i>	<i>Key</i>	<i>SMP</i>	<i>Oth</i>
2S/1E 32E 1	End of Arnold Rd	Camp	U	SA		A				T-HAC-1	
2S/1E 32N 1	Camp Parks	Camp	U	SA		A				T-HAC-2	
2S/1E 32Q 1	Summer Glen Dr	Camp	U	SA		A				32Q1	
2S/1E 33L 1	Gleason Dr @ Tassajara	Camp	U	SA		A				33L1	
2S/1E 33P 2	Central Pkwy at Emerald Glen	Camp	U	SA		A				33P2	
2S/1E 33R 1	Central Pkwy @ Grafton	Camp	U	SA		A				T-DUB-1	
2S/1W 15F 1	BOLLINGER	Bishop	U	SA		A					
2S/1W 26C 2	PINE VALLEY	Dublin	U	SA		A					
2S/1W 36E 3	Kolb Park	Dublin	U	SA						36E3	
2S/1W 36F 1	Dublin High shallow	Dublin	L	SA		A					
2S/1W 36F 2	Dublin High mid	Dublin	L	SA		A					
2S/1W 36F 3	Dublin High deep	Dublin	L	SA		A					
2S/2E 27C 2	Dagnino Rd	Spring	U	SA							
2S/2E 27P 2	hartford ave east	Spring	U	SA		A					
2S/2E 28D 2	May School	May	U	SA						T-MAY-1	
2S/2E 28J 2	FCC Well	May	L	SA		A					
2S/2E 28Q 1	hartford ave	May	U	SA		A				T-MAY-2	
2S/2E 32K 2	jenson's N liv. Ave	Cayetano	U	SA		A					
2S/2E 34E 1	mud city	May	U	SA		A				T-MAY-3	
2S/2E 34Q 2	Hollyhock & Crocus	Spring	U	SA		A				T-SPR-2	
3S/1E 1F 2	Constitution Dr	Mocho II	U	SA		A				T-AIR-1	
3S/1E 1H 3	Collier Canyon g1	Mocho II	U	SA		Q				1H3	
3S/1E 1J 3	Triad Vineyard	Mocho II	L	SA							
3S/1E 1L 1	Kitty Hawk	Camp	U	SA		A				T-AIR-2	
3S/1E 1P 2	airport gas g5	Amador	U	SA						T-AIR-3	
3S/1E 1P 3	New airport well	Amador	L	SA		Q					
3S/1E 1R 2	Kittyhawk and Airway	Mocho II	U	SA		Q					
3S/1E 2J 2	Maint. Bldg	Camp	U	SA		A				T-GLF-2	
3S/1E 2J 3	Doolan Rd East	Camp	U	SA		A				T-GLF-1	
3S/1E 2K 2	Doolan Rd West	Camp	U	SA		A				2K2	
3S/1E 2M 3	Friesman Rd North	Camp	U	SA		A				T-FRI-1	
3S/1E 2N 2	Friesman Rd Mid	Camp	U	SA		A				T-FRI-2	
3S/1E 2N 6	Friesman Rd South	Amador	U	SA		A				T-FRI-3	
3S/1E 2P 3	Crosswinds Church	Camp	L	SA		A					
3S/1E 2Q 1	LPGC #1	Amador	U	SA		A				T-GLF-3	
3S/1E 2R 1	Beebs	Amador	U	SA		Q					
3S/1E 3G 2	fallon rd	Camp	U	SA		A					
3S/1E 4A 1	SMP-DUB-2	Camp	U	SA		A				T-DUB-2	
3S/1E 4J 5	Pimlico shallow	Camp	U	SA		A				T-DUB-3	
3S/1E 4J 6	Pimlico deep	Camp	U	SA		A				T-DUB-4	
3S/1E 4Q 2	gulfstream	Amador	U	SA		A					
3S/1E 5K 6	Rosewood shallow	Camp	U	SA		A					
3S/1E 5K 7	Rosewood deep	Camp	L	SA		A					
3S/1E 5L 3	Oracle	Camp	U	SA		A				T-HAC-3	
3S/1E 5P 6	Owens Park	Camp	U	SA		A				T-HAC-4	

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SITE INFORMATION				Levels		Quality			Levels and Quality		
State Name	Well Name	Subbasin	Aq	Freq	WR	Freq	Mu	WR	Key	SMP	Oth
3S/1E 6F 3	Dublin Ct	Dublin	U	SA		A				6F3	
3S/1E 6G 5	Nissan Repair	Dublin	L	SA							
3S/1E 6N 2	DSRSD MW-3	Dublin	U	SA		A					
3S/1E 6N 3	DSRSD MW-4	Dublin	U	SA		A					
3S/1E 6N 6	DSRSD NE-76	Dublin	U	SA		A					
3S/1E 7B 2	Hopyard rd	Dublin	L	SA		A					
3S/1E 7B12	Hacienda Arch	Dublin	U	SA		A				T-CHA-1	
3S/1E 7D 1	DSRSD SW-75	Dublin	U	SA		A					
3S/1E 7D 3	DSRSD SE-70	Dublin	U	SA		A					
3S/1E 7G 7	Chabot Well	Dublin	U	SA		A				T-CHA-2	
3S/1E 7J 5	Thomas Hart School	Dublin	U	SA		A				T-CHA-3	
3S/1E 7M 2	DSRSD Sub	Dublin	U	SA		A				7M2	
3S/1E 7R 8	Mocho Canal North at Willow	Bernal	U	SA		A				T-CHA-4	
3S/1E 8B 1	Lizard Well	Amador	U	SA		A				T-HAC-5	
3S/1E 8G 4	Apache	Amador	U	SA		A				T-HAC-6	
3S/1E 8H 9	Mocho 4 Nested Shallow	Amador	L	M		A					
3S/1E 8H10	Mocho 4 Nested Middle	Amador	L	M		A					
3S/1E 8H11	Mocho 4 Nested deep	Amador	D	M		A					
3S/1E 8H13	Mocho 3 mon	Amador	D	M		A					
3S/1E 8H18	Mocho 4	Amador	L	R		Q	√				
3S/1E 8K 1	sutter gate	Amador	U	SA		A					
3S/1E 8N 1	sports park	Bernal	U	SA		A					
3S/1E 9B 1	Stoneridge	Amador	L	R		Q	√				
3S/1E 9G 1	3775 trenery - Kamp	Amador	U	SA		A					
3S/1E 9H10	NW Lake I Shallow	Amador	U	SA							
3S/1E 9H11	NW Lake I Deep	Amador	L	SA							
3S/1E 9J 7	SW Lake I Shallow	Amador	U	SA		A					
3S/1E 9J 8	SW Lake I Middle	Amador	L	SA		A					
3S/1E 9J 9	SW Lake I Deep	Amador	L	SA		A					
3S/1E 9M 2	Mocho 1	Amador	L			Q	√				
3S/1E 9M 3	Mocho 2	Amador	L	M		Q	√				
3S/1E 9M 4	Mocho 3	Amador	L	R		Q	√				
3S/1E 9P 5	Key_AmW_U (Mohr Key)	Amador	U	M		A			√		
3S/1E 9P 9	Mohr Ave Shallow	Amador	L	M		A					
3S/1E 9P10	Key_AmW_L	Amador	L	M		A			√		
3S/1E 9P11	Mohr Ave Deep	Amador	L	M		A					
3S/1E 10A 1	Rancho El Charro	Amador	L	SA							
3S/1E 10A 2	El C harro Rd	Amador	U	SA		A					
3S/1E 10B 8	Kaiser Rd Shallow	Amador	L	SA		A					
3S/1E 10B 9	Kaiser Rd Middle 1	Amador	L	SA		A					
3S/1E 10B10	Kaiser Rd Middle 2	Amador	L	SA		A					
3S/1E 10B11	Kaiser Rd Deep	Amador	D	SA		A					
3S/1E 10D 2	Stoneridge Shallow	Amador	L	SA		A					
3S/1E 10D 3	Stoneridge Middle 1	Amador	L	SA		A					
3S/1E 10D 4	Stoneridge Middle 2	Amador	L	SA		A					
3S/1E 10D 5	Stoneridge Deep	Amador	D	SA		A					
3S/1E 10D 7	North Lake I Shallow	Amador	U	SA							
3S/1E 10D 8	North Lake I Cluster 2	Amador	L	SA							
3S/1E 10K 2	NorthWest Cope Lake	Amador	L	SA		A					
3S/1E 10K 3	COL 1	Amador	L	SA		A					
3S/1E 10N 2	South Lake I Shallow	Amador	U	SA							

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SITE INFORMATION				Levels		Quality			Levels and Quality		
State Name	Well Name	Subbasin	Aq	Freq	WR	Freq	Mu	WR	Key	SMP	Oth
3S/1E 10N 3	South Lake I Deep	Amador	L	SA							
3S/1E 11B 1	Airport West	Amador	U	SA		Q				11B1	
3S/1E 11C 3	LAVWMA ROW	Amador	U	SA		A				T-GLF-4	
3S/1E 11G 1	Key_AmE_U	Amador	U	M		A			√		
3S/1E 11G 2	Rancho Charro Middle 1	Amador	L	M		A					
3S/1E 11G 3	Rancho Charro Middle 2	Amador	L	M		A					
3S/1E 11G 4	Rancho Charro Deep	Amador	D	M		A					
3S/1E 11M 2	COL2 Monitoring	Amador	L	SA		A					
3S/1E 11M 3	COL 2	Amador	L	SA		A					
3S/1E 11P 6	New Jamieson Residence	Amador	L	SA		A					
3S/1E 12A 2	Airport South	Amador	U	SA		Q				12A2	
3S/1E 12D 2	LWRP G6	Amador	U			Q					
3S/1E 12G 1	Oaks Park Shallow	Amador	U	M		Q					
3S/1E 12H 4	LWRP Shallow	Amador	L	SA		A					
3S/1E 12H 5	LWRP Middle 1	Amador	L	SA		A					
3S/1E 12H 6	LWRP Middle 2	Amador	L	SA		A					
3S/1E 12H 7	LWRP Deep	Amador	D	SA		A					
3S/1E 12K 2	Key_AmE_L	Amador	L	R		A			√		
3S/1E 12K 3	Oaks Park Mid	Amador	L	M		A					
3S/1E 12K 4	Oaks Park Deep	Amador	D	M		A					
3S/1E 13P 1	cal rock	Amador	L	SA		A					
3S/1E 13P 5	LGA Grant Nested 1		U	M		A					
3S/1E 13P 6	LGA Grant Nested 2		L	M		A					
3S/1E 13P 7	LGA Grant Nested 3		L	M		A					
3S/1E 13P 8	LGA Grant Nested 4		L	M		A					
3S/1E 14B 1	Industrial Asphalt	Amador	L	SA		A					
3S/1E 14D 2	South Cope Lake	Amador	L	SA		A					
3S/1E 14K 2	lone star ind	Amador	L	SA							
3S/1E 15F 3	kaiser #8	Amador	L	SA							
3S/1E 15J 3	shadow cliff	Amador	L	SA							
3S/1E 15M 3	Bush/Valley South	Amador	L	SA		A					
3S/1E 16A 2	Pleas 8	AmWest	L	M		A	√				
3S/1E 16A 4	Bush/Valley Mid	Amador	L	SA		A					
3S/1E 16B 1	Bush/Valley North	Amador	D	SA		A					
3S/1E 16C 2	Santa Rita Valley Shallow	Amador	L	SA		A					
3S/1E 16C 3	Santa Rita Valley Middle	Amador	L	SA		A					
3S/1E 16C 4	Santa Rita Valley Deep	Amador	L	SA		A					
3S/1E 16E 4	black ave - cultural	Amador	U	SA		A					
3S/1E 16L 2	Pleas 3 - MW	Amador	U	M		A					
3S/1E 16L 5	Pleas 5	Amador	L	M		A	√				
3S/1E 16L 7	Pleas 6	Amador	L	M		A	√				
3S/1E 16P 5	Vervais Monitor	Amador	U	R	√	SA		√			
3S/1E 16R 1	Stanley Berry Farm	Amador	L	SA							
3S/1E 17B 4	Casterson	Amador	L	SA		A					
3S/1E 17D 3	Hopyard Nested Shallow	Bernal	L	M		A					
3S/1E 17D 4	Hopyard Nested Middle 1	Bernal	L	M		A					
3S/1E 17D 5	Hopyard Nested Middle 2	Bernal	L	M		A					
3S/1E 17D 6	Hopyard Nested Middle 3	Bernal	L	M		A					
3S/1E 17D 7	Hopyard Nested Deep	Bernal	D	M		A					
3S/1E 17D10	Hopyard 7	Bernal	L	SA							
3S/1E 17D11	Hopyard 9 Monitoring Well	Bernal	L	SA		A					

