3.3.2.5 Arroyo De La Laguna

The following are items of special note for the Arroyo De La Laguna in the 2010 Water Year:

- Water flowed continuously down the Arroyo De La Laguna throughout the 2010 Water Year. The Peak flow measured at the Arroyo De La Laguna at Verona station (ADLLV) during the 2010 Water Year was 2,130 cfs on October 13.

3.4 Subsidence Monitoring Program

3.4.1 Program Description

This monitoring program began in earnest in 2002. Prior to that, in 1994, Zone 7 had conducted a study of historical benchmark elevation data throughout the Main Basin to determine if there had been any recorded subsidence, possibly due to groundwater pumping from the basin. The conclusion then was that there was no evidence of significant inelastic (permanent) subsidence due to historical groundwater pumping.

Zone 7's Well Master Plan (WMP), which was adopted by the Board in 2005, included a recommendation to conduct high precision leveling surveys twice a year; in spring when groundwater levels are relatively high and again in fall when groundwater levels are relatively low. The spring and fall survey results, along with results from previous years, are used to identify potential occurrences of inelastic subsidence, and to get a better handle on the limits of groundwater pumping stress that result in only elastic subsidence (i.e., subsidence that can be recovered by aquifer recharge).

The 2010 program included surveying elevations in a network of about 80 benchmarks and other survey points in the spring and fall. Table 3.4-1 contains a list of all land surface elevation monitoring locations for the 2010 program, and Figure 3.4-1 shows the locations of each survey point. These points all tie into a main circuit (A1) that includes points in bedrock to the west and south of the Main Basin: Sites A1-1.0 and A1-17.0, respectively. Several smaller circuits (B1 to B5) branch off this main circuit. These benchmarks were surveyed by Kier & Wright Civil Engineers and Surveyors, Inc., of Pleasanton, California. For groundwater elevation reference points, Zone 7 also surveys small circuits in and around Zone 7 wells as needed. These small circuits branch off the Kier & Wright surveyed circuits.

Starting in 2009, staff began monitoring the elevation difference between the cement floor and the wellhead pedestals at several Zone 7 municipal wells. While it is unlikely that these sites (labeled in Table 3.4-1 with a suffix of "-Diff") will show evidence of elastic subsidence or even minor inelastic subsidence, they may provide evidence of significant, inelastic land subsidence in the unlikely event that it were to occur. These are measured monthly to investigate if such inelastic subsidence were to occur between Zone 7's semiannual surveying events.

3.4.2 2010 Results

Zone 7's survey points are graphed, along with Key Well water elevations, on Figure 3.4-2 (Bernal Subbasin) and Figure 3.4-3 (Amador Subbasin). Figure 3.4-4 (Bernal Subbasin - Hopyard 6 Well), Figure 3.4-5 (Amador Subbasin - Mocho Wellfield), and Figure 3.4-6 (Amador Subbasin - Stoneridge) show graphs of land surface elevation changes and groundwater elevation at Zone 7 municipal wells. These graphs show a one-time jump in ground surface elevation in Fall 2006. This is because when the program was started, Site A1-9.0 was believed to be on stationary bedrock. However, measurements taken up to the 2007 Water Year suggested that the site had actually been moving elastically. Therefore, starting with the Fall 2006 dataset, the data calculations were readjusted so that A1-9.0 elevations could vary.

Table 3.4-2 shows the most recent (Fall 2010) measurements and includes the elevation changes since the Fall 2009 and Spring 2010 measurements. Figure 3.4-7 shows that during the 2010 Water Year, most of Zone 7's survey benchmarks have increased slightly from Fall 2009 to Fall 2010 (up to 0.126 feet). This slight increase in land surface elevation is within the range of elastic subsidence observed over the life of the monitoring program. Elevation changes from Spring to Fall 2010, which varied from -0.048 to +0.037, were also within the range of elastic movement.

3.5 Mining Area Monitoring Program

3.5.1 Program Description

Zone 7 monitors conditions and activities in the Chain of Lakes area because the gravel mining operations have an appreciable effect on groundwater levels, groundwater quality and salt loading in the Main Basin. Many of the quarry pits have been dug deep into the Upper Aquifer, creating 'windows' into groundwater basin, and exposing groundwater to large evaporative loses. Groundwater is also pumped from some of the pits and discharged to others or to the arroyos to facilitate the gravel mining occurring in the active pits. The Mining Area Monitoring Program includes water level measurements and water quality sampling of the mining area pits. The program also maps and documents current mining activities, locations of discharge lines, the filling of old pits, and the locations of flow barriers created by the pits that are lined or backfilled with silty-clay mining spoils.

The table below identifies the previous owners, current owners, and current mining operator associated with each pond prefix and pond number as shown on Figure 3.5-1.

Table: Mining Pond Operators and Owners

Pond Prefix*	"K" Ponds	"R" Ponds	"C" Ponds	"P" Ponds
Previous Owners	Kaiser Sand & Gravel Hanson Aggregates	Rhodes & Jamieson Calmat	Cal Rock	Pacific Coast Aggregates RMC/Lonestar
Current Owners	PGC (K30,K28) Legacy (K9-K14) EBRP (K15) Zone 7 (K37)	PGC (all R's except 3,4,12) Vulcan (R3,4,12)	PGC (all C's)	Cemex (all Ps except P12) EBRP (P12)
Current Operator	Hanson Aggregates (K28)	Vulcan (all Rs)	Vulcan (all Cs except C5)	Cemex (all Ps except P12)

* Prefix for pond names (e.g., K37)
PGC Pleasanton Gravel Company
EBRP East Bay Regional Parks
SC Shadow Cliffs

All of the ponds in the program are measured semi-annually for water surface elevations. In 2009, eleven of the mining pits were also measured monthly for water levels; however, for the 2010 Water Year, staff changed the water level monitoring frequency of these ponds from monthly to semi-annually in an effort to optimize the monitoring program. Also Ponds P13 and P45 were removed from the program since the water levels in these ponds are similar to those in adjacent ponds that are in the program.

All of the ponds in the program are sampled annually. Zone 7's laboratory analyzes these samples for a general mineralogical analysis that is consistent with the analyses performed for the groundwater monitoring program.

All stream discharges are metered, and the volume of water discharged from the Valley is computed by prorating the flows after accounting for any re-percolation back into the groundwater basin.

This program also includes the tracking of pond evaporative areas, total monthly evaporative losses for the ponds, and an estimate of groundwater lost due the export of moist gravels. Mining area evaporation accounts for a large portion of the 'Demand' component for the annual hydrologic inventory calculation; second only to 'Municipal Pumping.'

3.5.2 2010 Results

Mining activities continued for Vulcan Materials (formerly Calmat) and Cemex (formerly RMC and Lonestar). Vulcan Materials continued their mining in R28 (future Lake D), utilizing the tunnel and conveyor line built under Stanley Boulevard in 2006, and continued limited operations in R24 (future lake E). Cemex continued mining in P42 (Figure 3.5-1). A summary of mining pit conditions including their areal extent and elevations are shown on Table 3.5-1.

For the 2010 Water Year Vulcan Materials discharged 3,569 AF into the Arroyo Mocho, of which 1,570 AF re-percolated back into the groundwater basin and 1,996 AF was lost as basin outflow. Zone 7 staff has begun collaborating with Vulcan Materials on a project that will capture their pit de-watering operations discharge in Lake I for subsequent recharge back into the aquifers. This project would

eliminate 2,000 to 3,000 AF of water normally lost due to Mining Area discharges now being made to the Arroyo Mocho.

Cemex did not discharge into the Arroyo Valle during the 2010 Water Year.

Zone 7 resumed its cooperative off-site recharge program with East Bay Regional Parks District and diverted approximately 640 AF to Shadow Cliff's lake in 2010. As a result, water levels in Shadow Cliffs were maintained at around 330 ft in elevation through most of the year.

Water elevations were measured in most of the pits that contained water during the 2010 Water Year, and the results are shown on Figure 3.5-1 and Table 3.5-1. The water elevations measured in the mining area ponds that are in direct communication with the upper aquifer are included in the Groundwater Monitoring Program's dataset used for the upper aquifer groundwater elevation contour maps (Figure 3.2-4, and Figure 3.2-5)

Water quality was also monitored in certain mining ponds (Table 3.5-2). Salt concentrations, measured as TDS, in the mining area pits ranged from below 300 mg/L in the pits along the Arroyo Valle to over 1,000 mg/L in Cope Lake [K30]. The high TDS in Cope Lake is due to evaporation which concentrates the salts in this clay-lined pond. The TDS, nitrate and boron concentrations measured in the mining area ponds that are in direct communication with the upper aquifer are included in the Groundwater Monitoring Program's dataset used maps for the upper aquifer concentration maps (Figure 3.2-9, Figure 3.2-10, and Figure 3.2-11).

3.6 Land Use Monitoring Program

3.6.1 Program Description

Zone 7 monitors land use changes in the Valley as part of the long-range groundwater basin management program. The purpose of the program is to identify changes in land use with emphasis on impervious areas and the volume and quality of irrigation water that could impact the volume or quality of water recharging the Main Basin. There are about 18 specific land use types divided into five general categories. Critical elements identified within each specific type include the type and quality of water used for irrigation, the percent of pervious surface, and the presence of water or irrigated crops subject to evaporative loss (the main mechanism for the concentration of salts). The general categories in the program are:

- **Urban** - includes residential and commercial areas, which typically are irrigated. Small vacant lots, non-irrigated fields, and other undeveloped areas are included as urban land if they are smaller than about 20 acres and are located in urban areas.

- **Irrigated/Agriculture** - consists of irrigated farmland such as vineyards, field crops, vegetable crops and pastures.

- **Gravel Mining Area** - includes all lands that have been mined or are scheduled to be mined in the Chain of Lakes area. Mining area "ponds" include all areas of ponded water or wet silt.

- **Golf Courses** - includes the golf courses overlying the Main Basin (i.e., Castlewood Golf Course, Tri-Valley Golf Center, and Las Positas Golf Course).

- **Unclassified** - land which is generally not irrigated and generally does not fit into any of the categories above (including undeveloped or natural land).

Land use data are derived from aerial photography (when available), interviews with landowners, permit applications, and field observations. In addition, all areas receiving untreated water from Zone 7 are mapped. The program quantifies Main Basin land use changes for rainfall and applied water recharge calculations.

3.6.2 2010 Results

For the 2010 Water Year land use areas were mapped and quantified for each of the 18 land use types in each of the nodal areas. The map (Figure 3.6-1) shows the geographic information system (GIS) layers produced in 2010 and the data table (Table 3.6-1) provides a summary of the land use data used in the Groundwater Program. For the 2010 Water Year land use over the Main Basin remained relatively unchanged from the 2008 Water Year. Development continues to be slow due to the poor economy effect on real estate. Due to the limited number of crops, the irrigated/agriculture was not differentiated by crop types.

3.7 Groundwater Production Monitoring

3.7.1 Program Description

Zone 7 collects and compiles data for all large capacity pumping wells within the Main Basin. This includes daily and monthly pumping totals from the retailers and 15-minute totals from the Zone 7 production wells. The relative locations of these municipal supply wells are shown in Figure 3.7-1. All Zone 7 production wells are metered. All retailer wells have discharge meters as well, which are read by retailer staff and reported periodically to Zone 7 as required by their treated water contracts with Zone 7. The treated water contracts also allow each retailer to pump a certain volume of groundwater each calendar year from the Main Basin without charge. These volumes are called their Groundwater Pumping Quota [GPQ]. Zone 7 charges the retailers a ‘recharge fee’ for all groundwater they pump over the annual GPQ unless it is less than the amount carried-over from their previous year’s un-pumped GPQ allocation.

Records of other pumping wells are obtained from well owners when available. Pumping records from significant wells without meters are estimated from utility records or from the associated land use (e.g. number of acres irrigated). Zone 7 obtains these records as part of the Groundwater Monitoring, Land Use and Untreated Water Contracts programs.

3.7.2 2010 Results

For the 2010 Water Year about 16,200 AF of groundwater was pumped from the Main Basin. Production volumes from the municipal wells (total pumped minus the pumped-to-waste volume) for the 2010 Water

Year are shown on Table 3.7-1 and discussed in Section 5.1.3. In addition to the nine municipal wells operated by Zone 7 in Pleasanton, CWS operated 12 wells in the Livermore area, and the City of Pleasanton operated three wells in Pleasanton in 2010.

Zone 7 produced approximately 8,890 AF of groundwater for the 2010 Water Year (about 114% of average), and 8,417 AF for the Calendar Year. This includes the 3,142 AF of water (2,402 AF for Calendar Year) that was sent through the membranes of the demineralization plant (Section 5.2.3).

For the 2010 Calendar Year (January to December), CWS pumped 3,098 AF, which is slightly over the sum of their GPQ (3,069 AF) and 2009 carry-over amount (5 AF). Pleasanton, which has a GPQ of 3,500 AF (plus a carryover of 675 AF from 2009), pumped 3,507 AF and carried-over 668 AF into the 2011 Calendar Year. All other groundwater production was about normal for the basin.

3.8 Wastewater and Recycled Water Monitoring Program

3.8.1 Program Description

Zone 7 compiles and reviews data on the volume and quality of wastewater collected and recycled water used within the watershed from the City of Livermore Water Reclamation Plant (LWRP), DSRSD Water Reclamation plant, and the Veterans Hospital sewage treatment plant.

Zone 7 also reviews Septic Tank Use Applications located within the Valley for compliance with Zone 7's Wastewater Management Plan. Zone 7 must approve all onsite disposal systems for new commercial developments or any residential system that will potentially exceed the loading allowed for the site. See Section 5.3.2 for a summary of Zone 7's 2010 Water Year activities relating to individual onsite wastewater treatment/disposal systems.

3.8.2 2010 Results

The results of the Zone 7 Wastewater Monitoring Program for the 2010 Water Year are presented in the following table. The two largest wastewater collection and treatment agencies (LWRP and DSRSD), which treat over 99% of the wastewater in the Valley, are listed first, followed by the much smaller Veterans Hospital and the Main Basin Septic Tanks. The third row ('Volume Recycled') shows the volume recycled within the watershed. The fourth row ('Main Basin') shows the total volume of effluent that is applied over the Main Basin. The final two rows present average nitrogen (as Total Kjeldahl Nitrogen) and TDS concentrations in recycled water.

Table: Wastewater Monitoring Results for 2010 Water Year

	Livermore (LWRP)	DSRSD	VA Hospital	Septic Tanks in Main Basin	Total
FLOW VOLUMES (AF)					
Total Influent	6,636	12,894	50*	80	19,660
Volume Exported	5,104	10,489	0	0	15,593
Volume Recycled	2,540	2,197	0	0	4,737
Applied to Main Basin	845	0	50*	80	895
RECYCLED WATER CHEMISTRY (mg/L)					
TKN	33-43	24-32	10-25	30-40**	
TDS	450-620	568-748	480-680	500-700**	

* Estimated
** Not monitored due to large number of tanks and diverse quality. Estimated.
MB Main Basin
TKN Total Kjeldahl Nitrogen
TDS Total Dissolved Solids

In 2010, 19,660 AF (18,991 AF in 2009) of wastewater was produced and about 24% was recycled for irrigation of landscape and turf, and the remainder was exported from the valley through the LAVWMA (Livermore-Amador Valley Water Management Agency) export pipeline. About 19% of the recycled water was applied over the Main Basin. The table helps illustrate the relative magnitude of different sources of recycled water use and wastewater disposal on the basin and watershed. In total, less than one percent of groundwater supply is from wastewater or recycled water origin.

Recycled water use by the City of Livermore over the Main Basin is increasing (from 591 for 2009 to 845 AF for 2010). Elevated salinity in the recycled water continues to be Zone 7's primary groundwater quality concern for its use over the Main Basin; however, several constituents-of-emerging-concern (CECs) are being considered for future basin monitoring plans. Nitrate has not been as big of a concern for LWRP's recycled water since they ceased nitrifying their effluent in 1995.

Recycled water use by DSRSD, which was entirely over the fringe subbasins, decreased slightly in the 2010Water Year (from 2,221 AF in 2009 to 2,197 AF in 2010). DSRSD also operates a wastewater treatment and sludge disposal facility in the northwestern portion of Pleasanton, which is also in the fringe basin. While there does not appear to be an immediate impact of DSRSD's operations on the Main Basin, Zone 7 continues to monitor the water quality in the fringe basins and investigate (as part of SMP, Section 5.2.2) the stratigraphic relationship between the fringe and Main basins to identify if and how groundwater in the fringe basin may impact the Main Basin.

No changes were reported for the Veterans Hospital's wastewater system in 2010. Both, the Veterans Hospital wastewater and septic tank flows are not monitored; therefore, they are estimated for this report.

TABLE 3.4-1

Zone 7 Water Agency
Subsidence Monitoring Program
Survey Points and Descriptions, 2010 Water Year

Sites Monitored by Kier & Wright

Site ID	Well ID	Survey Points	Description
A1- 1.0		G972	Brass disk located in sidewalk
A1- 2.0		Foot-La-Pos	Chisel mark on brdge footing
A1- 3.0		C972	Brass disk mounted on bridge platform
A1- 4.0		Mocho-Chabot	Brass disk located on access road
A1- 5.0		Mocho-Tass-W	Brass disk located on access road
A1- 6.0		Mocho-Tass-E	Brass disk located on access road
A1- 6.05		Mocho TP48	
A1- 6.1		Mocho_CB	Chisel mark on catch basin
A1-10.0		Vine-Pipe	Brass disk in concrete
A1-12.0		Mohr-RR	Spike at Mohr Ave and RR
A1-13.1		COP RE 25281	Replaced A1-13.0 on 4/13/09
A1-14.1		Bush-Valley	
A1-15.0		D8	Brass disk on bridge foundation
A1-15.1		BM-P929 Reset	
A1-16.0		V1	Brass disk
A1-17.0		K2	Brass disk (?) NGVD Benchmark
B1- 1.0		Mocho-san MP3	Disk located on bridge platform
B1- 2.0		Mocho-san MP2	Disk located on bridge platform
B1- 3.0		Mocho-san MP1	Disk located on bridge platform
B1- 4.0	3S/1E 8H 3	Army Well 2, Floor	Chisel mark on pumphouse floor
B1- 5.1	3S/1E 8H18	STP640 MN/W	Replaced B1-5.0 on 4/13/09
B1- 6.0	3S/1E 8H 2	Army Well 1, Floor	Chisel mark on pumphouse floor
B1- 7.0		Mocho-Stone MP1	Disk located on bridge platform
B1- 8.0		Mocho-Stone MP2	Disk located on bridge platform
B1- 9.0		Mocho-Stone MP3	Disk located on bridge platform
B1-10.0		Mocho-Stone MP4	Disk located on bridge platform
B1-11.0	3S/1E 8H 4	Army Well 3, Floor	Chisel mark on pumphouse floor
B1-12.0	3S/1E 8H13	Obs. Well, Casing	Chisel mark on casing
B1-13.0	3S/1E 9M 4	Mocho 3, Shiner	Shiner at entrance door
B1-14.1	3S/1E 9M 2	Mocho 1, Floor	
B1-16.1	3S/1E 9M 3	Mocho 2, Floor	
B2- 1.0		Tass-Las-Pos MP1	Disk located on bridge platform
B2- 2.0		Tass-Las-Pos MP2	Disk located on bridge platform
B2- 3.0		Tass-Las-Pos MP3	Disk located on bridge platform
B2- 4.0		Tass-Las-Pos MP4	Disk located on bridge platform
B3- 1.0		Mocho-Park	Brass disk on concrete vault
B3- 2.0		1H ALA	County Benchmark
B3- 3.0	3S/1E 17D12	Hop 9 BM	Benchmark, rod in access road
B3- 4.0		MP1 (Disc)	
B3- 5.0		MP2 (Disc)	
H7- C	3S/1E 17D10		Hopyard 7 Well (Punch)
B4- 1.0 S		AMP-Ctl S	Brass Disk on Control
B4- 1.0 N		AMP-Ctl N	
B4- 2.0	3S/1E 9B 1	Stoneridge, Floor	Chisel mark at entrance door
B5- 1.0		OSRR-BC	New Monument disk
B5- 2.0		OSRR-Andrew	New Monument disk
B5- 3.0		OSRR-Cafe	New Monument disk
B5-4.0		Tass-Rose	Disk on bridge foundation (formerly A1-8.0)
B6- 1.0		5608 Belleza	New Monument disk
B6- 2.0		FLORA-end	New Monument disk
B6- 3.0		Belleza-Verd	New Monument disk
B7- 1.0		Larame-Larame	New Monument disk
B7- 2.0		Suttr-Larame	New Monument disk
B7- 3.0		Suttr-Jones	New Monument disk