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SITE INFORMATION				Levels		Quality			Levels and Quality		
State Name	Well Name	Subbasin	Aq	Freq	WR	Freq	Mu	WR	Key	SMP	Oth
3S/1E 17D12	Hopyard 9	Bernal	L	R		Q	√				
3S/1E 18A 5	Pleas 7	Bernal	L	M		A	√				
3S/1E 18A 6	Hopyard 6	Bernal	L	R		Q	√				
3S/1E 18E 4	Valley Trails II	Bernal	U	SA		A					
3S/1E 18J 2	camino segura	Bernal	U	SA		A					
3S/1E 18N 1	merritt	Bernal	L	SA							
3S/1E 19A10	SFWD South (B)	Bernal	L			A	√				
3S/1E 19A11	SFWD North (A)	Bernal	L	SA		A	√				
3S/1E 19C 4	del valle & laguna	Bernal	U	SA		A					
3S/1E 19K 1	680/bernal	Bernal	U	SA		A					
3S/1E 20B 2	Fairgrounds Potable	Bernal	L	SA		A	√				
3S/1E 20C 3	Fairgrounds Potable Backup	Bernal	L	SA		A	√				
3S/1E 20C 7	Key_Bern_U	Bernal	U	R	√	SA		√	√		
3S/1E 20C 8	Key_Bern_L	Bernal	L	M		A			√		
3S/1E 20C 9	Fair Nested Deep	Bernal	L	M		A					
3S/1E 20J 4	civic center	Bernal	U	SA		A					
3S/1E 20M11	S.F "M"LINE	Bernal	U	SA		A					
3S/1E 20Q 2	20Q2	Bernal	U	SA		A				T-PL-3	
3S/1E 22D 2	vineyard trailer	Amador	U	SA		A				T-BER-3	
3S/1E 23J 1	1627 vineyard trailer	Amador	U	SA		A					
3S/1E 24Q 1	Ruby Hills	Amador	L	SA							
3S/1E 25C 3	Katz Winery Mansion	Amador	U	SA		A					
3S/1E 29M 4	f.c. channel	Castle	U	M	√	A					
3S/1E 29P 2	castlewood dr	Bernal	U	SA		A					
3S/1W 1B 9	DSRSD Shallow	Dublin	L	SA		A					
3S/1W 1B10	DSRSD Middle	Dublin	L	SA		A					
3S/1W 1B11	DSRSD Deep	Dublin	L	SA		A				1B11	
3S/1W 1J 1	DSRSD MW-1	Dublin	U	SA		A					
3S/1W 2A 2	McNamara's	Dublin	U	SA		A				2A2	
3S/1W 12A 9	DSRSD NW-75	Dublin	U	SA		A					
3S/1W 12B 2	Stoneridge Mall Rd	Dublin	U	SA		A					
3S/1W 12J 1	DSRSD South	Dublin	U	SA		A					
3S/1W 13J 1	muirwood dr	Castle	U	SA		A					
3S/2E 1F 2	Brisa at Circuit City	Spring	U	SA		A					
3S/2E 2B 2	south front rd	Spring	U	SA		A					
3S/2E 3A 1	Bluebell	Spring	U	SA		A				T-SPR-1	
3S/2E 3K 3	first & S. front rd	Mocho I	U	SA		A				3K3	
3S/2E 5N 1	1037 portola - trailer	Mocho II	L	SA		A					
3S/2E 7C 2	york way - jaws - G4	Mocho II	U	SA		Q					
3S/2E 7H 2	dakota	Mocho II	U	SA		A					
3S/2E 7N 1	kittyhawk south	Amador	U	SA		A					
3S/2E 7P 3	CWS STA 24	Amador	L	M		A	√				
3S/2E 7R 2	CWS STA 31 Monitoring	Mocho II	D	M							
3S/2E 7R 3	CWS STA 31	Mocho II	L	M		A	√				
3S/2E 8F 1	CWS STA 10	Mocho II	L	M		A	√				
3S/2E 8G 1	CWS STA 19	Mocho II	L	M		A	√				
3S/2E 8H 2	North k	Mocho II	U	SA		A					
3S/2E 8H 3	Key_Mo2_L	Mocho II	L	M		A			√		
3S/2E 8H 4	N Liv Ave Deep	Mocho II	L	M		A					
3S/2E 8K 2	Key_Mo2_U (Livermore Key)	Mocho II	U	R		A			√		
3S/2E 8N 2	CWS STA 14	Mocho II	L	M		A	√				

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SITE INFORMATION				Levels		Quality			Levels and Quality		
State Name	Well Name	Subbasin	Aq	Freq	WR	Freq	Mu	WR	Key	SMP	Oth
3S/2E 8P 1	CWS STA 8	Mocho II	L	M		A	√				
3S/2E 9L 1	CWS STA 17	Mocho II	L	M							
3S/2E 9P 1	CWS STA 12	Mocho II	L	M		A	√				
3S/2E 9Q 1	CWS STA 9	Mocho II	L	M		A	√				
3S/2E 9Q 4	school st	Mocho II	U	SA		A					
3S/2E 10F 3	hexcel	Mocho I	U	SA		A					
3S/2E 10Q 1	almond	Mocho II	U	SA		A					
3S/2E 10Q 2	LLNL P-703	Mocho II	L	SA		A					
3S/2E 11C 1	joan way	Mocho I	U	SA		A				11C1	
3S/2E 12C 4	LLNL W-486	Spring	U	SA		A					
3S/2E 12J 3	LLNL W-017A	Spring	L	SA		A					
3S/2E 14A 3	S. vasco @east ave	Mocho I	U	SA		A					
3S/2E 14B 1	5763 east ave	Mocho I	L	SA							
3S/2E 15E 2	Retzlaff Winery	Mocho II	L	SA		A					
3S/2E 15Q 6	Concannon	Mocho II	L	SA		A					
3S/2E 15R17	Buena Vista Shallow	Mocho II	U	SA		A					
3S/2E 15R18	Buena Vista Deep	Mocho II	L	SA		A					
3S/2E 16A 3	Memory Gardens	Mocho II	L	SA		A					
3S/2E 16B 1	CWS STA 5	Mocho II	L	M		A	√				
3S/2E 16C 1	CWS STA 15	Mocho II	L	M		A	√				
3S/2E 16E 4	pepper tree	Mocho II	U	SA		A					
3S/2E 17E 2	Mocho Street	Mocho II	U	SA		A					
3S/2E 18B 1	CWS STA 20	Amador	L	M		A	√				
3S/2E 18E 1	E. stanley	Amador	U	SA		A					
3S/2E 19D 7	Isabel Shallow	Amador	L	SA		A					
3S/2E 19D 8	Isabel Middle 1	Amador	L	SA		A					
3S/2E 19D 9	Isabel Middle 2	Amador	L	SA		A					
3S/2E 19D10	Isabel Deep	Amador	L	SA		A					
3S/2E 20M 1	Alden Lane	Amador	L	SA		A					
3S/2E 22B 1	grapes	Mocho II	U	SA		A					
3S/2E 23E 1	Mines Nested Shallow	Mocho II	U	SA		A					
3S/2E 23E 2	Mines Nested Deep	Mocho II	L	SA		A					
3S/2E 24A 1	S. greenville	Mocho I	U	SA		A				24A1	
3S/2E 26J 2	mines rd	Mocho II	U	SA		A					
3S/2E 29F 4	usgs wetmore	Amador	U	M	√	SA		√			
3S/2E 30D 2	vineyard	Amador	U	R	√					T-VIN-3	
3S/2E 30G 1	genesis farms	Amador	L	SA							
3S/2E 33G 1	crohare	Amador	U	M	√	SA		√			
3S/2E 33K 1	V.A.	Amador	U	Q		Q					
3S/2E 33L 1	VA/CROHARE FENCE	Amador	U	Q		Q					
3S/3E 7D 2	7D 2	Spring	U	SA		A					
3S/3E 7M 2	lupin way	Spring	L	SA							
TOTALS:	All Wells: 240	In Program: 240		237	6	214	26	4	8	51	0

Salt Management Plan (SMP) Designations

T-AIR = Airport Transect
T-BER = Bernal Transect
T-CHA = Chabot Transect
T-DUB = East Dublin Transect
T-FRI = Friesman Transect

T-HAC = Hacienda Transect
T-HV = Happy Valley Transect
T-LIV = South Livermore Transect
T-MAY = May Transect
T-PLE = Pleasanton Transect

T-RH = Ruby Hill Transect
T-SPR = Springtown Transect
T-VIN = Vineyard Transect
T-WEN = Wente Transect

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**Table 3.2-2
Zone 7 Water Agency - Groundwater Monitoring Program
Well Construction Details - 2011 Water Year**