Additional Well Sites Monitored by Zone 7

Site ID	Well Id	Survey Points	Description
AW1-P	3S/1E 8H 2	Army Well 1, Pedestal	Army Well 1 well pedestal
AW1-RP	3S/1E 8H 2	Army Well 1, RP	Army Well 1 reference point
AW2-P	3S/1E 8H 3	Army Well 2, Pedestal	Army Well 2 well pedestal
AW3-Diff	3S/1E 8H 4	Army Well 3, Pedestal	Army Well 3 pedestal to ground difference
AW3-P	3S/1E 8H 4	Army Well 3, Pedestal	Army Well 3 well pedestal
H6-C	3S/1E 18A 6	Hopyard 6, Casing	Hop 6 casing / flange
H6-D	3S/1E 18A 6	Hopyard 6, Drain	Hop 6 drain
H6-Diff	3S/1E 18A 6	Hopyard 6, Pedestal	Hop 6 pedestal to ground difference
H6-F	3S/1E 18A 6	Hopyard 6, Floor	Hop 6 chisel mark on pumphouse floor
H6-P	3S/1E 18A 6	Hopyard 6, Pedestal	Hop 6 well pedestal
H6-RP	3S/1E 18A 6	Hopyard 6, RP	Hop 6 reference point
H9-T	3S/1E 17D12	Hopyard 9, Transformer	Hop 9 transformer pad
H9-C	3S/1E 17D12	Hopyard 9, Casing	Hop 9 casing / flange
H9-Diff	3S/1E 17D12	Hopyard 9, Pedestal	Hop 9 pedestal to ground difference
H9-F	3S/1E 17D12	Hopyard 9, Floor	Hop 9 chisel mark on pumphouse floor
H9-P	3S/1E 17D12	Hopyard 9, Pedestal	Hop 9 well pedestal
H9-RP	3S/1E 17D12	Hopyard 9, RP	Hop 9 reference point
M1-C	3S/1E 9M 2	Mocho 1, Casing	Mocho 1 casing / flange
M1-P	3S/1E 9M 2	Mocho 1, Pedestal	Mocho 1 well pedestal
M1-RP	3S/1E 9M 2	Mocho 1, RP	Mocho 1 reference point
M1-T	3S/1E 9M 2	Mocho 1, Transformer	Mocho 1 transformer pad
M2-Diff	3S/1E 9M 3	Mocho 2, Pedestal	Mocho 2 pedestal to ground difference
M3-C	3S/1E 9M 4	Mocho 3, Casing	Mocho 3 casing / flange
M3-Diff	3S/1E 9M 4	Mocho 3, Pedestal	Mocho 3 pedestal to ground difference
M3-P	3S/1E 9M 4	Mocho 3, Pedestal	Mocho 3 well pedestal
M3-RP	3S/1E 9M 4	Mocho 3, RP	Mocho 3 reference point
M3-T	3S/1E 9M 4	Mocho 3, Transformer	Mocho 3 transformer pad
M4-C	3S/1E 8H18	Mocho 4, Casing	Mocho 4 casing / flange
M4-Diff	3S/1E 8H18	Mocho 4, Pedestal	Mocho 4 pedestal to ground difference
M4-P	3S/1E 8H18	Mocho 4, Pedestal	Mocho 4 well pedestal
M4-RP	3S/1E 8H18	Mocho 4, RP	Mocho 4 reference point
M4-T	3S/1E 8H18	Mocho 4, Transformer	Mocho 4 transformer pad
S-C	3S/1E 9B 1	Stoneridge, Casing	Stoneridge casing / flange
S-D	3S/1E 9B 1	Stoneridge, Drain	Stoneridge drain
S-Diff	3S/1E 9B 1	Stoneridge, Pedestal	Stoneridge pedestal to ground difference
S-P	3S/1E 9B 1	Stoneridge, Pedestal	Stoneridge well pedestal
S-RP	3S/1E 9B 1	Stoneridge, RP	Stoneridge reference point

Monitoring Frequency

Circuit	Frequency	Last Measured	Next Measurement
A1 Circuit*	Semi-annually	Fall 2009	Spring 2010
B1 Mocho loop	Semi-annually	Fall 2009	Spring 2010
B2 Tassajara loop	As needed	Fall 2007	as needed
B3 Hopyard wells loop	Semi-annually	Fall 2009	Spring 2010
B4 Stoneridge well loop	Semi-annually	Fall 2009	Spring 2010
B5 Tassajara - Rosewood	Annually	Fall 2009	Fall 2010
B6 Verona loop	As needed	Apr-04	as needed
B7 Suttergate loop	As needed	Apr-04	as needed
Municipal Wells	As needed	Oct-07	as needed

Legend

*	Not including the A1 North Segment, which was discontinued in 2007
	Probable bedrock sites

Table 3.4-2
Zone 7 Water Agency
Subsidence Monitoring; Kier & Wright Survey Measurements
2010 Water Year

Site	Site Description	Date Measured	Elev Fall 10 (ft NAVD88)	Elev Spr 10 (ft NAVD88)	Elev Fall 09 (ft NAVD88)	Change in Elevation (ft)	
						Fall 10 - Spr 10	Fall 10 - Fall 09
A1- 1.0	G972*	Sep 29, 2010	365.705	365.705	365.705	0.000	0.000
A1- 2.0	Foothill and Las Positas	Sep 29, 2010	405.451	405.459	405.449	-0.008	0.002
A1- 3.0	C972	Sep 29, 2010	330.584	330.573	330.583	0.011	0.001
A1- 4.0	Arroyo Mocho at Chabot Crk	Sep 29, 2010	324.030	324.011	324.024	0.019	0.006
A1- 5.0	Arroyo Mocho at Tassajara Crk West	Sep 29, 2010	327.151	327.125	327.14	0.026	0.011
A1- 6.0	Arroyo Mocho at Tassajara Crk East	Sep 29, 2010	327.812	327.776	327.782	0.036	0.030
A1- 6.05	Arroyo Mocho at Tassajara Crk East	Sep 29, 2010	329.337	329.300	329.211	0.037	0.126
A1- 6.1	Arroyo Mocho Pleasanton Control	Sep 29, 2010	332.645	332.620	332.603	0.025	0.042
A1- 7.0	M1257	Sep 29, 2010	341.878	341.867	341.841	0.011	0.037
A1-10.0	Vineyard Pipeline at Santa Rita Rd	Sep 29, 2010	340.932	340.942	340.923	-0.010	0.009
A1-12.0	Mohr Ave at Iron Horse	Sep 29, 2010	347.513	347.497	347.489	0.016	0.024
A1-13.1	COP RE 25281	Sep 29, 2010	349.986	349.966	349.958	0.020	0.028
A1-14.1	Busch and Valley	Sep 29, 2010	356.867	356.849	356.841	0.018	0.026
A1-15.0	D8	Sep 29, 2010	367.013	366.999	366.991	0.014	0.022
A1-15.1	D8	Sep 29, 2010	361.471	361.474	361.463	-0.003	0.008
A1-16.0	V1	Sep 29, 2010	367.011	367.018	367.008	-0.007	0.003
A1-17.0	K2*	Sep 29, 2010	399.808	399.808	399.808	0.000	0.000
B1- 5.1	Mocho 4	Sep 28, 2010	336.689	336.674	336.646	0.015	0.043
B1-11.0	3S/1E 8H 4	Sep 28, 2010	337.972	337.967	337.935	0.005	0.037
B1-12.0	3S/1E 8H13	Sep 28, 2010	336.995	336.978	336.958	0.017	0.037
B1-13.0	3S/1E 9M 4	Sep 28, 2010	336.448	336.434	336.41	0.014	0.038
B1-14.1	3S-1E 9M 2 New	Sep 28, 2010	341.028	341.044	341.021	-0.016	0.007
B1-16.1	3S-1E 9M 3 New	Sep 28, 2010	341.831	341.826	341.813	0.005	0.018
B3- 1.0	MOCHO-PARK	Oct 04, 2010	323.165	323.174	323.169	-0.009	-0.004
B3- 2.0	1H ALA	Oct 04, 2010	320.592	320.575	320.573	0.017	0.019
B3- 3.0	HOP9-BM	Oct 04, 2010	321.566	321.614	321.544	-0.048	0.022
B3- 4.0	PLEASANTON CANAL	Oct 04, 2010	323.607	323.598	323.591	0.009	0.016
B3- 5.0	HOP7 MP1	Oct 04, 2010	322.569	322.561	322.555	0.008	0.014
H7-C	Hop7 Casing	Oct 04, 2010	324.868	324.851	324.858	0.017	0.010
B4- 1.0 S	AMP-CTL S	Sep 24, 2010	322.044	322.027	322.01	0.017	0.034
B4- 1.0 N	AMP-CTL N	Sep 24, 2010	322.185	322.168	322.151	0.017	0.034
B4- 2.0	Stoneridge Wellhouse	Sep 24, 2010	344.783	344.765	344.74	0.018	0.043
B4- 3.0	GUZMAN PKWY	Sep 24, 2010	343.888	343.864	343.851	0.024	0.037
B4- 4.0	TREVOR PKWY	Sep 24, 2010	346.495	346.474	346.459	0.021	0.036
B5- 1.0	OSRR-BC	Oct 09, 2010	344.020	NA	343.986	NA	0.034
B5- 2.0	OSRR-ANDREW	Oct 09, 2010	343.089	NA	343.05	NA	0.039
B5- 3.0	OSRR-CAFÉ	Oct 09, 2010	344.532	NA	344.497	NA	0.035
B5- 4.0	Tass-Rose	Oct 09, 2010	349.646	NA	349.624	NA	0.022

* Fixed reference point
Elev Ground Surface Elevation
NM Not Measured
NA Not Applicable/Available

TABLE 3.5-1
ZONE 7 WATER AGENCY
MINING AREA MONITORING PROGRAM
WATER LEVEL DATA
2010 WATER YEAR

PIT NUMBER	Monitoring	Contact	ORIGINAL GROUND ELEVATION	DEEPEST MINED DEPTH		MINING USE	CHAIN OF LAKE NAME	POND ELEVATION (ft MSL, NAVD88)	
				Elev	Depth	2010		SPRING 10	FALL 10
CALROCK/RHODES & JAMIESON/VULCAN/PLEASANTON GRAVEL COMPANY/CALMAT									
C 1	SA	C	410	360	50	UNUSED	C	376.8	376.3
C 2			410	360	50	CLAY STORAGE	C		
C 3			410	360	50	CLAY STORAGE			
C 4			400	390	10	CLAY STORAGE			
C 5			400	290	110	CLAY STORAGE			
C 6			400	385	15	UNUSED	C		
C 7			400	330	70	CLAY STORAGE	D		
C 8A		C	410	330	80	UNUSED	D		
C 8B		C	410	340	70	UNUSED	D		
C 9			410	310	100	UNUSED	D		
C10			410	330	80	REMINED AS R28			
R 1			370	240	130	RENUMBERED R12			
R 2			370	240	130	RENUMBERED R12			
R 3	SA	CP	370	240	130	WATER & CLAY		330	331
R 4	SA	CP	380	240	140	WATER STORAGE		305.8	309.8
R 5			380	240	140	CLAY STORAGE			
R 6			370	270	100	RENUMBERED R13			
R 7			370	270	100	RENUMBERED R13			
R 8	SA	CP	365	260	105	WATER STORAGE	G		354.5
R 9			370	280	90	RENUMBERED R17			
R10			380	370	10	CLAY STORAGE			
R11			390	370	20	CLAY STORAGE			
R12			370	240	130	CLAY STORAGE			
R13			370	270	100	CLAY & DEBRIS			
R14			400	380	20	UNUSED			
R15			380	360	20	RENUMBERED R16			
R16			380	270	110	RENUMBERED R23/24			
R17			370	300	70	RENUMBERED R27			
R18			380	290	90	RENUMBERED R22			
R19			380	300	80	RENUMBERED R27			
R20			390	320	70	RENUMBERED R22			
R21		N	380	280	100	WATER & CLAY			
R22	SA	CP	380	290	90	WATER STORAGE	F	356	354.5
R23	SA	CP	380	270	110	WATER STORAGE		356.6	356.9
R24	SA	C	390	280	110	ACTIVE MINING	E	288	
R25			395	300	95	INACTIVE MINING	E		
R26			390	310	80	INACTIVE MINING			
R27		N	380	300	80	WATER STORAGE			
R28	SA	CP	400	320	80	ACTIVE MINING	D	317.4	321.9

SA = Semiannual
C = in contact with GW levels
CP = GW contact but subject to pumping
N = no contact with GW.