<i>Site</i>	<i>Type</i>	<i>Other Name</i>	<i>Owner</i>	<i>Basin</i>	<i>Aquifer</i>	<i>RP</i>	<i>Dp</i>	<i>Di</i>	<i>Perf</i>
2S/1E 32E 1	monitor	End of Arnold Rd	ZONE 7	Camp	Upper	392.56	70	2	55 - 70
2S/1E 32N 1	monitor	Camp Parks	ZONE 7	Camp	Upper	360.79	44	2.5	35 - 41
2S/1E 32Q 1	monitor	Summer Glen Dr	ZONE 7	Camp	Upper	367.55	45	2	30 - 45
2S/1E 33L 1	monitor	Gleason Dr @ Tassajara	ZONE 7	Camp	Upper	389.46	80	2	65 - 80
2S/1E 33P 2	monitor	Central Pkwy at Emerald Glen	ZONE 7	Camp	Upper	370.05	55	2	45 - 55
2S/1E 33R 1	monitor	Central Pkwy @ Grafton	ZONE 7	Camp	Upper	358.5	60	2	40 - 60
2S/1W 15F 1	monitor	BOLLINGER	ZONE 7	Bishop	Upper	439.44	60	2.5	50.3 - 55.3
2S/1W 26C 2	monitor	PINE VALLEY	ZONE 7	Dublin	Upper	406.53	50	2.5	40 - 45
2S/1W 36E 3	monitor	Kolb Park	ZONE 7	Dublin	Upper	346.51	60	2.5	50 - 55
2S/1W 36F 1	nested	Dublin High shallow	DSRSD	Dublin	Lower	342.71	190	2	140 - 180
2S/1W 36F 2	nested	Dublin High mid	DSRSD	Dublin	Lower	342.71	320	2	270 - 310
2S/1W 36F 3	nested	Dublin High deep	DSRSD	Dublin	Lower	342.71	520	2	440 - 510
2S/2E 27C 2	supply	Dagnino Rd	JACK PIECEFIELD	Spring	Upper	542.14	108	8	41 - 56
2S/2E 27P 2	monitor	hartford ave east	ZONE 7	Spring	Upper	505.43	68	4	35 - 63
2S/2E 28D 2	monitor	May School	ZONE 7	May	Upper	555.15	55	2.5	45 - 50
2S/2E 28J 2	supply	FCC Well	FCC	May	Lower	518.84	230	6	50 - 230
2S/2E 28Q 1	monitor	hartford ave	ZONE 7	May	Upper	513.04	28	2.5	17.6 - 22.6
2S/2E 32K 2	monitor	jenson's N liv. Ave	ZONE 7	Cayetano	Upper	507.43	43	2.5	33 - 38
2S/2E 34E 1	monitor	mud city	ZONE 7	May	Upper	499.73	49	2.5	40 - 45
2S/2E 34Q 2	monitor	Hollyhock & Crocus	ZONE 7	Spring	Upper	507.24	50	2	25 - 50
3S/1E 1F 2	monitor	Constitution Dr	ZONE 7	Mocho II	Upper	428.44	40	2	25 - 40
3S/1E 1H 3	monitor	Collier Canyon g1	ZONE 7	Mocho II	Upper	422.8	80	2.5	70 - 75
3S/1E 1J 3	irrigation	Triad Vineyard	TKG INTERNATIONAL	Mocho II	Lower	417.88	300	9	270 - 290
3S/1E 1L 1	monitor	Kitty Hawk	ZONE 7	Camp	Upper	403.04	70	2	60 - 70
3S/1E 1P 2	monitor	airport gas g5	ZONE 7	Amador	Upper	389.64	50	2.5	40 - 45
3S/1E 1P 3	supply	New airport well	CITY OF LIVERMORE	Amador	Lower	394.44	480	12	245 - 460
3S/1E 1R 2	monitor	Kittyhawk and Airway	ZONE 7	Mocho II	Upper	398.59	56	8	49 - 55
3S/1E 2J 2	monitor	Maint. Bldg	ZONE 7	Camp	Upper	380.89	41	2	31 - 41
3S/1E 2J 3	monitor	Doolan Rd East	ZONE 7	Camp	Upper	406.35	65	2	55 - 65
3S/1E 2K 2	monitor	Doolan Rd West	ZONE 7	Camp	Upper	397.04	46	2.5	36.5 - 41.5
3S/1E 2M 3	monitor	Friesman Rd North	ZONE 7	Camp	Upper	365.04	50	2	35 - 50
3S/1E 2N 2	supply	Friesman Rd Mid	Crosswinds Church	Camp	Upper	363.24	80	6	0 - 0
3S/1E 2N 6	monitor	Friesman Rd South	ZONE 7	Amador	Upper	366.14	55	2	40 - 55
3S/1E 2P 3	potable	Crosswinds Church	Crosswinds Church	Camp	Lower	371.73	380	10	340 - 372
3S/1E 2Q 1	monitor	LPGC #1	ZONE 7	Amador	Upper	369.92	45	2	35 - 45
3S/1E 2R 1	monitor	Beebs	ZONE 7	Amador	Upper	376.29	33	2.5	21 - 26
3S/1E 3G 2	monitor	fallon rd	ZONE 7	Camp	Upper	354.24	50	2.5	40 - 45
3S/1E 4A 1	monitor	SMP-DUB-2	ZONE 7	Camp	Upper	350.67	49.5	2	29.5 - 49.5
3S/1E 4J 5	monitor	Pimlico shallow	ZONE 7	Camp	Upper	345.2	47	2	22 - 47
3S/1E 4J 6	monitor	Pimlico deep	ZONE 7	Camp	Upper	345.55	110	2	68 - 110
3S/1E 4Q 2	monitor	gulfstream	ZONE 7	Amador	Upper	345.42	90	2.5	80 - 85
3S/1E 5K 6	monitor	Rosewood shallow	ZONE 7	Camp	Upper	346.05	75	4	40 - 70
3S/1E 5K 7	monitor	Rosewood deep	ZONE 7	Camp	Lower	346.19	150	4	134 - 144
3S/1E 5L 3	monitor	Oracle	ZONE 7	Camp	Upper	339.43	40	2	15 - 40
3S/1E 5P 6	monitor	Owens Park	ZONE 7	Camp	Upper	336.65	35	2	25 - 35
3S/1E 6F 3	monitor	Dublin Ct	ZONE 7	Dublin	Upper	329.82	36	2.5	27 - 32
3S/1E 6G 5	supply	Nissan Repair	VALLEY NISSAN/VOLVO	Dublin	Lower	332.22	200	8	103 - 178
3S/1E 6N 2	monitor	DSRSD MW-3	DSRSD	Dublin	Upper	335.2	67	4	42 - 67

<i>Site</i>	<i>Type</i>	<i>Other Name</i>	<i>Owner</i>	<i>Basin</i>	<i>Aquifer</i>	<i>RP</i>	<i>Dp</i>	<i>Di</i>	<i>Perf</i>
3S/1E 6N 3	monitor	DSRSD MW-4	DSRSD	Dublin	Upper	340.74	72	49	- 72
3S/1E 6N 6	monitor	DSRSD NE-76	DSRSD	Dublin	Upper	333.58	75	2 50	- 70
3S/1E 7B 2	monitor	Hopyard rd	ZONE 7	Dublin	Lower	327.77	152	4 143	- 149
3S/1E 7B12	monitor	Hacienda Arch	ZONE 7	Dublin	Upper	327.82	70	2 50	- 70
3S/1E 7D 1	monitor	DSRSD SW-75	DSRSD	Dublin	Upper	330.09	75	2 54	- 74
3S/1E 7D 3	monitor	DSRSD SE-70	DSRSD	Dublin	Upper	332.28	70	2 45	- 65
3S/1E 7G 7	monitor	Chabot Well	ZONE 7	Dublin	Upper	327.33	55	2 35	- 55
3S/1E 7J 5	monitor	Thomas Hart School	ZONE 7	Dublin	Upper	326.78	50	2 30	- 50
3S/1E 7M 2	monitor	DSRSD Sub	ZONE 7	Dublin	Upper	328.4	88	4 70	- 85
3S/1E 7R 8	monitor	Mocho Canal North at Willow	ZONE 7	Bernal	Upper	326.63	52	2 42	- 52
3S/1E 8B 1	monitor	Lizard Well	ZONE 7	Amador	Upper	338.28	148	4 55	- 82
3S/1E 8G 4	monitor	Apache	ZONE 7	Amador	Upper	341.47	85	2 60	- 85
3S/1E 8H 9	nested	Mocho 4 Nested Shallow	DSRSD	Amador	Lower	338.53	240	2 210	- 230
3S/1E 8H10	nested	Mocho 4 Nested Middle	DSRSD	Amador	Lower	339.26	440	2 290	- 430
3S/1E 8H11	nested	Mocho 4 Nested deep	DSRSD	Amador	Deep	339.26	720	2 520	- 720
3S/1E 8H13	monitor	Mocho 3 mon	ZONE 7	Amador	Deep	338.96	800	2 570	- 790
3S/1E 8H18	muni	Mocho 4	ZONE 7	Amador	Lower	341.94	745	20 515	- 730
3S/1E 8K 1	monitor	sutter gate	ZONE 7	Amador	Upper	332.37	99	2.5 89	- 94
3S/1E 8N 1	monitor	sports park	ZONE 7	Bernal	Upper	323.68	72	2.5 62	- 67
3S/1E 9B 1	muni	Stoneridge	ZONE 7	Amador	Lower	349.23	810	20 250	- 800
3S/1E 9G 1	supply	3775 trenery - Kamp	MRS. KAMP	Amador	Upper	352.36	160	9 77	- 149
3S/1E 9H10	nested	NW Lake I Shallow	ZONE 7	Amador	Upper	352.89	145	2 120	- 140
3S/1E 9H11	nested	NW Lake I Deep	ZONE 7	Amador	Lower	353.04	190	2 165	- 185
3S/1E 9J 7	nested	SW Lake I Shallow	ZONE 7	Amador	Upper	357.36	505	2 120	- 140
3S/1E 9J 8	nested	SW Lake I Middle	ZONE 7	Amador	Lower	357.55	305	2 280	- 300
3S/1E 9J 9	nested	SW Lake I Deep	ZONE 7	Amador	Lower	357.68	505	2 480	- 500
3S/1E 9M 2	muni	Mocho 1	ZONE 7	Amador	Lower	343.95	530	16 150	- 510
3S/1E 9M 3	muni	Mocho 2	ZONE 7	Amador	Lower	347.47	575	18 250	- 570
3S/1E 9M 4	muni	Mocho 3	ZONE 7	Amador	Lower	342.89	498	20 315	- 493
3S/1E 9P 5	monitor	Key_AmW_U (Mohr Key)	ZONE 7	Amador	Upper	349.4	105	2.5 95	- 100
3S/1E 9P 9	nested	Mohr Ave Shallow	ZONE 7	Amador	Lower	349.59	210	2 185	- 205
3S/1E 9P10	nested	Key_AmW_L	ZONE 7	Amador	Lower	349.51	310	2 285	- 305
3S/1E 9P11	nested	Mohr Ave Deep	ZONE 7	Amador	Lower	349.44	425	2 405	- 420
3S/1E 10A 1	supply	Rancho El Charro	JAMIESON COMPANY	Amador	Lower	364.65	253	10 103	- 240
3S/1E 10A 2	monitor	El C harro Rd	ZONE 7	Amador	Upper	367.35	88	4 70	- 80
3S/1E 10B 8	nested	Kaiser Rd Shallow	DSRSD	Amador	Lower	353.6	200	2 100	- 190
3S/1E 10B 9	nested	Kaiser Rd Middle 1	DSRSD	Amador	Lower	353.49	294	2 244	- 284
3S/1E 10B10	nested	Kaiser Rd Middle 2	DSRSD	Amador	Lower	353.52	600	2 400	- 590
3S/1E 10B11	nested	Kaiser Rd Deep	DSRSD	Amador	Deep	353.52	810	2 660	- 800
3S/1E 10D 2	nested	Stoneridge Shallow	DSRSD	Amador	Lower	349.32	212	2 182	- 212
3S/1E 10D 3	nested	Stoneridge Middle 1	DSRSD	Amador	Lower	349.28	322	2 262	- 312
3S/1E 10D 4	nested	Stoneridge Middle 2	DSRSD	Amador	Lower	349.3	616	2 366	- 606
3S/1E 10D 5	nested	Stoneridge Deep	DSRSD	Amador	Deep	349.32	790	2 710	- 780
3S/1E 10D 7	nested	North Lake I Shallow	ZONE 7	Amador	Upper	361.06	215	2 118	- 138
3S/1E 10D 8	nested	North Lake I Cluster 2	ZONE 7	Amador	Lower	361.02	215	2 190	- 210
3S/1E 10K 2	monitor	NorthWest Cope Lake	ZONE 7	Amador	Lower	358.68	590.6	4 195.5	- 585.6
3S/1E 10K 3	muni	COL 1	ZONE 7	Amador	Lower	363.79	530	18 205	- 530
3S/1E 10N 2	nested	South Lake I Shallow	ZONE 7	Amador	Upper	360.31	195	2 125	- 145
3S/1E 10N 3	nested	South Lake I Deep	ZONE 7	Amador	Lower	360.18	195	2 170	- 190
3S/1E 11B 1	monitor	Airport West	ZONE 7	Amador	Upper	369.35	43	2.5 33	- 38
3S/1E 11C 3	monitor	LAVWMA ROW	ZONE 7	Amador	Upper	364.82	55	2 35	- 55
3S/1E 11G 1	nested	Key_AmE_U	DSRSD	Amador	Upper	371.62	120	2 100	- 110