TABLE 3.5-1
ZONE 7 WATER AGENCY
MINING AREA MONITORING PROGRAM
WATER LEVEL DATA
2010 WATER YEAR

PIT NUMBER	Monitoring	Contact	ORIGINAL GROUND ELEVATION	DEEPEST MINED DEPTH		MINING USE	CHAIN OF LAKE NAME	POND ELEVATION (ft MSL, NAVD88)	
				Elev	Depth	2010		SPRING 10	FALL 10
KAISER GRAVELS/HANSON									
K 1			350	325	25	CLAY STORAGE			
K 2			350	325	25	CLAY STORAGE			
K 3			350	315	35	RENUMBERED K 4			
K 4			350	315	35	CLAY STORAGE			
K 5			350	315	35	CLAY STORAGE			
K 6			350	325	25	CLAY STORAGE			
K 7			350	320	30	CLAY STORAGE			
K 8			350	320	30	CLAY STORAGE			
K 9			360	305	55	CLAY STORAGE			
K10			370	355	15	CLAY STORAGE			
K11			370	315	55	CLAY STORAGE			
K12			370	275	95	CLAY STORAGE			
K13			370	275	95	CLAY STORAGE			
K14			370	275	95	CLAY STORAGE			
K15	SA	C	360	265	95	WATER STORAGE	Sh.Cliff	330.92	330.4
K16			360	325	35	RENUMBERED K15			
K17			360	330	30	RENUMBERED K18			
K18	SA	C	360	330	30	UNUSED		346.1	346.05
K19			350	335	15	CLAY STORAGE			
K20			370	255	115	RENUMBERED K30			
K21			370	240	130	RENUMBERED K30			
K22			370	260	110	RENUMBERED K30			
K23			360	260	100	RENUMBERED K30			
K24			360	220	140	CLAY STORAGE			
K25			360	230	130	RENUMBERED K30			
K26			360	230	130	RENUMBERED K30			
K27			350	300	50	RENUMBERED K31			
K28	SA	C	360	220	140	WATER STORAGE	H	290	288.4
K29			360	230	130	RENUMBERED K30			
K30	SA	N	370	240	130	WATER & CLAY	Cope	328.5	327.5
K31			360	220	140	RENUMBERED K36			
K32			360	335	25	CLAY STORAGE			
K33			360	335	25	UNUSED			
K34			350	215	135	RENUMBERED K37			
K35			360	200	160	RENUMBERED K37			
K36			360	220	140	RENUMBERED K37			
K37	SA	C	360	220	140	WATER STORAGE	I	290	288.4

SA = Semiannual
C = in contact with GW levels
CP = GW contact but subject to pumping
N = no contact with GW.

TABLE 3.5-1
ZONE 7 WATER AGENCY
MINING AREA MONITORING PROGRAM
WATER LEVEL DATA
2010 WATER YEAR

PIT NUMBER	Monitoring	Contact	ORIGINAL GROUND ELEVATION	DEEPEST MINED DEPTH		MINING USE	CHAIN OF LAKE NAME	POND ELEVATION (ft MSL, NAVD88)	
				Elev	Depth	2010		SPRING 10	FALL 10
PACIFIC AGGREGATE/RMC/LONESTAR/CEMEX									
P 1			380	360	20	CLAY STORAGE			
P 2		CP	380	360	20	WATER STORAGE			
P 3			400	360	40	CLAY STORAGE			
P 4			400	360	40	CLAY STORAGE			
P 5			390	350	40	RENUMBERED P38			
P 6			380	280	100	CLAY & DEBRIS			
P 7			380	280	100	CLAY & DEBRIS			
P 8			380	270	110	RENUMBERED P22			
P 9			400	380	20	CLAY STORAGE			
P10	SA	C	400	340	60	UNUSED		372.9	373.13
P11	SA	C	380	340	40	UNUSED		349.8	349.9
P12	SA	C	360	330	30	UNUSED		346.12	346.3
P13		C	380	300	80	WATER STORAGE			
P14			390	310	80	RENUMBERED P22			
P15			390	340	50	RENUMBERED P19			
P16			390	250	140	RENUMBERED P43			
P17			390	240	150	RENUMBERED P23			
P18			390	240	150	RENUMBERED P23			
P19			390	260	130	RENUMBERED P27			
P20			390	280	110	RENUMBERED P33			
P21			380	240	140	CLAY STORAGE			
P22			380	270	110	RENUMBERED P34/35			
P23			390	240	150	RENUMBERED P43			
P24			390	250	140	RENUMBERED P30			
P25			390	270	120	RENUMBERED P30			
P26			390	210	180	RENUMBERED P31			
P27	SA	C	390	250	160	WATER STORAGE		307.4	314.4
P28	SA	CP	420	360	60	WATER STORAGE	A	402.7	398.2
P29			430	420	10	UNUSED			
P30			390	240	150	RENUMBERED P32/33			
P31			390	210	180	RENUMBERED P36/37			
P32			390	290	100	RENUMBERED P36			
P33			390	240	150	RENUMBERED P43			
P34			380	270	110	CLAY & DEBRIS			
P35			380	270	110	RENUMBERED P42			
P36			390	220	170	RENUMBERED P43			
P37			390	210	180	RENUMBERED P43			
P38			390	250	140	RENUMBERED P44/45			
P39			410	380	30	INACTIVE MINING	B		
P40	SA	C	390	260	130	WATER STORAGE		287.4	334.4
P41	SA	CP	410	370	40	WATER STORAGE	A	398.7	402.8
P42	SA	CP	380	310	70	ACTIVE MINING	B	283.1	283.3
P43		N	390	240	150	WATER & CLAY			
P44	SA	CP	390	250	140	WATER STORAGE		323.3	323.2
P45		CP	380	310	70	WATER STORAGE			

SA = Semiannual
C = in contact with GW levels
CP = GW contact but subject to pumping
N = no contact with GW.

TABLE 3.5-2
ZONE 7 WATER AGENCY
WATER QUALITY RESULTS FOR MINING AREA WATER SAMPLES
2010 Water Year

		TEMP.	EC		Mineral Constituents (mg/L)									Select Metals (mg/L)				TDS	Hard
SITE ID	DATE	°C	umhos/cm	pH	Ca	Mg	Na	K	HCO3	SO4	Cl	NO3	SiO2	B	As	Fe	Mn	mg/L	mg/L
MA-C01	26-Oct-10	19.0	1303	8.9	22	81	164	4.1	345	90	206	<0.44	7.8	1.1	0.013	0.22	0.017	770	390
MA-K15	26-Oct-10	20.4	704	8.4	29	35	67	3.6	207	47	95	<0.44	8.9	0.46	0.0042	0.056	<0.01	392	217
MA-K18	26-Oct-10	19.4	475	8.2	33	20	36	2.5	190	29	34	<0.44	7.7	0.25	0.0013	<0.05	0.021	258	164
MA-K28	26-Oct-10	20.4	925	8.2	28	56	82	2.2	292	52	120	<0.44	12.6	0.79	0.0023	1.1	0.066	501	302
MA-K30	26-Oct-10	20.9	1823	8.7	24	102	212	2.9	317	161	350	<0.44	2.7	2.14	0.012	1.3	0.036	1025	480
MA-K37	26-Oct-10	20.9	938	8.5	24	60	95	2.6	281	60	138	<0.44	3.5	0.93	0.0044	0.38	0.012	530	308
MA-P10	26-Oct-10	17.8	504	7.7	39	17	41	2.4	180	29	42	<0.44	14.0	0.27	<0.001	0.19	0.063	274	169
MA-P11	26-Oct-10	14.0	515	7.7	38	17	45	2.7	168	29	60	<0.44	15.2	0.24	0.001	0.06	0.031	290	166
MA-P12	26-Oct-10	19.1	507	8.0	40	19	37	2.6	204	26	37	<0.44	10.4	0.26	0.0016	0.12	0.057	274	180
MA-P27	26-Oct-10	20.0	672	8.5	32	35	53	1.6	163	52	97	<0.44	7.5	0.45	0.0023	0.081	0.013	363	224
MA-P28	26-Oct-10	19.8	879	8.3	25	46	87	2.7	199	49	141	<0.44	5.0	0.41	0.0049	0.25	0.011	457	254
MA-P40	12-May-10	20.1	664	9.9	17	38	65	0.6	112	35	89	0.80	0.5	0.56	0.003	1.4	0.035	385	197
MA-P41	12-May-10	21.3	765	8.5	45	32	55	2.4	215	35	93	0.44	3.5	0.26	0.0024	<0.05	0.032	379	245
MA-P42	12-May-10	20.9	691	8.2	57	23	47	1.6	230	35	71	0.49	13.9	0.31	0.0012	0.15	0.038	366	236
MA-P44	12-May-10	21.0	655	8.4	49	23	50	2.1	179	41	82	<0.44	9.2	0.34	0.0012	0.15	<0.01	349	216
MA-R03	12-May-10	18.8	769	8.7	38	41	50	3.4	218	42	89	<0.44	8.5	0.35	0.0017	1.5	0.05	389	266
MA-R04	12-May-10	17.5	779	8.5	40	43	48	2.2	233	41	87	1.37	7.9	0.35	0.0018	0.73	0.084	392	276
MA-R22	12-May-10	18.7	793	8.5	42	47	47	2.2	253	41	84	4.25	12.4	0.34	0.0018	1.	0.032	412	298
MA-R23	12-May-10	18.6	751	8.7	36	45	46	2.0	234	40	87	2.04	8.4	0.33	0.002	0.25	0.079	393	276
MA-R24	12-May-10	21.3	685	10.0	14	43	60	0.8	89	36	96	<0.44	<1.1	0.39	0.0023	0.4	0.02	377	212
MA-R28	12-May-10	23.3	567	8.8	33	35	45	1.8	224	30	51	0.44	10.6	0.26	0.0026	2.8	0.13	330	225

TABLE 3.6-1
ZONE 7 WATER AGENCY

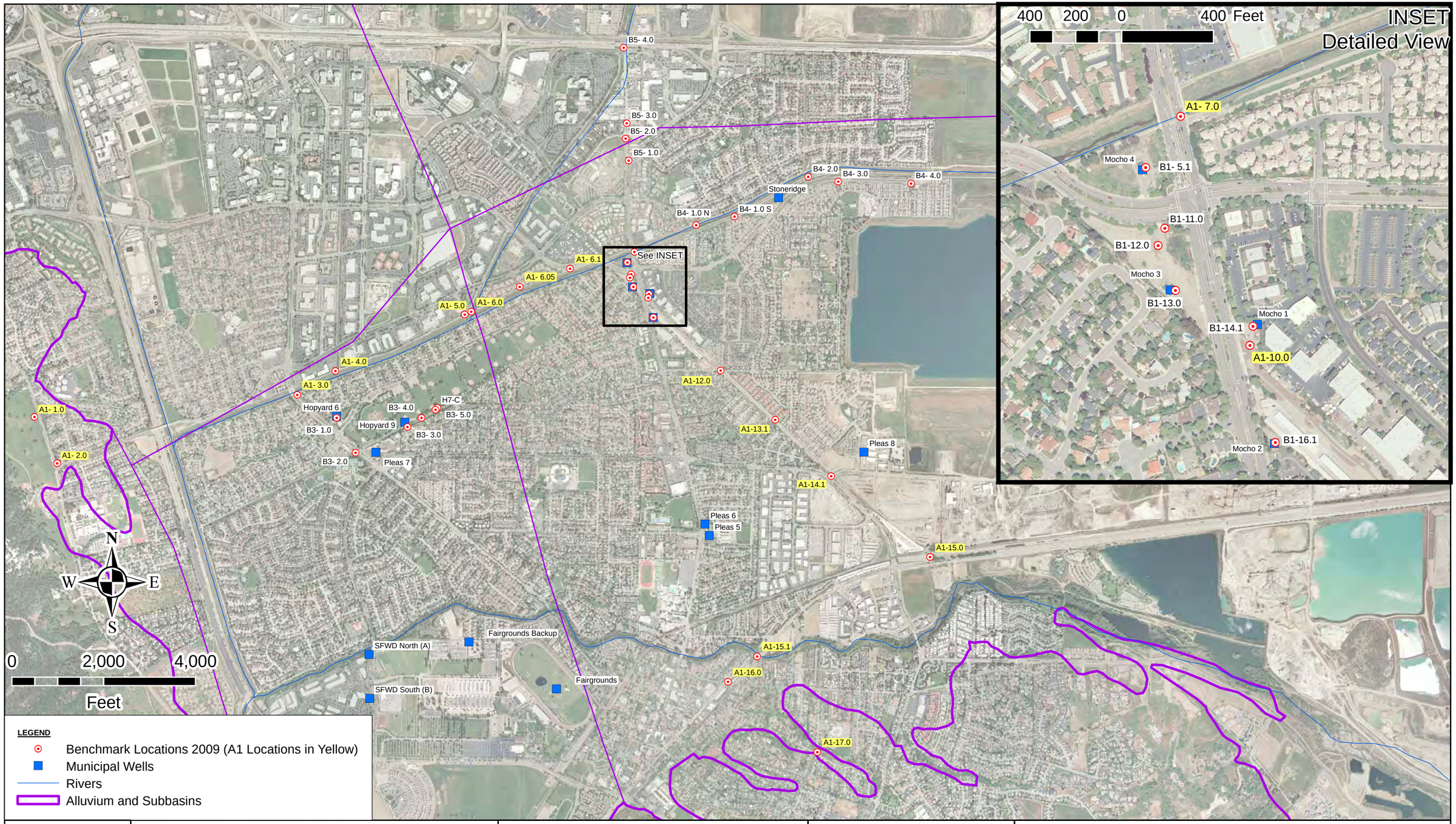
LAND USE ACREAGE BY MAIN BASIN NODE
AND LAND USE TYPE
2010 WATER YEAR
NEAREST 10 ACRES

LAND USE TYPE NUMBER	1	1.1	2	3	4	5	6	7	7.1	7.2	8	9	10	11	12	13	14	15	
	URBAN		**IRRIGATED/AGRICULTURAL**				**Non Irrigated**	**GRAVEL MINING AREA**							**GOLF COURSES**				
NODE	POTABLE WATER **Urban**	RECLAIMED WATER **UrbanRec**	METERED GROUNDWATER **AgMetGW**	UNMETERED GROUNDWATER **AgUnMGW**	METERED SURFACE WATER **AgMetSW**	RECLAIMED WASTEWATER **AgRec**	UNCLASSIFIED LAND **NonIrr**	TOTAL WET **MAPonded**	PONDED WATER (subset)	PONDED WET SILT (subset)	RECLAIMED **MARec**	URBAN **MAUrban**	AGRICUL-TURAL **MAAg**	OTHER **MAOther**	METERED GW **GolfMetGW**	UNMETERED GW **GolfUnMGW**	METERED SW **GolfMetSW**	RECLAIMED WASTEWATER **Golf Rec**	**TOTAL NODE**
15	410		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410
16	470		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	470
17	280		0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	300
18	680		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680
19	460		0	0	0	0	240	0	0	0	0	0	0	0	0	0	0	0	700
20	270		0	0	0	0	180	0	0	0	0	0	0	0	80	0	0	0	530
23	410		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410
24	500		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500
25	550		0	0	0	0	20	0	0	0	60	160	0	90	0	0	0	0	880
26	670		0	0	0	0	60	150	150	0	20	0	0	50	0	0	0	0	950
29	20		0	0	0	0	270	0	0	0	0	0	0	0	0	10	0	90	390
30	30		0	10	0	0	150	260	250	10	120	0	0	140	0	0	0	10	720
31	40		0	0	0	0	0	330	270	60	330	0	0	510	0	0	0	0	1210
33	100	10	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	30	160
34	190	40	0	0	0	0	260	70	70	0	20	0	0	100	0	0	0	0	680
35	930	10	0	0	70	0	30	210	200	10	250	0	0	850	0	0	10	0	2360
36	530		0	20	430	0	530	50	50	0	0	0	0	140	0	0	50	0	1750
38	660	10	0	30	0	0	170	0	0	0	0	0	0	0	0	0	0	0	870
39	1840		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1840
40	240		0	0	270	0	400	0	0	0	0	0	0	0	0	0	0	0	910
41	0		0	10	230	0	1380	0	0	0	0	0	0	0	0	0	0	0	1620
42	570		0	0	60	0	60	0	0	0	0	0	0	0	0	0	0	0	690
TOTAL	**9850**	**70**	**0**	**70**	**1060**	**0**	**3790**	**1070**	**990**	**80**	**800**	**160**	**0**	**1880**	**80**	**10**	**60**	**130**	**19030**
% AREA OF TOTAL	52%	0%	0%	0%	6%	0%	20%	6%	5%	0%	4%	1%	0%	10%	0%	0%	0%	1%	100%

Urban:Potable & Recl	9,920	acres	AgMetSW + GolfMetSW: Main Basin	1289	acres
Golf	280	acres	AgMetSW + GolfMetSW: Outside Main Basin	2875	acres
Mining Area: Urban	160	acres	Total Metered SW Area	4164	acres
TOTAL URBAN	**10,360**	acres	Ratio: Met. SW Main Basin/Total Met. SW	**31%**	

TOTALS

Urban & Golf	10200	acres	54%
Irrigated Ag	1130	acres	6%
Unclassified	3790	acres	20%
Mining Area	3910	acres	21%



ZONE 7 WATER AGENCY 100 North Canyons Parkway Livermore, CA	DRAWN: MG/CW/TR	SCALE: 1 in = 2,000 ft INSET SCALE: 1 in = 400 ft
	REVIEWED: TR	DATE: May 27, 2011
	FILE: E:\MONITOR\EM\2010wy\Annual\Figures\Fig3.4-1-EMBasemap.mxd	

Figure 3.4-1
Benchmark Locations
2010 Subsidence Monitoring Program
Livermore Valley Groundwater Basin

Figure 3.4-2
Cumulative Land Surface Elevation Changes Since Start of Program
Bernal Subbasin