<i>Site</i>	<i>Type</i>	<i>Other Name</i>	<i>Owner</i>	<i>Basin</i>	<i>Aquifer</i>	<i>RP</i>	<i>Dp</i>	<i>Di</i>	<i>Perf</i>
3S/1E 11G 2	nested	Rancho Charro Middle 1	DSRSD	Amador	Lower	371.61	350	2	230 - 340
3S/1E 11G 3	nested	Rancho Charro Middle 2	DSRSD	Amador	Lower	371.64	590	2	380 - 580
3S/1E 11G 4	nested	Rancho Charro Deep	DSRSD	Amador	Deep	371.68	790	2	620 - 780
3S/1E 11M 2	monitor	COL2 Monitoring	ZONE 7	Amador	Lower	365.96	700	4.5	199 - 699
3S/1E 11M 3	muni	COL 2	ZONE 7	Amador	Lower	369.24	684	18	345 - 684
3S/1E 11P 6	potable	New Jamieson Residence	DOUG JAMIESON	Amador	Lower	376.67	400	5	240 - 380
3S/1E 12A 2	monitor	Airport South	ZONE 7	Amador	Upper	401.35	69	2.5	63.7 - 68.7
3S/1E 12D 2	monitor	LWRP G6	ZONE 7	Amador	Upper	384.45	44.6		36 - 41
3S/1E 12G 1	monitor	Oaks Park Shallow	ZONE 7	Amador	Upper	404.47	73	2.5	63 - 68
3S/1E 12H 4	nested	LWRP Shallow	CITY OF LIVERMORE	Amador	Lower	407.75	270	2	185 - 260
3S/1E 12H 5	nested	LWRP Middle 1	CITY OF LIVERMORE	Amador	Lower	407.78	400	2	360 - 390
3S/1E 12H 6	nested	LWRP Middle 2	CITY OF LIVERMORE	Amador	Lower	407.75	480	2	410 - 468
3S/1E 12H 7	nested	LWRP Deep	CITY OF LIVERMORE	Amador	Deep	407.67	684	2	609 - 674
3S/1E 12K 2	nested	Key_AmE_L	ZONE 7	Amador	Lower	406.29	300	2	210 - 295
3S/1E 12K 3	nested	Oaks Park Mid	ZONE 7	Amador	Lower	406.83	475	2	355 - 470
3S/1E 12K 4	nested	Oaks Park Deep	ZONE 7	Amador	Deep	406.71	575	2	550 - 570
3S/1E 13P 1	supply	cal rock	JAIMESON COMPANY	Amador	Lower	399.98	652	14	94 - 652
3S/1E 13P 5	nested	LGA Grant Nested 1	ZONE 7 WATER AGENCY		Upper	380.78	135	14	110 - 130
3S/1E 13P 6	nested	LGA Grant Nested 2	ZONE 7 WATER AGENCY		Lower	380.76	255	12	230 - 250
3S/1E 13P 7	nested	LGA Grant Nested 3	ZONE 7 WATER AGENCY		Lower	380.76	375		350 - 370
3S/1E 13P 8	nested	LGA Grant Nested 4	ZONE 7 WATER AGENCY		Lower	380.76	605		580 - 600
3S/1E 14B 1	industrial	Industrial Asphalt	VULCAN MATERIALS	Amador	Lower	384.2	435	8	200 - 410
3S/1E 14D 2	monitor	South Cope Lake	ZONE 7	Amador	Lower	371.83	740	16	170 - 740
3S/1E 14K 2	supply	lone star ind	LONESTAR	Amador	Lower	391.73	508	16	120 - 480
3S/1E 15F 3	supply	kaiser #8	KAISER	Amador	Lower	368.99	640	14	195 - 615
3S/1E 15J 3	supply	shadow cliff	EAST BAY REGIONAL PARK	Amador	Lower	344.59	196	8	154 - 184
3S/1E 15M 3	monitor	Bush/Valley South	ZONE 7	Amador	Lower	362.88	600	2	280 - 590
3S/1E 16A 2	muni	Pleas 8	CITY OF PLEASANTON	AmWest	Lower	358.2	510	20	200 - 495
3S/1E 16A 4	monitor	Bush/Valley Mid	ZONE 7	Amador	Lower	359.36	603	2	260 - 580
3S/1E 16B 1	monitor	Bush/Valley North	ZONE 7	Amador	Deep	355.81	805	2	605 - 800
3S/1E 16C 2	nested	Santa Rita Valley Shallow	ZONE 7	Amador	Lower	344.38	190	2	165 - 185
3S/1E 16C 3	nested	Santa Rita Valley Middle	ZONE 7	Amador	Lower	344.27	305	2	280 - 300
3S/1E 16C 4	nested	Santa Rita Valley Deep	ZONE 7	Amador	Lower	344.16	375	2	355 - 370
3S/1E 16E 4	monitor	black ave - cultural	ZONE 7	Amador	Upper	351.69	105	2.5	95 - 100
3S/1E 16L 2	monitor	Pleas 3 - MW	CITY OF PLEASANTON	Amador	Upper	355.86	151	12	56 - 136
3S/1E 16L 5	muni	Pleas 5	CITY OF PLEASANTON	Amador	Lower	358.05	685	18	149 - 650
3S/1E 16L 7	muni	Pleas 6	CITY OF PLEASANTON	Amador	Lower	354.47	647	18	165 - 647
3S/1E 16P 5	monitor	Vervais Monitor	ZONE 7	Amador	Upper	354.51	75	2.5	64 - 69
3S/1E 16R 1	supply	Stanley Berry Farm	R.L. IRBY	Amador	Lower	362.5	239	10	70 - 226
3S/1E 17B 4	supply	Casterson	LLOYD HAINES	Amador	Lower	337.69	248	8	0 - 248
3S/1E 17D 3	nested	Hopyard Nested Shallow	ZONE 7	Bernal	Lower	325.13	108	4	92 - 98
3S/1E 17D 4	nested	Hopyard Nested Middle 1	ZONE 7	Bernal	Lower	325.14	236	4	206 - 226
3S/1E 17D 5	nested	Hopyard Nested Middle 2	ZONE 7	Bernal	Lower	325.13	308	4	266 - 286
3S/1E 17D 6	nested	Hopyard Nested Middle 3	ZONE 7	Bernal	Lower	325.12	408	4	378 - 398
3S/1E 17D 7	nested	Hopyard Nested Deep	ZONE 7	Bernal	Deep	325.13	684	4	654 - 674
3S/1E 17D10	monitor	Hopyard 7	ZONE 7	Bernal	Lower	328.13	425	24	185 - 415
3S/1E 17D11	monitor	Hopyard 9 Monitoring Well	ZONE 7	Bernal	Lower	324.84	603	2	340 - 505
3S/1E 17D12	muni	Hopyard 9	ZONE 7	Bernal	Lower	327.9	315	18	235 - 310
3S/1E 18A 5	muni	Pleas 7	CITY OF PLEASANTON	Bernal	Lower	329.05	454	18	120 - 440
3S/1E 18A 6	muni	Hopyard 6	ZONE 7	Bernal	Lower	326.74	500	18	158 - 490
3S/1E 18E 4	monitor	Valley Trails II	ZONE 7	Bernal	Upper	320.21	83	4	69 - 79
3S/1E 18J 2	monitor	camino segura	ZONE 7	Bernal	Upper	323.02	71	2.5	61 - 66

<i>Site</i>	<i>Type</i>	<i>Other Name</i>	<i>Owner</i>	<i>Basin</i>	<i>Aquifer</i>	<i>RP</i>	<i>Dp</i>	<i>Di</i>	<i>Perf</i>
3S/1E 18N 1	supply	merritt	RALPH MERRITT	Bernal	Lower	319.43	708	12	229 - 610
3S/1E 19A10	muni	SFWD South (B)	SFWD	Bernal	Lower	337.02	331		189 - 327
3S/1E 19A11	muni	SFWD North (A)	SFWD	Bernal	Lower	334.27	330	18	196 - 320
3S/1E 19C 4	monitor	del valle & laguna	ZONE 7	Bernal	Upper	322.23	78	4	68 - 73
3S/1E 19K 1	monitor	680/bernal	ZONE 7	Bernal	Upper	321.54	57.6	2.5	47.6 - 52.6
3S/1E 20B 2	supply	Fairgrounds Potable	ALAMEDA COUNTY	Bernal	Lower	342.62	500	12	218 - 500
3S/1E 20C 3	supply	Fairgrounds Potable Backup	ALAMEDA FAIRGROUNDS	Bernal	Lower	340.31	110		74 - 107
3S/1E 20C 7	monitor	Key_Bern_U	ZONE 7	Bernal	Upper	338.66	153	2	65 - 145
3S/1E 20C 8	nested	Key_Bern_L	ZONE 7	Bernal	Lower	338.67	315	2	295 - 315
3S/1E 20C 9	nested	Fair Nested Deep	ZONE 7	Bernal	Lower	338.78	515	2	495 - 515
3S/1E 20J 4	monitor	civic center	ZONE 7	Bernal	Upper	331.62	72	2.5	62 - 67
3S/1E 20M11	monitor	S.F "M"LINE	ZONE 7	Bernal	Upper	325.73	71	2.5	61 - 66
3S/1E 20Q 2	monitor	20Q2	CITY OF PLEASANTON	Bernal	Upper	325.82	65	10	45 - 53
3S/1E 22D 2	monitor	vineyard trailer	ZONE 7	Amador	Upper	368.05	72	2.5	62 - 67
3S/1E 23J 1	monitor	1627 vineyard trailer	D. SAFRENO	Amador	Upper	428.2	120	8	0 - 120
3S/1E 24Q 1	supply	Ruby Hills	RUBY HILLS	Amador	Lower	427.5	440	14	200 - 400
3S/1E 25C 3	monitor	Katz Winery Mansion	RUBY HILLS	Amador	Upper	454.16	146	2	70 - 140
3S/1E 29M 4	monitor	f.c. channel	ZONE 7	Castle	Upper	310.94	57	2.5	47 - 52
3S/1E 29P 2	monitor	castlewood dr	ZONE 7	Bernal	Upper	302.82	42	2.5	32 - 37
3S/1W 1B 9	nested	DSRSD Shallow	DSRSD	Dublin	Lower	333.56	162	2	122 - 152
3S/1W 1B10	nested	DSRSD Middle	DSRSD	Dublin	Lower	333.57	414	2	274 - 404
3S/1W 1B11	nested	DSRSD Deep	DSRSD	Dublin	Lower	333.74	560	2	480 - 550
3S/1W 1J 1	monitor	DSRSD MW-1	DSRSD	Dublin	Upper	334.36	70		44 - 64
3S/1W 2A 2	monitor	McNamara's	ZONE 7	Dublin	Upper	369.4	47	2.5	37 - 42
3S/1W 12A 9	monitor	DSRSD NW-75	DSRSD	Dublin	Upper	332.14	74	2	49 - 69
3S/1W 12B 2	monitor	Stoneridge Mall Rd	ZONE 7	Dublin	Upper	342.89	39.5	4	20 - 50
3S/1W 12J 1	monitor	DSRSD South	ZONE 7	Dublin	Upper	329.31	62	2.5	52 - 57
3S/1W 13J 1	monitor	muirwood dr	ZONE 7	Castle	Upper	343.94	48	2.5	39 - 44
3S/2E 1F 2	monitor	Brisa at Circuit City	ZONE 7	Spring	Upper	572.99	68.6	2.5	59 - 64
3S/2E 2B 2	monitor	south front rd	ZONE 7	Spring	Upper	539.45	46	2.5	36.9 - 41.9
3S/2E 3A 1	monitor	Bluebell	ZONE 7	Spring	Upper	517.63	54	2.5	44 - 49
3S/2E 3K 3	monitor	first & S. front rd	ZONE 7	Mocho I	Upper	522.83	60	2.5	50 - 55
3S/2E 5N 1	supply	1037 portola - trailer	TRAILER RANCH	Mocho II	Lower	440	210	10	0 - 210
3S/2E 7C 2	monitor	york way - jaws - G4	ZONE 7	Mocho II	Upper	420.84	49	2.5	39 - 44
3S/2E 7H 2	monitor	dakota	CITY OF LIVERMORE	Mocho II	Upper	442.85	54	2	44 - 54
3S/2E 7N 1	monitor	kittyhawk south	ZONE 7	Amador	Upper	421.06	130	4	76 - 130
3S/2E 7P 3	muni	CWS STA 24	CAL WATER SERVICE	Amador	Lower	431.46	510	16	300 - 490
3S/2E 7R 2	monitor	CWS STA 31 Monitoring	CAL WATER SERVICE	Mocho II	Deep	446	805	2	750 - 805
3S/2E 7R 3	muni	CWS STA 31	CAL WATER SERVICE	Mocho II	Lower	446	583	16	410 - 528
3S/2E 8F 1	muni	CWS STA 10	CAL WATER SERVICE	Mocho II	Lower	456.24	576	16	143 - 433
3S/2E 8G 1	muni	CWS STA 19	CAL WATER SERVICE	Mocho II	Lower	465.05	465	16	120 - 455
3S/2E 8H 2	monitor	North k	ZONE 7	Mocho II	Upper	469.61	46	2.5	36 - 41
3S/2E 8H 3	nested	Key_Mo2_L	ZONE 7	Mocho II	Lower	477.25	195	2	170 - 190
3S/2E 8H 4	nested	N Liv Ave Deep	ZONE 7	Mocho II	Lower	476.97	385	2	360 - 380
3S/2E 8K 2	monitor	Key_Mo2_U (Livermore Key)	ZONE 7	Mocho II	Upper	464.78	74	2.5	64 - 69
3S/2E 8N 2	muni	CWS STA 14	CAL WATER SERVICE	Mocho II	Lower	453.64	526	10	140 - 515
3S/2E 8P 1	muni	CWS STA 8	CAL WATER SERVICE	Mocho II	Lower	468.2	273	10	122 - 263
3S/2E 9L 1	muni	CWS STA 17	CAL WATER SERVICE	Mocho II	Lower	499.39	516	16	136 - 496
3S/2E 9P 1	muni	CWS STA 12	CAL WATER SERVICE	Mocho II	Lower	501.28	515	16	192 - 492
3S/2E 9Q 1	muni	CWS STA 9	CAL WATER SERVICE	Mocho II	Lower	518.15	572	14	180 - 492
3S/2E 9Q 4	monitor	school st	ZONE 7	Mocho II	Upper	504.35	80	2.5	70 - 75
3S/2E 10F 3	monitor	hexcel	ZONE 7	Mocho I	Upper	534.84	45	2.5	35 - 40