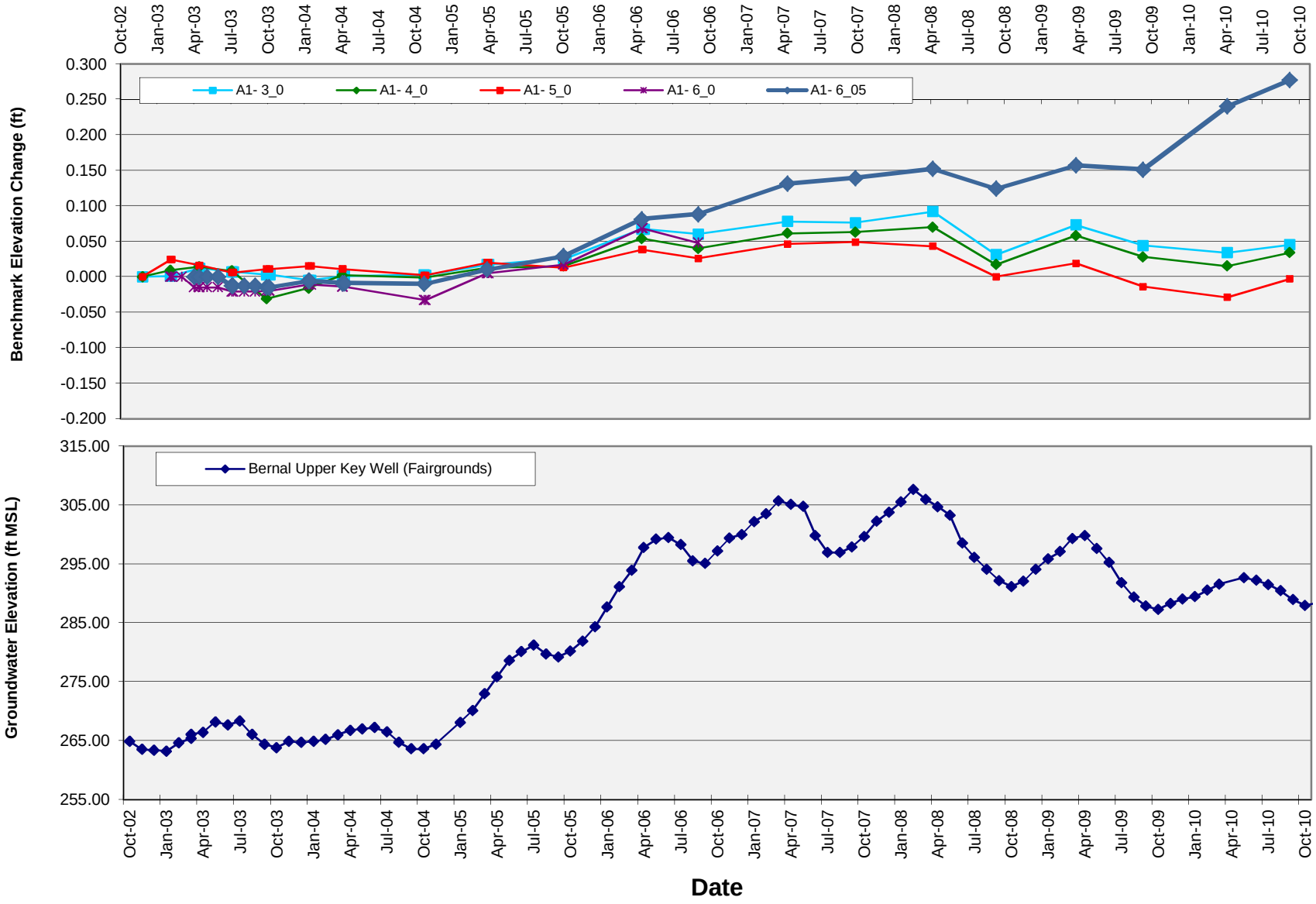


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Figure 3.4-3
Cumulative Land Surface Elevation Changes Since Start of Program
Amador Subbasin

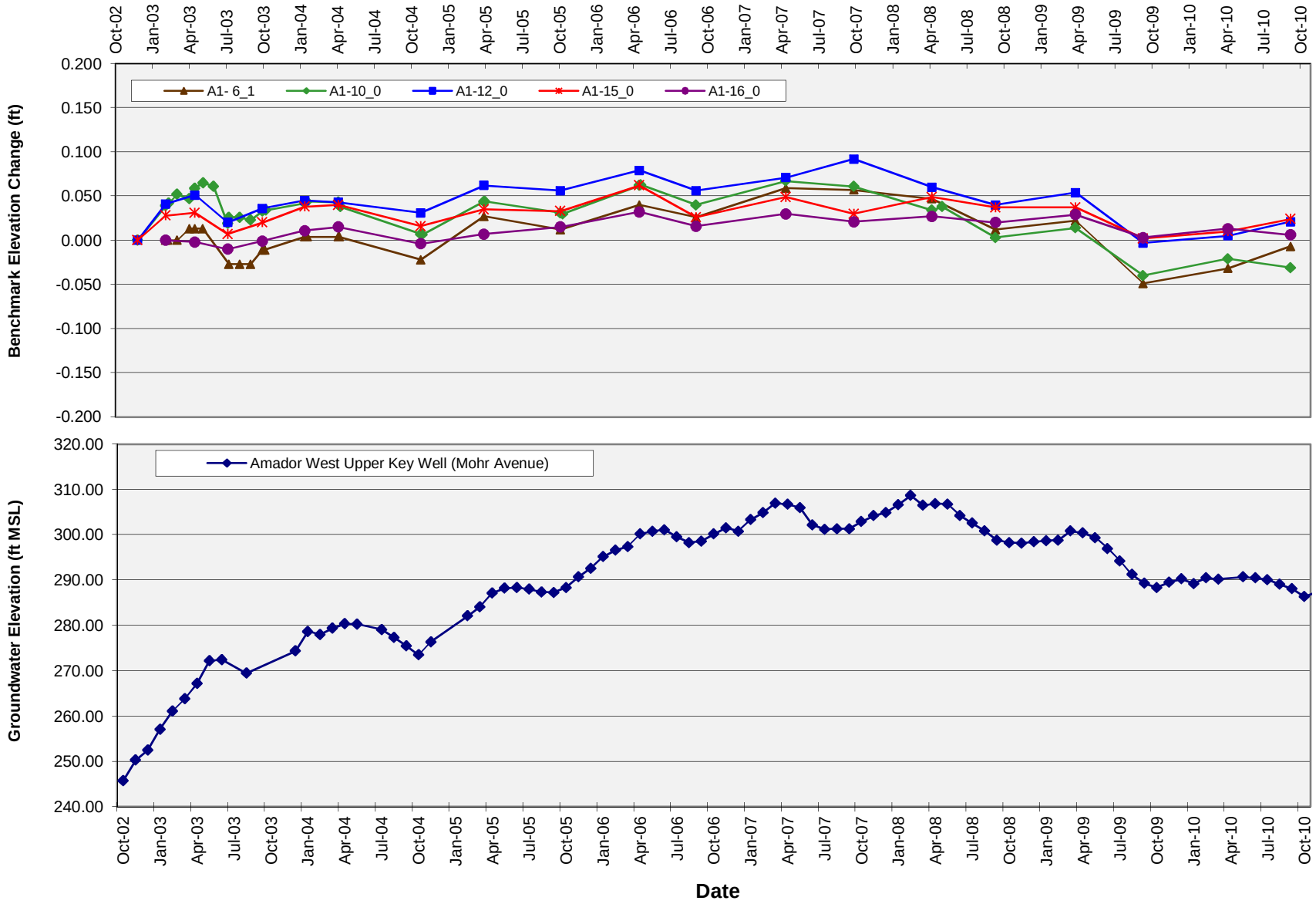

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Figure 3.4-4
Graphs of Land Surface Elevation and Groundwater Elevation Versus Time
Bernal Subbasin - Hopyard 6 Well

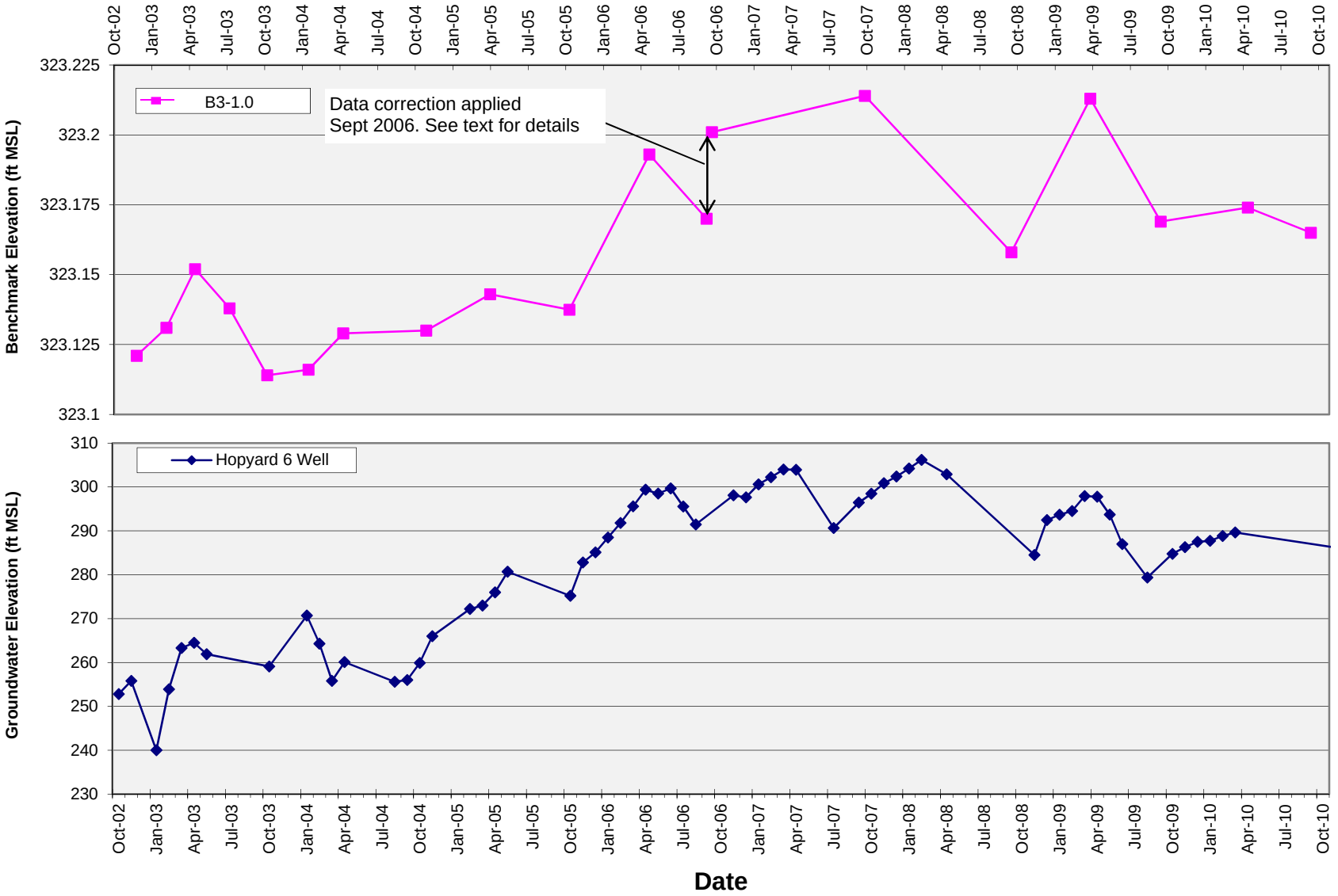


Figure 3.4-5
Graphs of Land Surface Elevation and Groundwater Elevation Versus Time
Amador Subbasin - Mocho Wellfield