<i>Site</i>	<i>Type</i>	<i>Other Name</i>	<i>Owner</i>	<i>Basin</i>	<i>Aquifer</i>	<i>RP</i>	<i>Dp</i>	<i>Di</i>	<i>Perf</i>
3S/2E 10Q 1	monitor	almond	ZONE 7	Mocho II	Upper	555.36	43.5	2.5	33.5 - 33.8
3S/2E 10Q 2	monitor	LLNL P-703	LLNL	Mocho II	Lower	549.33	325	4.5	298 - 325
3S/2E 11C 1	monitor	joan way	ZONE 7	Mocho I	Upper	557.1	66.2	2.5	56.2 - 61.2
3S/2E 12C 4	monitor	LLNL W-486	LLNL	Spring	Upper	591.46	108	4.5	100 - 108
3S/2E 12J 3	monitor	LLNL W-017A	LLNL	Spring	Lower	628.84	160	5	127 - 157
3S/2E 14A 3	monitor	S. vasco @east ave	ZONE 7	Mocho I	Upper	601.87	110	2.5	100 - 105
3S/2E 14B 1	domestic	5763 east ave	LAS POSITAS SWIM CLUB	Mocho I	Lower	593.36	300	9	146 - 234
3S/2E 15E 2	irrigation	Retzlaff Winery	BOB TAYLOR	Mocho II	Lower	549.69	192	8	104 - 189
3S/2E 15Q 6	irrigation	Concannon	CONCANNON	Mocho II	Lower	577.26	301	12	220 - 301
3S/2E 15R17	nested	Buena Vista Shallow	ZONE 7	Mocho II	Upper	592.41	63	2	38 - 58
3S/2E 15R18	nested	Buena Vista Deep	ZONE 7	Mocho II	Lower	592.47	138	2	113 - 133
3S/2E 16A 3	irrigation	Memory Gardens	MEMORY GARDENS	Mocho II	Lower	527.06	240	10	91 - 240
3S/2E 16B 1	muni	CWS STA 5	CAL WATER SERVICE	Mocho II	Lower	520.22	410	14	140 - 390
3S/2E 16C 1	muni	CWS STA 15	CAL WATER SERVICE	Mocho II	Lower	510.97	584	16	150 - 523
3S/2E 16E 4	monitor	pepper tree	ZONE 7	Mocho II	Upper	506.26	45	2.5	35 - 40
3S/2E 17E 2	supply	Mocho Street	JOHN & BARBARA STEIGE	Mocho II	Upper	467.71	94	6	0 - 94
3S/2E 18B 1	muni	CWS STA 20	CAL WATER SERVICE	Amador	Lower	438.56	497	16	190 - 465
3S/2E 18E 1	monitor	E. stanley	ZONE 7	Amador	Upper	423.86	133.8	2.5	123.8 - 128.8
3S/2E 19D 7	nested	Isabel Shallow	ZONE 7	Amador	Lower	415.07	180	2	100 - 180
3S/2E 19D 8	nested	Isabel Middle 1	ZONE 7	Amador	Lower	415.04	260	2	210 - 260
3S/2E 19D 9	nested	Isabel Middle 2	ZONE 7	Amador	Lower	414.98	390	2	280 - 390
3S/2E 19D10	nested	Isabel Deep	ZONE 7	Amador	Lower	414.89	470	2	420 - 470
3S/2E 20M 1	supply	Alden Lane	ALDEN LANE NURSERY	Amador	Lower	478.79	184	12	0 - 184
3S/2E 22B 1	monitor	grapes	ZONE 7	Mocho II	Upper	585.88	31.9	2.5	21.9 - 26.9
3S/2E 23E 1	nested	Mines Nested Shallow	ZONE 7	Mocho II	Upper	613.36	40	2	20 - 35
3S/2E 23E 2	nested	Mines Nested Deep	ZONE 7	Mocho II	Lower	613.23	110	2	95 - 105
3S/2E 24A 1	monitor	S. greenville	ZONE 7	Mocho I	Upper	717.7	46.3	2.5	36.3 - 41.3
3S/2E 26J 2	monitor	mines rd	ZONE 7	Mocho II	Upper	689.92	44	2.5	34 - 39
3S/2E 29F 4	monitor	usgs wetmore	ZONE 7	Amador	Upper	457.5	36	2.5	26 - 31
3S/2E 30D 2	monitor	vineyard	ZONE 7	Amador	Upper	431.6	44	4	24 - 39
3S/2E 30G 1	domestic	genesis farms	GENISIS FARMS	Amador	Lower	453.69	390	12	150 - 370
3S/2E 33G 1	monitor	crohare	ZONE 7	Amador	Upper	511.52	17	2.5	9 - 14
3S/2E 33K 1	monitor	V.A.	ZONE 7	Amador	Upper	546.83	15	2.5	7 - 12
3S/2E 33L 1	monitor	VA/CROHARE FENCE	ZONE 7	Amador	Upper	557.63	25	2.5	11 - 16
3S/3E 7D 2	monitor	7D 2	ZONE 7	Spring	Upper	622.84	74	2.5	64 - 69
3S/3E 7M 2	supply	lupin way	LEON MOORE	Spring	Lower	628.64	199	6	171 - 188

RP = Reference Point Elevation (in feet above MSL, NAVD88)

Dp = Depth of well (in feet below ground surface)

Di = Diameter of well casing (in inches)

Perf = Perforated interval (in feet below ground surface)

TABLE 3.2-3
Zone 7 Water Agency - Groundwater Monitoring Program
Semi-Annual Groundwater Levels (in feet above Mean Sea Level, NAVD88)
Spring and Fall 2011