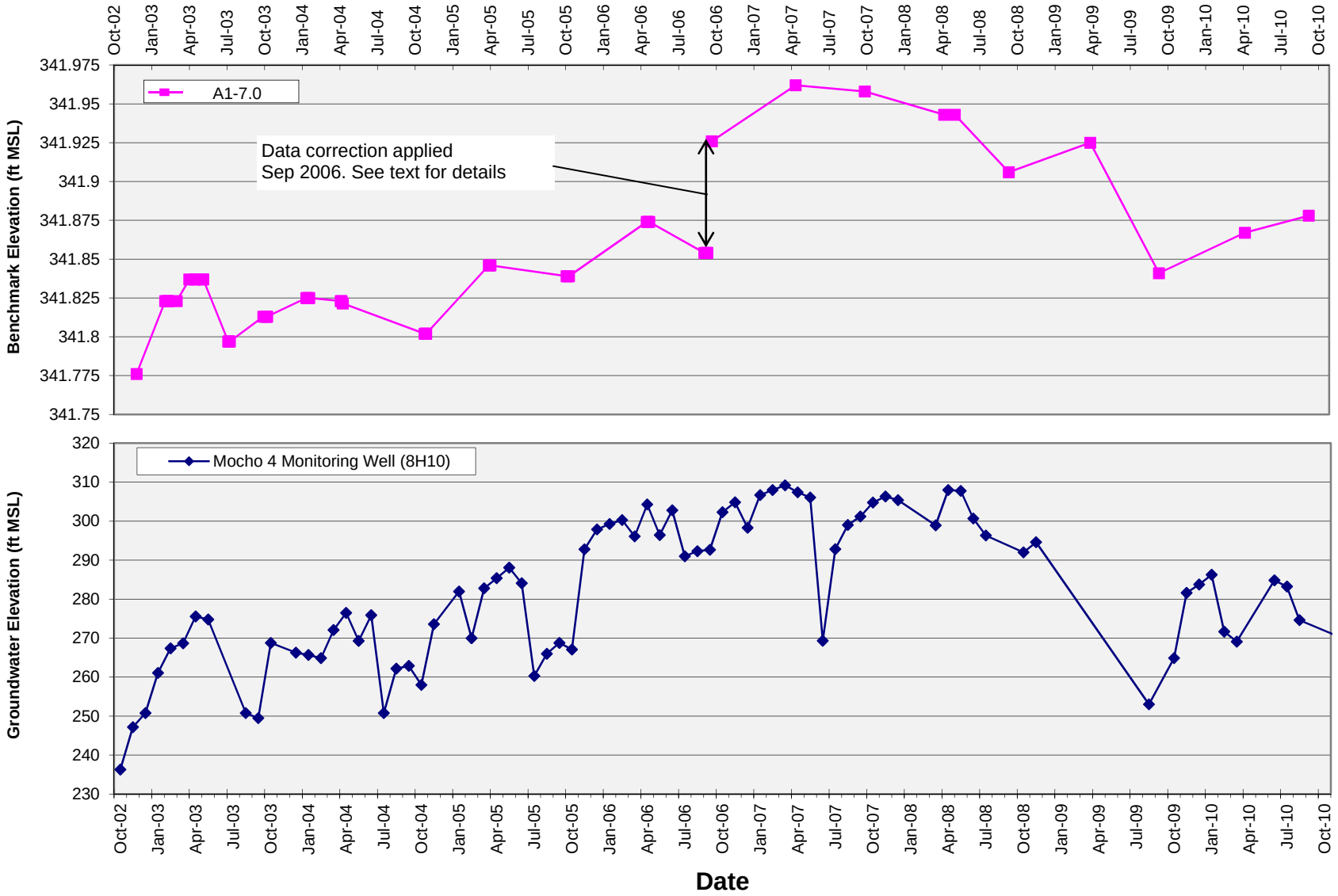
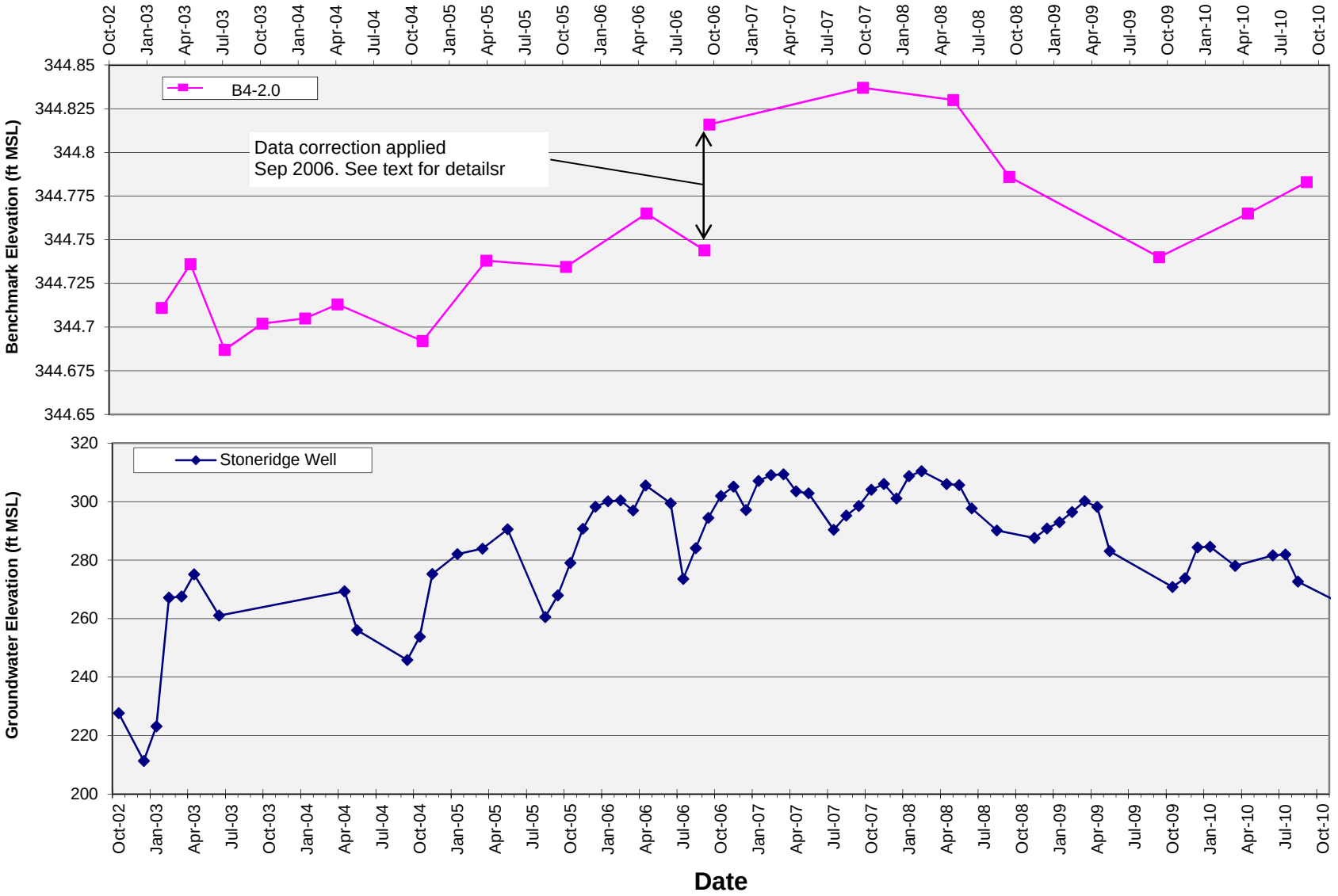
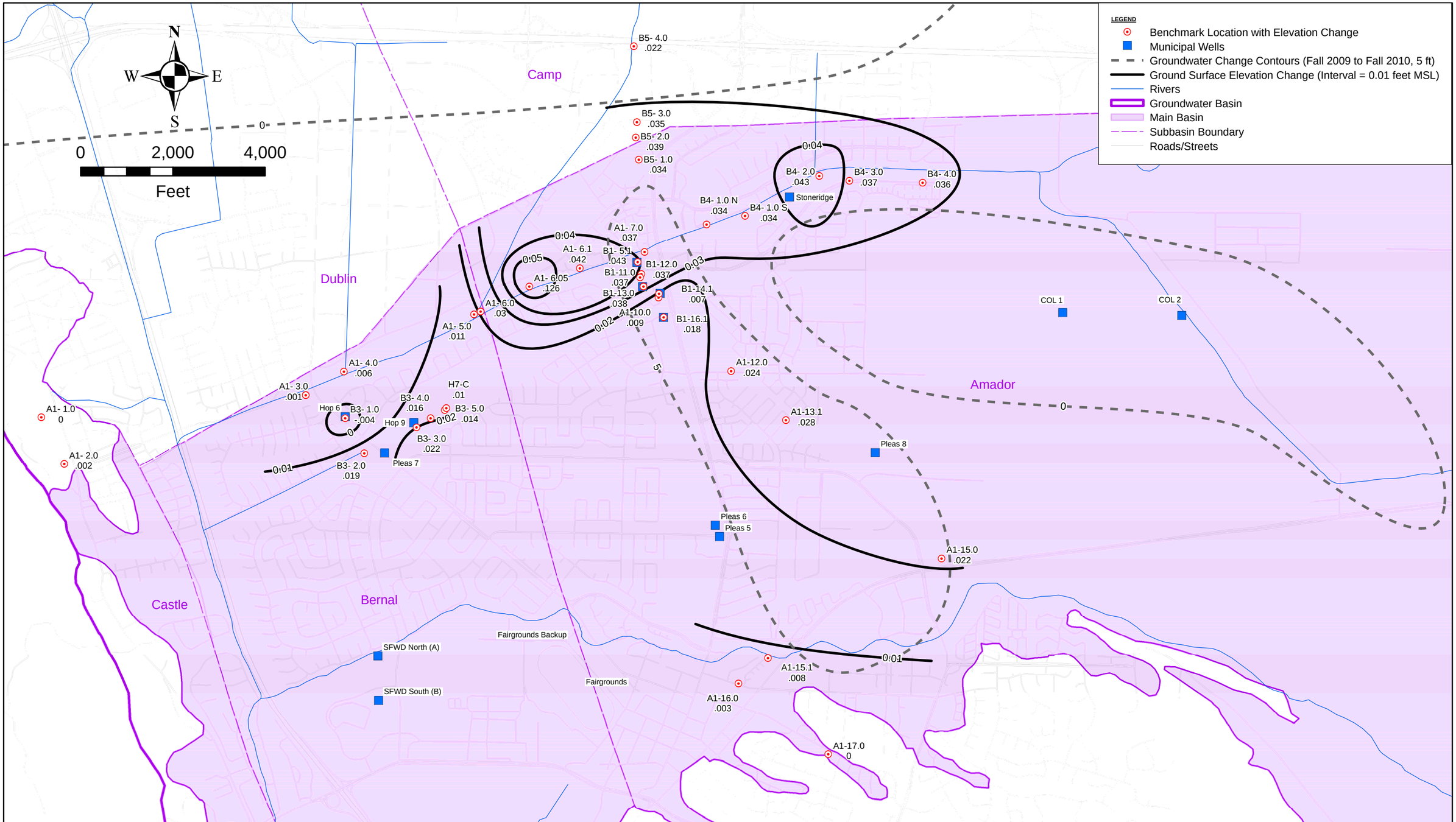
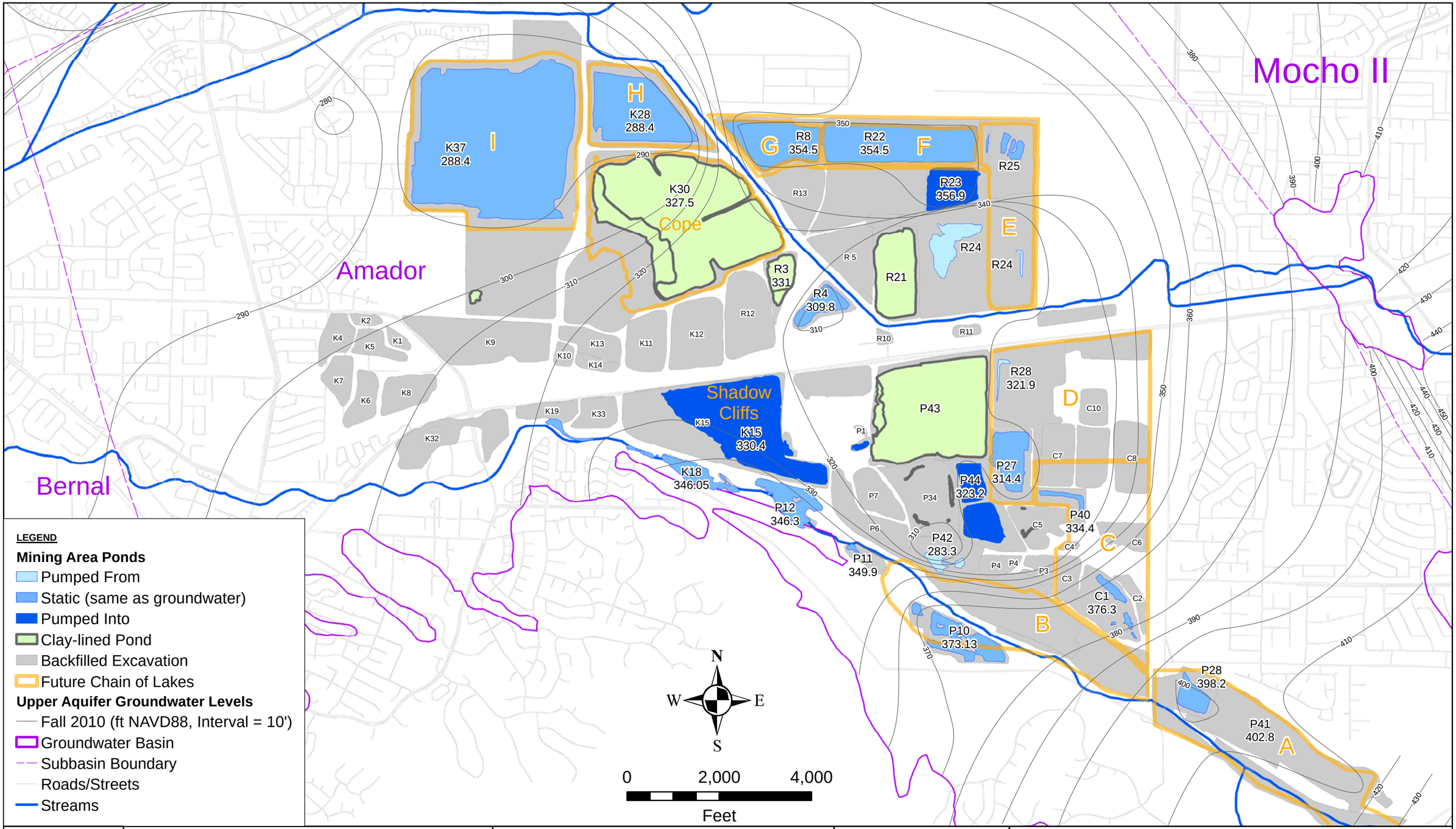


Figure 3.4-6
Graphs of Land Surface Elevation and Groundwater Elevation Versus Time
Amador Subbasin - Stoneridge Well





ZONE 7 WATER AGENCY 100 North Canyons Parkway Livermore, CA	DRAWN: TR/MG/CW	SCALE: 1 in = 2,000 ft	**Figure 3.4-7** **Ground Surface Elevation Change (ft)** **Fall 2009 to Fall 2010** **Livermore Valley Groundwater Basin**
	REVIEWED: TR	DATE: June 6, 2011	
	FILE: E:\MONITOR\EM\2010wy\Annual\Fig3.4-7-EMFall09toFall10.mxd		



LEGEND

Mining Area Ponds
- Pumped From
- Static (same as groundwater)
- Pumped Into
- Clay-lined Pond
- Backfilled Excavation
- Future Chain of Lakes

Upper Aquifer Groundwater Levels
- Fall 2010 (ft NAVD88, Interval = 10')
- Groundwater Basin
- Subbasin Boundary
- Roads/Streets
- Streams

ZONE 7 WATER AGENCY
100 North Canyons Parkway
Livermore, CA

DRAWN: TR	SCALE: 1 in = 2,000 ft
REVIEWED: TR	DATE: June 3, 2011
FILE: E:\MONITOR\MA\2010WY\Fig3.5-1-MiningArea2010.mxd	

Figure 3.5-1
Location of Gravel Mining Pits
2010 Water Year
Livermore Valley Groundwater Basin

EXPLANATION

NODE NUMBER — NODE BOUNDARY — MAIN BASIN / NODE BOUNDARY — MAIN BASIN NODE NUMBER

(46, 47)

LAND USE CATEGORIES

URBAN

- URBAN RECYCLED WATER
- GOLF COURSE GROUNDWATER
- GOLF COURSE SURFACE WATER
- GOLF COURSE RECYCLED WATER

IRRIGATED AGRICULTURE — BY PRIMARY IRRIGATION SOURCE

- GROUNDWATER
- SURFACE WATER

MINING AREA

- LAKES
- WET CLAY
- RECYCLED URBAN MINING

N

0' 3000' 6000'

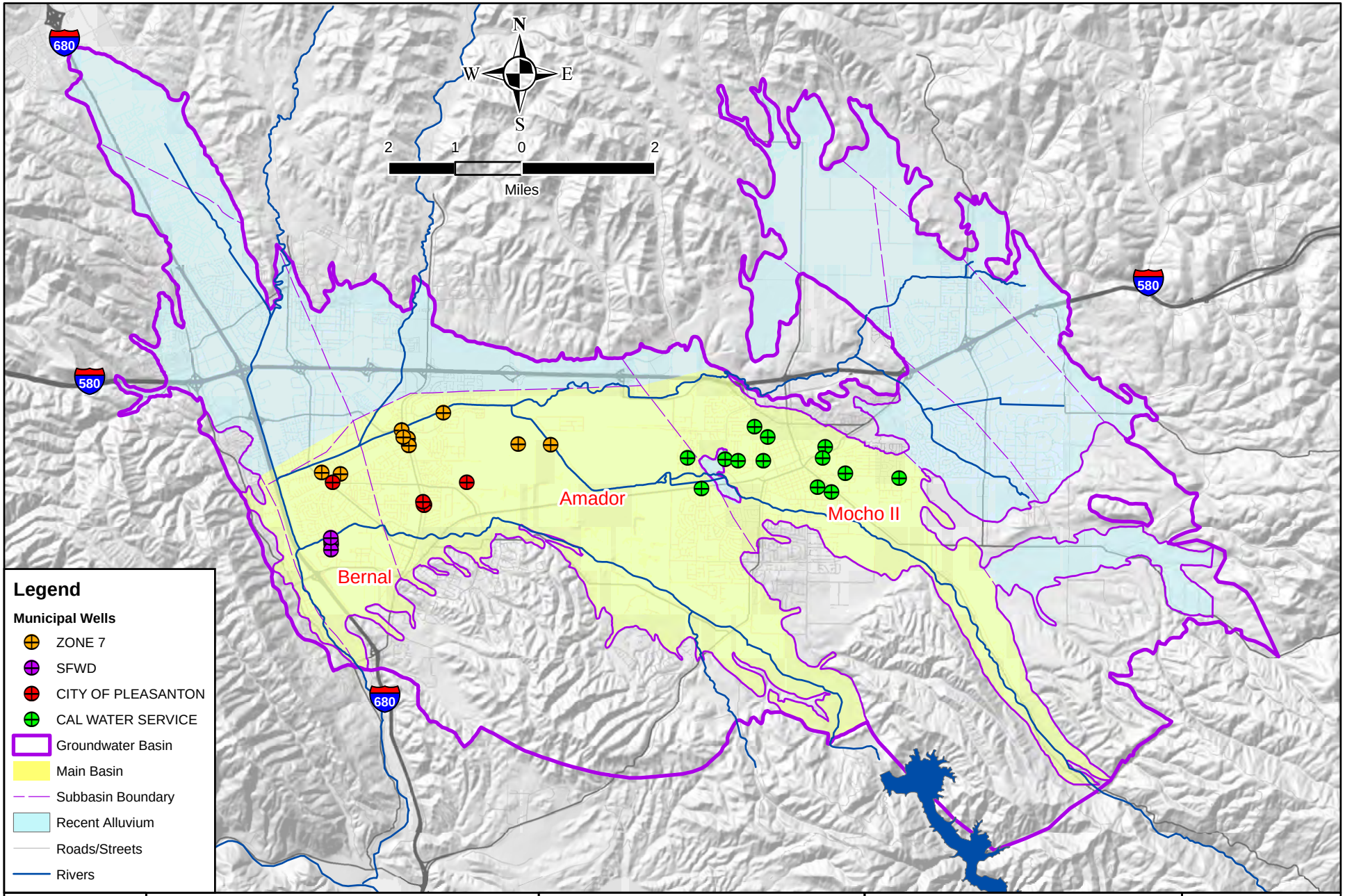
SCALE

ZONE 7 WATER AGENCY

100 NORTH CANYONS PKWY, LIVERMORE, CA

DRAWN	Tom Rooze
DESIGNED	TODD WENDLER
CHECKED	Tom Rooze
APPROVED	
SCALE	1" = 6000'
DATE	May 30, 2011
FILE NO.	E:\MONITOR\Land Use\2010WY\ Fig3.6-1-LUMap2010.wor

FIGURE 3.6-1
LIVERMORE VALLEY LAND USE 2010 WATER YEAR



ZONE 7 WATER AGENCY
100 North Canyons Parkway, Livermore, CA

DRAWN: TR

REVIEWED: TR

File: E:\MONITOR\MUNI\2010WY\
Fig3.7-1-BasinSubbasins.mxd

LOCATIONS OF SUB-BASINS AND MUNICIPAL WELLS

Scale: 1" = 2 Miles

Date: May 30, 2011

FIGURE 3.7-1