Well Number	Well Depth	Aqui fer	Sub-Basin	Fall 2010		Spring 2011		Fall 2011		Change in Elevation		
				Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Seasonal		Annual
										Fall 10 to Spring 11	Spring 11 to Fall 11	
2S/1E 32E 1	70	U	Camp	35.0	357.6	31.4	361.2	34.8	357.8	3.5	-3.4	0.1
2S/1E 32Q 1	45	U	Camp	24.9	342.7	25.0	342.6	25.2	342.4	-0.1	-0.2	-0.3
2S/1E 33L 1	80	U	Camp	50.0	339.4	50.4	339.1	49.6	339.9	-0.3	0.8	0.4
2S/1E 33P 2	55	U	Camp	31.4	338.7	31.2	338.9	31.0	339.0	0.2	0.1	0.4
2S/1E 33R 1	60	U	Camp	20.1	338.5	18.5	340.0	20.1	338.4	1.5	-1.6	-0.1
2S/1W 15F 1	60	U	Bishop	10.5	428.9	8.6	430.9	10.2	429.2	1.9	-1.7	0.3
2S/1W 26C 2	50	U	Dublin	25.1	381.4	20.1	386.4	23.7	382.8	5.0	-3.6	1.4
2S/1W 36E 3	60	U	Dublin	7.8	338.8	2.6	343.9	4.2	342.3	5.2	-1.6	3.6
2S/1W 36F 1	190	L	Dublin	22.4	320.3	15.5	327.2	22.5	320.3	6.9	-6.9	-0.1
2S/1W 36F 2	320	L	Dublin	30.0	312.7	23.1	319.7	26.2	316.5	6.9	-3.2	3.8
2S/1W 36F 3	520	L	Dublin	114.2	228.6	43.8	299.0	56.0	286.7	70.4	-12.3	58.2
2S/2E 27C 2	108	U	Spring	16.7	525.5	15.9	526.2	15.4	526.8	0.7	0.6	1.3
2S/2E 27P 2	68	U	Spring	3.0	502.4	0.6	504.9	2.6	502.9	2.4	-2.0	0.5
2S/2E 28D 2	55	U	May	28.7	526.4	28.7	526.5	29.2	525.9	0.0	-0.5	-0.5
2S/2E 28J 2	230	L	May	4.4	514.5	2.5	516.3	4.1	514.8	1.8	-1.6	0.3
2S/2E 28Q 1	28	U	May	7.1	506.0	2.3	510.8	5.9	507.2	4.8	-3.6	1.2
2S/2E 32K 2	43	U	Cayetano	9.5	498.0	7.1	500.4	9.1	498.3	2.4	-2.1	0.4
2S/2E 34E 1	49	U	May	5.5	494.2	2.6	497.1	5.1	494.7	2.9	-2.5	0.5
2S/2E 34Q 2	50	U	Spring	2.9	504.3	1.9	505.3	2.7	504.6	1.0	-0.8	0.2
3S/1E 1F 2	40	U	Mocho II	18.0	410.4	16.6	411.9	16.7	411.7	1.5	-0.2	1.3
3S/1E 1H 3	80	U	Mocho II	27.2	395.6	24.1	398.7	26.9	395.9	3.1	-2.8	0.3
3S/1E 1J 3	300	L	Mocho II	44.0	373.9	13.1	404.8	19.1	398.8	30.9	-6.0	24.9
3S/1E 1L 1	70	U	Camp	53.3	349.7	53.3	349.8	54.4	348.7	0.1	-1.1	-1.0
3S/1E 1P 2	50	U	Amador	23.5	366.1	19.3	370.4	20.5	369.1	4.3	-1.3	3.0
3S/1E 1P 3	480	L	Amador	113.7	280.7	104.5	289.9	113.8	280.6	9.2	-9.3	-0.1
3S/1E 1R 2	56	U	Mocho II	NM	-	13.1	385.5	NM	-	-	-	-
3S/1E 2J 2	41	U	Camp	15.8	365.1	10.7	370.2	14.4	366.5	5.2	-3.8	1.4
3S/1E 2J 3	65	U	Camp	27.2	379.2	25.2	381.1	25.4	380.9	1.9	-0.2	1.8
3S/1E 2K 2	46	U	Camp	28.4	368.6	NM	-	27.2	369.8	-	-	1.2
3S/1E 2M 3	50	U	Camp	19.6	345.4	17.5	347.6	18.9	346.2	2.1	-1.4	0.7
3S/1E 2N 2	80	U	Camp	20.4	342.8	18.4	344.8	19.8	343.4	2.0	-1.4	0.6
3S/1E 2N 6	55	U	Amador	32.3	333.9	30.3	335.9	31.9	334.3	2.0	-1.6	0.4
3S/1E 2P 3	380	L	Camp	101.9	269.9	87.5	284.2	NM	-	14.4	-	-
3S/1E 2Q 1	45	U	Amador	21.0	348.9	16.9	353.1	20.2	349.7	4.1	-3.3	0.8
3S/1E 2R 1	33	U	Amador	19.9	356.4	13.9	362.4	18.7	357.6	5.9	-4.8	1.1
3S/1E 3G 2	50	U	Camp	15.0	339.2	11.3	343.0	13.6	340.6	3.8	-2.4	1.4
3S/1E 4A 1	50	U	Camp	17.6	333.1	16.8	333.9	17.2	333.5	0.7	-0.4	0.4
3S/1E 4J 5	47	U	Camp	16.3	328.9	14.4	330.8	16.1	329.1	1.9	-1.8	0.2
3S/1E 4J 6	110	U	Camp	19.4	326.2	18.1	327.4	19.1	326.4	1.3	-1.0	0.3
3S/1E 4Q 2	90	U	Amador	52.9	292.5	52.2	293.3	52.7	292.7	0.8	-0.6	0.2
3S/1E 5K 6	75	U	Camp	13.3	332.8	11.9	334.2	13.6	332.4	1.4	-1.7	-0.3
3S/1E 5K 7	150	L	Camp	19.1	327.1	17.8	328.4	19.0	327.2	1.3	-1.2	0.1
3S/1E 5L 3	40	U	Camp	12.8	326.6	12.9	326.5	12.7	326.8	-0.1	0.3	0.1
3S/1E 5P 6	35	U	Camp	10.6	326.1	10.6	326.0	11.2	325.5	0.0	-0.5	-0.6
3S/1E 6F 3	36	U	Dublin	5.2	324.6	4.7	325.1	4.9	325.0	0.5	-0.1	0.4
3S/1E 6G 5	200	L	Dublin	20.5	311.7	8.4	323.8	9.9	322.3	12.1	-1.5	10.6
3S/1E 6N 2	67	U	Dublin	13.6	321.6	12.2	323.1	13.4	321.8	1.5	-1.3	0.2
3S/1E 7B 2	152	L	Dublin	9.7	318.1	8.6	319.2	9.7	318.1	1.1	-1.0	0.1
3S/1E 7B12	70	U	Dublin	11.4	316.4	10.5	317.3	11.5	316.3	0.9	-1.0	-0.1
3S/1E 7G 7	55	U	Dublin	12.6	314.8	12.8	314.5	12.8	314.5	-0.2	0.0	-0.3
3S/1E 7J 5	50	U	Dublin	15.0	311.8	14.5	312.3	15.2	311.6	0.5	-0.6	-0.2
3S/1E 7M 2	88	U	Dublin	17.1	311.3	15.1	313.3	17.4	311.0	2.0	-2.3	-0.3
3S/1E 7R 8	52	U	Bernal	37.3	289.3	34.5	292.1	36.7	289.9	2.8	-2.1	0.6
3S/1E 8B 1	148	U	Amador	48.3	290.0	46.0	292.3	48.1	290.2	2.3	-2.1	0.2
3S/1E 8G 4	85	U	Amador	51.6	289.9	50.0	291.5	51.5	290.0	1.6	-1.5	0.1
3S/1E 8H 9	240	L	Amador	67.0	271.6	49.3	289.2	60.9	277.7	17.7	-11.6	6.1
3S/1E 8H10	440	L	Amador	71.0	268.2	49.9	289.3	72.4	266.8	21.1	-22.5	-1.4
3S/1E 8H11	720	D	Amador	75.3	264.0	48.8	290.5	61.5	277.8	26.5	-12.7	13.8
3S/1E 8H13	800	D	Amador	74.8	264.2	48.2	290.7	60.9	278.0	26.6	-12.7	13.9
3S/1E 8H18	745	L	Amador	79.6	262.3	53.0	289.0	65.6	276.3	26.6	-12.7	14.0
3S/1E 8K 1	99	U	Amador	46.8	285.6	41.6	290.8	46.0	286.4	5.3	-4.4	0.8
3S/1E 8N 1	72	U	Bernal	35.8	287.9	32.0	291.7	33.8	289.9	3.8	-1.8	2.0
3S/1E 9B 1	810	L	Amador	85.7	263.6	59.7	289.5	69.4	279.9	26.0	-9.6	16.3
3S/1E 9G 1	160	U	Amador	78.3	274.1	60.6	291.7	62.6	289.8	17.7	-1.9	15.8
3S/1E 9H10	145	U	Amador	62.5	290.4	61.0	291.9	62.2	290.7	1.5	-1.3	0.2
3S/1E 9H11	190	L	Amador	69.3	283.8	60.7	292.4	64.4	288.6	8.6	-3.8	4.8
3S/1E 9J 7	505	U	Amador	67.1	290.3	65.4	292.0	67.2	290.2	1.7	-1.8	-0.1
3S/1E 9J 8	505	L	Amador	78.5	279.1	64.9	292.6	71.7	285.9	13.6	-6.7	6.8
3S/1E 9J 9	505	L	Amador	96.6	261.1	67.3	290.4	75.9	281.8	29.4	-8.6	20.7
3S/1E 9M 3	575	L	Amador	NM	-	57.2	290.3	61.4	286.0	-	-4.3	-

Table 3.2-3
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TABLE 3.2-3
Zone 7 Water Agency - Groundwater Monitoring Program
Semi-Annual Groundwater Levels (in feet above Mean Sea Level, NAVD88)
Spring and Fall 2011

Well Number	Well Depth	Aqui fer	Sub-Basin	Fall 2010		Spring 2011		Fall 2011		Change in Elevation		
				Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Seasonal		Annual
										Fall 10 to Spring 11	Spring 11 to Fall 11	
2S/1E 32E 1	70	U	Camp	35.0	357.6	31.4	361.2	34.8	357.8	3.5	-3.4	0.1
2S/1E 32Q 1	45	U	Camp	24.9	342.7	25.0	342.6	25.2	342.4	-0.1	-0.2	-0.3
2S/1E 33L 1	80	U	Camp	50.0	339.4	50.4	339.1	49.6	339.9	-0.3	0.8	0.4
2S/1E 33P 2	55	U	Camp	31.4	338.7	31.2	338.9	31.0	339.0	0.2	0.1	0.4
2S/1E 33R 1	60	U	Camp	20.1	338.5	18.5	340.0	20.1	338.4	1.5	-1.6	-0.1
2S/1W 15F 1	60	U	Bishop	10.5	428.9	8.6	430.9	10.2	429.2	1.9	-1.7	0.3
3S/1E 9M 3	575	L	Amador	NM	-	57.2	290.3	61.4	286.0	-	-4.3	-
3S/1E 9M 4	498	L	Amador	76.0	266.9	54.7	288.2	61.4	281.5	21.2	-6.7	14.5
3S/1E 9P 5	105	U	Amador	61.3	288.1	57.7	291.7	61.1	288.3	3.6	-3.4	0.2
3S/1E 9P 9	210	L	Amador	65.5	284.1	58.3	291.3	63.7	285.9	7.3	-5.4	1.8
3S/1E 9P10	310	L	Amador	72.5	277.0	58.5	291.1	67.7	281.8	14.0	-9.2	4.8
3S/1E 9P11	425	L	Amador	84.5	264.9	58.9	290.5	74.9	274.6	25.6	-16.0	9.6
3S/1E 10A 1	253	L	Amador	NM	-	65.2	299.5	NM	-	-	-	-
3S/1E 10A 2	88	U	Amador	57.3	310.1	57.8	309.5	60.2	307.2	-0.6	-2.4	-2.9
3S/1E 10B 8	200	L	Amador	65.3	288.3	59.1	294.5	62.8	290.8	6.2	-3.7	2.5
3S/1E 10B 9	294	L	Amador	72.9	280.6	59.9	293.6	65.9	287.6	13.0	-6.0	7.0
3S/1E 10B10	600	L	Amador	91.3	262.2	66.0	287.5	72.3	281.3	25.3	-6.2	19.1
3S/1E 10B11	810	D	Amador	100.0	253.5	61.6	291.9	71.9	281.6	38.4	-10.3	28.1
3S/1E 10D 2	212	L	Amador	64.1	285.2	55.6	293.7	60.3	289.0	8.5	-4.7	3.8
3S/1E 10D 3	322	L	Amador	71.4	277.9	60.0	289.3	63.0	286.3	11.5	-3.0	8.4
3S/1E 10D 4	616	L	Amador	86.2	263.1	56.3	293.0	67.8	281.5	29.9	-11.6	18.4
3S/1E 10D 5	790	D	Amador	101.1	248.2	57.6	291.7	68.2	281.1	43.5	-10.6	32.9
3S/1E 10D 7	215	U	Amador	69.6	291.5	69.0	292.1	69.6	291.5	0.6	-0.6	0.0
3S/1E 10D 8	215	L	Amador	76.5	284.5	66.9	294.1	73.0	288.0	9.6	-6.1	3.5
3S/1E 10K 2	591	L	Amador	82.1	276.6	66.3	292.4	74.0	284.7	15.8	-7.7	8.1
3S/1E 10K 3	530	L	Amador	82.1	276.6	66.3	292.4	74.0	284.7	15.8	-7.7	8.1
3S/1E 10N 2	195	U	Amador	69.8	290.5	68.3	292.0	69.6	290.8	1.6	-1.3	0.3
3S/1E 10N 3	195	L	Amador	74.9	285.3	67.3	292.9	72.4	287.8	7.6	-5.1	2.5
3S/1E 11B 1	43	U	Amador	32.7	336.7	28.8	340.5	31.9	337.5	3.8	-3.0	0.8
3S/1E 11C 3	55	U	Amador	31.8	333.1	29.5	335.4	31.2	333.6	2.3	-1.8	0.5
3S/1E 11G 1	120	U	Amador	59.5	312.1	56.8	314.9	59.6	312.0	2.7	-2.9	-0.1
3S/1E 11G 2	350	L	Amador	92.8	278.8	86.8	284.9	93.6	278.0	6.0	-6.9	-0.8
3S/1E 11G 3	590	L	Amador	100.4	271.2	82.5	289.2	92.3	279.3	18.0	-9.8	8.1
3S/1E 11G 4	790	D	Amador	95.5	276.2	80.2	291.5	95.4	276.3	15.3	-15.2	0.0
3S/1E 11M 2	700	L	Amador	90.7	275.3	73.1	292.9	79.0	286.9	17.6	-5.9	11.7
3S/1E 11M 3	684	L	Amador	90.7	275.3	73.1	292.9	79.0	286.9	17.6	-5.9	11.7
3S/1E 11P 6	400	L	Amador	104.2	272.5	83.5	293.2	94.1	282.6	20.7	-10.6	10.1
3S/1E 12A 2	69	U	Amador	36.3	365.0	NM	-	33.5	367.9	-	-	2.9
3S/1E 12G 1	73	U	Amador	59.9	344.6	57.8	346.6	57.9	346.6	2.1	0.0	2.1
3S/1E 12H 4	270	L	Amador	120.3	287.5	120.8	286.9	127.6	280.1	-0.6	-6.8	-7.4
3S/1E 12H 5	400	L	Amador	127.5	280.3	112.9	294.9	127.3	280.5	14.6	-14.4	0.1
3S/1E 12H 6	480	L	Amador	128.3	279.5	113.8	294.0	129.1	278.7	14.5	-15.3	-0.8
3S/1E 12H 7	684	D	Amador	181.1	226.6	151.2	256.5	132.9	274.8	29.9	18.3	48.2
3S/1E 12K 2	300	L	Amador	121.6	284.7	131.6	274.7	135.6	270.7	-10.0	-4.0	-14.0
3S/1E 12K 3	475	L	Amador	122.9	284.0	108.9	298.0	121.6	285.3	14.0	-12.7	1.3
3S/1E 12K 4	475	D	Amador	142.7	264.0	115.4	291.3	130.7	276.1	27.3	-15.3	12.1
3S/1E 13P 1	652	L	Amador	102.7	297.3	96.2	303.8	98.6	301.4	6.6	-2.5	4.1
3S/1E 14B 1	435	L	Amador	120.9	263.3	91.6	292.6	105.2	279.0	29.3	-13.5	15.8
3S/1E 14D 2	740	L	Amador	97.0	274.8	76.8	295.0	86.0	285.9	20.2	-9.1	11.1
3S/1E 14K 2	508	L	Amador	115.7	276.1	94.3	297.4	104.2	287.5	21.3	-9.9	11.5
3S/1E 15F 3	640	L	Amador	106.0	263.0	76.1	292.9	89.9	279.1	29.9	-13.8	16.1
3S/1E 15J 3	196	L	Amador	79.6	265.0	53.0	291.6	67.0	277.6	26.6	-14.0	12.6
3S/1E 15M 3	600	L	Amador	103.8	259.1	74.0	288.9	90.5	272.4	29.8	-16.5	13.3
3S/1E 16A 2	510	L	AmWest	79.7	278.5	68.0	290.2	NM	-	11.7	-	-
3S/1E 16A 4	603	L	Amador	102.3	257.1	73.8	285.6	87.5	271.8	28.5	-13.7	14.8
3S/1E 16B 1	805	D	Amador	93.8	262.1	65.3	290.5	82.8	273.0	28.4	-17.5	10.9
3S/1E 16C 2	190	L	Amador	68.7	275.7	52.8	291.6	63.9	280.5	15.9	-11.0	4.8
3S/1E 16C 3	305	L	Amador	82.1	262.2	54.3	290.0	72.4	271.9	27.9	-18.2	9.7
3S/1E 16C 4	375	L	Amador	87.4	256.8	53.7	290.5	72.8	271.4	33.7	-19.1	14.6
3S/1E 16E 4	105	U	Amador	57.8	293.9	51.7	300.0	55.8	295.9	6.2	-4.1	2.1
3S/1E 16L 2	151	U	Amador	35.8	320.0	55.8	300.0	NM	-	-20.0	-	-
3S/1E 16L 5	685	L	Amador	64.7	293.4	58.2	299.9	NM	-	6.5	-	-
3S/1E 16L 7	647	L	Amador	NM	-	54.2	300.3	NM	-	-	-	-
3S/1E 16P 5	75	U	Amador	49.6	305.0	40.7	313.8	49.5	305.0	8.9	-8.9	0.0
3S/1E 16R 1	239	L	Amador	83.5	279.0	64.8	297.7	79.8	282.8	18.7	-14.9	3.8
3S/1E 17B 4	248	L	Amador	50.8	286.9	44.7	293.0	NM	-	6.1	-	-
3S/1E 17D 3	108	L	Bernal	39.4	285.8	33.7	291.4	36.1	289.1	5.7	-2.4	3.3
3S/1E 17D 4	236	L	Bernal	39.4	285.7	33.6	291.5	39.9	285.3	5.8	-6.3	-0.5
3S/1E 17D 5	308	L	Bernal	39.3	285.8	33.6	291.6	35.8	289.4	5.7	-2.2	3.5
3S/1E 17D 6	408	L	Bernal	37.6	287.5	32.9	292.2	34.6	290.5	4.7	-1.7	3.0

Table 3.2-3
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TABLE 3.2-3
Zone 7 Water Agency - Groundwater Monitoring Program
Semi-Annual Groundwater Levels (in feet above Mean Sea Level, NAVD88)
Spring and Fall 2011

Well Number	Well Depth	Aqui fer	Sub-Basin	Fall 2010		Spring 2011		Fall 2011		Change in Elevation		
				Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Seasonal		Annual
										Fall 10 to Spring 11	Spring 11 to Fall 11	
2S/1E 32E 1	70	U	Camp	35.0	357.6	31.4	361.2	34.8	357.8	3.5	-3.4	0.1
2S/1E 32Q 1	45	U	Camp	24.9	342.7	25.0	342.6	25.2	342.4	-0.1	-0.2	-0.3
2S/1E 33L 1	80	U	Camp	50.0	339.4	50.4	339.1	49.6	339.9	-0.3	0.8	0.4
2S/1E 33P 2	55	U	Camp	31.4	338.7	31.2	338.9	31.0	339.0	0.2	0.1	0.4
2S/1E 33R 1	60	U	Camp	20.1	338.5	18.5	340.0	20.1	338.4	1.5	-1.6	-0.1
2S/1W 15F 1	60	U	Bishop	10.5	428.9	8.6	430.9	10.2	429.2	1.9	-1.7	0.3
3S/1E 17D 7	684	D	Bernal	22.2	302.9	21.0	304.1	21.5	303.7	1.2	-0.5	0.8
3S/1E 17D10	425	L	Bernal	41.7	286.4	36.1	292.1	38.3	289.9	5.6	-2.2	3.4
3S/1E 17D11	603	L	Bernal	36.8	288.0	32.4	292.5	33.9	290.9	4.5	-1.6	2.9
3S/1E 17D12	315	L	Bernal	43.3	283.4	37.4	289.3	39.8	288.1	5.9	-1.2	4.7
3S/1E 18A 5	454	L	Bernal	43.3	285.8	35.5	293.6	NM	-	7.8	-	-
3S/1E 18A 6	500	L	Bernal	42.5	284.3	36.6	290.1	38.7	288.0	5.8	-2.1	3.8
3S/1E 18E 4	83	U	Bernal	32.4	287.8	27.8	292.4	30.9	289.3	4.6	-3.1	1.5
3S/1E 18J 2	71	U	Bernal	34.3	288.8	30.3	292.7	33.1	289.9	3.9	-2.8	1.2
3S/1E 18N 1	708	L	Bernal	32.9	286.5	27.4	292.0	30.1	289.3	5.5	-2.7	2.8
3S/1E 19A11	330	L	Bernal	46.5	287.8	NM	-	43.5	290.8	-	-	3.0
3S/1E 19C 4	78	U	Bernal	33.2	289.1	28.3	293.9	31.3	291.0	4.8	-2.9	1.9
3S/1E 19K 1	58	U	Bernal	35.7	285.8	29.3	292.2	32.5	289.0	6.4	-3.2	3.2
3S/1E 20B 2	500	L	Bernal	NM	-	NM	-	NM	-	-	-	-
3S/1E 20C 3	110	L	Bernal	NM	-	NM	-	NM	-	-	-	-
3S/1E 20C 7	153	U	Bernal	49.7	288.9	46.2	292.5	48.7	290.0	3.5	-2.5	1.0
3S/1E 20C 8	315	L	Bernal	58.0	280.7	47.3	291.3	50.4	288.2	10.6	-3.1	7.5
3S/1E 20C 9	515	L	Bernal	55.3	283.5	47.4	291.3	51.4	287.4	7.9	-3.9	4.0
3S/1E 20J 4	72	U	Bernal	39.8	291.9	36.6	295.0	39.0	292.6	3.2	-2.4	0.8
3S/1E 20M11	71	U	Bernal	33.9	291.9	29.4	296.3	32.3	293.5	4.5	-2.9	1.6
3S/1E 20Q 2	65	U	Bernal	21.3	304.5	18.0	307.8	20.8	305.0	3.2	-2.8	0.5
3S/1E 22D 2	72	U	Amador	50.7	317.4	43.6	324.5	47.2	320.9	7.1	-3.6	3.5
3S/1E 23J 1	120	U	Amador	80.1	348.1	76.2	352.0	78.7	349.6	4.0	-2.5	1.5
3S/1E 24Q 1	440	L	Amador	NM	-	150.6	276.9	119.6	308.0	-	31.0	-
3S/1E 25C 3	146	U	Amador	86.2	368.0	NM	-	84.5	369.7	-	-	1.6
3S/1E 29M 4	57	U	Castle	23.4	287.6	19.1	291.8	22.4	288.6	4.3	-3.3	1.0
3S/1E 29P 2	42	U	Bernal	27.9	274.9	32.3	270.5	27.5	275.3	-4.4	4.8	0.4
3S/1W 1B 9	162	L	Dublin	12.4	321.2	9.0	324.6	12.5	321.1	3.4	-3.5	-0.1
3S/1W 1B10	414	L	Dublin	20.0	313.6	16.6	317.0	17.5	316.1	3.3	-0.8	2.5
3S/1W 1B11	560	L	Dublin	42.9	290.8	34.8	299.0	39.2	294.6	8.1	-4.4	3.7
3S/1W 2A 2	47	U	Dublin	25.6	343.8	20.9	348.5	24.9	344.5	4.7	-4.0	0.7
3S/1W 12B 2	40	U	Dublin	21.1	321.8	19.0	323.9	21.0	321.9	2.1	-2.1	0.1
3S/1W 12J 1	62	U	Dublin	17.6	311.7	15.3	314.1	18.0	311.3	2.4	-2.8	-0.4
3S/1W 13J 1	48	U	Castle	29.5	314.4	17.5	326.4	29.2	314.7	12.0	-11.7	0.3
3S/2E 1F 2	69	U	Spring	21.6	551.4	21.4	551.6	21.6	551.4	0.2	-0.2	0.1
3S/2E 2B 2	46	U	Spring	9.4	530.1	8.5	530.9	9.2	530.3	0.9	-0.6	0.2
3S/2E 3A 1	54	U	Spring	4.7	512.9	3.0	514.6	4.3	513.4	1.7	-1.3	0.5
3S/2E 3K 3	60	U	Mocho I	13.4	509.4	12.9	510.0	13.3	509.6	0.6	-0.4	0.2
3S/2E 5N 1	210	L	Mocho II	38.3	401.8	29.2	410.9	35.5	404.5	9.1	-6.4	2.8
3S/2E 7C 2	49	U	Mocho II	27.0	393.9	23.8	397.0	26.2	394.6	3.1	-2.4	0.8
3S/2E 7H 2	54	U	Mocho II	30.4	412.5	26.0	416.8	28.5	414.4	4.4	-2.4	1.9
3S/2E 7N 1	130	U	Amador	74.3	346.8	81.0	340.1	78.0	343.1	-6.7	3.0	-3.7
3S/2E 7P 3	510	L	Amador	181.0	250.5	169.0	262.5	151.0	280.5	12.0	18.0	30.0
3S/2E 7R 3	583	L	Mocho II	65.0	381.0	40.0	406.0	126.0	320.0	25.0	-86.0	-61.0
3S/2E 8F 1	576	L	Mocho II	51.0	405.2	52.0	404.2	68.0	388.2	-1.0	-16.0	-17.0
3S/2E 8G 1	465	L	Mocho II	54.0	411.1	41.0	424.1	55.0	410.1	13.0	-14.0	-1.0
3S/2E 8H 2	46	U	Mocho II	41.1	428.5	30.8	438.8	37.6	432.0	10.3	-6.8	3.5
3S/2E 8H 3	195	L	Mocho II	69.6	407.7	51.8	425.5	63.4	413.9	17.8	-11.6	6.2
3S/2E 8H 4	385	L	Mocho II	146.1	330.9	66.1	410.9	124.1	352.8	80.0	-58.0	22.0
3S/2E 8K 2	74	U	Mocho II	39.0	425.8	28.9	435.9	35.4	429.3	10.1	-6.6	3.5
3S/2E 8P 1	273	L	Mocho II	54.0	414.2	37.0	431.2	46.0	422.2	17.0	-9.0	8.0
3S/2E 9L 1	516	L	Mocho II	78.0	421.4	55.0	444.4	81.0	418.4	23.0	-26.0	-3.0
3S/2E 9P 1	515	L	Mocho II	93.0	408.3	75.0	426.3	102.0	399.3	18.0	-27.0	-9.0
3S/2E 9Q 1	572	L	Mocho II	75.0	443.2	54.0	464.2	83.0	435.2	21.0	-29.0	-8.0
3S/2E 9Q 4	80	U	Mocho II	27.8	476.6	14.9	489.5	19.3	485.1	12.9	-4.4	8.5
3S/2E 10F 3	45	U	Mocho I	13.5	521.3	11.8	523.0	12.6	522.3	1.7	-0.7	1.0
3S/2E 10Q 1	44	U	Mocho II	25.4	530.0	21.1	534.3	22.5	532.9	4.3	-1.4	2.9
3S/2E 11C 1	66	U	Mocho I	26.2	531.0	25.6	531.6	26.2	530.9	0.6	-0.7	-0.1
3S/2E 14B 1	300	L	Mocho I	62.1	531.3	61.0	532.4	62.6	530.8	1.1	-1.6	-0.5
3S/2E 15E 2	192	L	Mocho II	38.6	511.1	28.6	521.1	28.9	520.8	9.9	-0.3	9.6
3S/2E 15Q 6	301	L	Mocho II	65.6	511.7	58.4	518.9	63.7	513.6	7.2	-5.3	1.9
3S/2E 15R17	63	U	Mocho II	12.1	580.3	7.3	585.1	11.8	580.6	4.8	-4.5	0.3
3S/2E 15R18	138	L	Mocho II	14.7	577.8	11.0	581.4	13.4	579.1	3.6	-2.3	1.3
3S/2E 16A 3	240	L	Mocho II	39.4	487.7	27.2	499.9	31.6	495.4	12.2	-4.4	7.7
3S/2E 16B 1	410	L	Mocho II	85.0	435.2	61.0	459.2	110.0	410.2	24.0	-49.0	-25.0

Table 3.2-3
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TABLE 3.2-3
Zone 7 Water Agency - Groundwater Monitoring Program
Semi-Annual Groundwater Levels (in feet above Mean Sea Level, NAVD88)
Spring and Fall 2011

Well Number	Well Depth	Aqui fer	Sub-Basin	Fall 2010		Spring 2011		Fall 2011		Change in Elevation		
				Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Seasonal		Annual
										Fall 10 to Spring 11	Spring 11 to Fall 11	
2S/1E 32E 1	70	U	Camp	35.0	357.6	31.4	361.2	34.8	357.8	3.5	-3.4	0.1
2S/1E 32Q 1	45	U	Camp	24.9	342.7	25.0	342.6	25.2	342.4	-0.1	-0.2	-0.3
2S/1E 33L 1	80	U	Camp	50.0	339.4	50.4	339.1	49.6	339.9	-0.3	0.8	0.4
2S/1E 33P 2	55	U	Camp	31.4	338.7	31.2	338.9	31.0	339.0	0.2	0.1	0.4
2S/1E 33R 1	60	U	Camp	20.1	338.5	18.5	340.0	20.1	338.4	1.5	-1.6	-0.1
2S/1W 15F 1	60	U	Bishop	10.5	428.9	8.6	430.9	10.2	429.2	1.9	-1.7	0.3
3S/2E 16C 1	584	L	Mocho II	121.0	390.0	84.0	427.0	114.0	397.0	37.0	-30.0	7.0
3S/2E 16E 4	45	U	Mocho II	16.8	489.5	15.3	490.9	16.2	490.1	1.5	-0.9	0.6
3S/2E 17E 2	94	U	Mocho II	16.7	451.0	15.8	451.9	16.4	451.4	0.9	-0.6	0.4
3S/2E 18B 1	497	L	Amador	166.0	272.6	169.0	269.6	153.0	285.6	-3.0	16.0	13.0
3S/2E 18E 1	134	U	Amador	56.1	367.8	65.3	358.6	58.1	365.8	-9.2	7.2	-2.0
3S/2E 19D 7	180	L	Amador	81.8	333.3	74.3	340.8	74.8	340.2	7.6	-0.6	7.0
3S/2E 19D 8	260	L	Amador	82.6	332.4	74.8	340.2	75.6	339.5	7.8	-0.8	7.0
3S/2E 19D 9	390	L	Amador	NM	-	118.8	296.2	129.5	285.5	-	-10.7	-
3S/2E 19D10	470	L	Amador	148.7	266.2	111.1	303.8	116.3	298.6	37.6	-5.2	32.4
3S/2E 20M 1	184	L	Amador	60.5	418.3	47.3	431.5	53.1	425.7	13.2	-5.8	7.4
3S/2E 22B 1	32	U	Mocho II	14.8	571.1	12.6	573.3	14.1	571.8	2.3	-1.6	0.7
3S/2E 23E 1	40	U	Mocho II	17.0	596.4	14.6	598.8	16.2	597.1	2.4	-1.6	0.8
3S/2E 23E 2	110	L	Mocho II	15.0	598.3	16.6	596.6	14.2	599.0	-1.7	2.4	0.7
3S/2E 24A 1	46	U	Mocho I	26.2	691.5	26.7	691.0	26.6	691.1	-0.5	0.1	-0.4
3S/2E 26J 2	44	U	Mocho II	11.3	678.6	6.1	683.8	10.7	679.2	5.2	-4.6	0.6
3S/2E 29F 4	36	U	Amador	8.6	448.9	8.5	449.0	8.5	449.0	0.1	0.0	0.1
3S/2E 30D 2	44	U	Amador	21.0	410.6	21.3	410.3	21.4	410.2	-0.3	-0.1	-0.4
3S/2E 30G 1	390	L	Amador	NM	-	NM	-	NM	-	-	-	-
3S/2E 33G 1	17	U	Amador	9.0	502.6	8.8	502.7	8.7	502.8	0.2	0.1	0.3
3S/3E 7M 2	199	L	Spring	45.2	583.4	45.3	583.4	45.6	583.0	-0.1	-0.3	-0.4
MA-C 1	0	U	Amador	0.0	376.3	NM	-	NM	-	-	-	-
MA-K 15	0	U	Amador	0.0	330.4	0.0	331.1	0.0	333.2	0.7	2.1	2.8
MA-K 18	0	U	Amador	0.0	346.1	0.0	346.2	0.0	350.8	0.1	4.6	4.7
MA-K 28	0	U	Amador	0.0	288.4	NM	-	0.0	291.4	-	-	3.0
MA-K 30	0	U	Amador	0.0	327.5	NM	-	0.0	319.0	-	-	-8.5
MA-K 37	0	U	Amador	0.0	288.4	NM	-	0.0	291.2	-	-	2.8
MA-P 10	0	U	Amador	0.0	373.1	0.0	373.1	0.0	366.8	0.0	-6.4	-6.4
MA-P 11	0	U	Amador	0.0	349.9	0.0	349.8	NM	-	-0.1	-	-
MA-P 12	0	U	Amador	0.0	346.3	0.0	346.4	0.0	351.1	0.1	4.7	4.8
MA-P 27	0	U	Amador	0.0	314.4	0.0	302.0	0.0	300.9	-12.4	-1.1	-13.5
MA-P 28	0	U	Amador	0.0	398.2	0.0	401.9	0.0	401.1	3.7	-0.8	2.9
MA-P 40	0	U	Amador	0.0	334.4	NM	-	0.0	304.8	-	-	-29.6
MA-P 41	0	U	Amador	0.0	402.8	0.0	409.0	0.0	408.9	6.2	-0.1	6.1
MA-P 42	0	U	Amador	0.0	283.3	0.0	284.6	0.0	287.8	1.3	3.2	4.5
MA-P 44	0	U	Amador	0.0	323.2	0.0	322.7	0.0	322.8	-0.5	0.1	-0.4
MA-R 3	0	U	Amador	0.0	331.0	0.0	328.5	0.0	335.6	-2.5	7.1	4.6
MA-R 4	0	U	Amador	0.0	309.8	0.0	307.1	0.0	313.6	-2.7	6.5	3.8
MA-R 8	0	U	Amador	0.0	354.5	NM	-	0.0	362.7	-	-	8.2
MA-R 22	0	U	Amador	0.0	354.5	NM	-	NM	-	-	-	-
MA-R 23	0	U	Amador	0.0	356.9	NM	-	0.0	359.8	-	-	2.9
MA-R 28	0	U	Amador	0.0	321.9	0.0	319.6	NM	-	-2.3	-	-

U Upper
L Lower
NM Not measured
DRY Well was dry
OBS Well was obstructed
- Not applicable
Key Well

**TABLE 3.2-4
ZONE 7 WATER AGENCY
WATER QUALITY RESULTS FOR GROUNDWATER SAMPLES
2011 Water Year**

SITE ID	DATE	TEMP. °C	EC umhos/cm	pH	Mineral Constituents (mg/L)										Select Metals (mg/L)				TDS mg/L	Hard mg/L
					Ca	Mg	Na	K	HCO3	SO4	Cl	NO3	SiO2	B	As	Fe	Mn			
3S/2E 26J 2	12-Oct-10	19.4	1308	7.5	70	106	60	3.5	517	54	106	59.34	16.0	0.74	<0.001	<0.05	0.093	731	610	
3S/2E 29F 4	17-Nov-10	18.2	646	8.2	68	26	42	1.8	297	50	36	<0.44	19.8	0.35	0.002	0.48	0.14	394	277	
3S/2E 29F 4	22-Mar-11	15.4	702	7.3	72	25	44	1.8	281	67	54	3.19	16.7	0.31	0.0027	0.11	0.062	422	282	
3S/2E 33G 1	17-Nov-10	16.7	457	7.9	29	14	44	2.2	153	29	47	<0.44	14.0	0.20	0.0013	<0.05	<0.01	256	132	
3S/2E 33G 1	22-Mar-11	12.0	456	7.5	48	17	21	1.7	197	34	21	1.68	12.2	0.22	<0.001	<0.05	<0.01	254	188	
3S/3E 7D 2	13-Oct-10	19.7	2099	7.3	131	36	278	2.3	269	210	411	18.78	46.9	5.59	0.0023	<0.05	<0.01	1267	477	