Bighorn-Desert View Water Agency

Reche Spreading Grounds Recharge Feasibility Study

February 2011

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February 2011

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1. INTRODUCTION

1.1 Background

The Bighorn-Desert View Water Agency (BDVWA) is located in the western Mojave Desert of San Bernardino County (also known as the High Desert). Groundwater is the primary source of water supply in the region, but increasing water demand is expected to stress limited groundwater resources in the future. BDVWA's service area includes most of the Pipes and Reche groundwater subbasins (Study Area), two of seventeen subbasins that comprise the greater USGS Morongo Groundwater Basin and are also included in the DWR Ames Valley Groundwater Basin.

During 2007 and in cooperation from Mojave Water Agency (MWA), BDVWA completed a comprehensive evaluation of hydrogeologic conditions and an assessment of water supply and demand for three High Desert groundwater basins, including the Ames Valley Groundwater Basin (Kennedy/Jenks/Todd LLC, 2007). The scope of the 2007 study was divided into two interrelated tasks: 1) the development of a basin conceptual model describing the basin geology and geometry, groundwater recharge and discharge sources, aquifer parameters, and groundwater occurrence, flow, and quality over time; and 2) an assessment of current and future water supply and demand under varying future climatic conditions. The combination of these two components provided the scientific basis to support future groundwater management decisions.

Results of the 2007 regional study demonstrated the need to augment the water supply of the Ames Valley Basin to satisfy future water demands. Specifically, the study identified an opportunity for a conjunctive use project in the Reche Subbasin involving surface recharge of imported State Water Project (SWP) water delivered through the Morongo Basin Pipeline within Pipes Wash, a dry alluvial wash that traverses the Study Area.

BDVWA initiated the Reche Spreading Grounds Recharge Feasibility Study (Study) to further evaluate the feasibility of implementing a conjunctive use project at the proposed Pipes Wash recharge area, herein referred to as the Reche Spreading Grounds.

1.2 Hydrogeologic Setting

The Pipes and Reche subbasins represent two of seventeen subbasins that comprise the greater USGS Morongo Groundwater Basin (Stamos et al., 2004). The two subbasins are also included in the DWR Ames Valley Groundwater Basin (DWR, 2004) (Figure 1). The region is tectonically active and is characterized by numerous primarily northwest-trending geologic faults that serve as partial barriers to groundwater flow. As shown in Figure 2, the Pipes Subbasin is separated from the neighboring Reche Subbasin to the east by two geologic faults, the Johnson

Valley Fault in the north and inferred Pipes Barrier in the south. Bedrock outcrops of the Little San Bernardino Mountains form the western and southern boundaries of the Pipes Subbasin. The Reche Subbasin is separated from neighboring subbasins by the Johnson Valley Fault and inferred Pipes Barrier to the west, the Kickapoo Fault to the north, and Homestead Valley Fault to the east. A groundwater divide forms the southern subbasin boundary, while bedrock outcrops represent the remaining boundaries.

Consolidated, pre-Tertiary rocks comprise the bedrock underlying the basin fill deposits of the Pipes and Reche subbasins. Bedrock is generally considered to be non water-bearing and constitutes the basin floor. As a result of historical faulting in the area, the elevation of bedrock across the subbasin is highly variable but generally ranges from 300 to 600 feet below ground surface (bgs). Basin fill deposits are represented by Tertiary and Quaternary alluvial and fluvial deposits, including interbedded layers of unconsolidated to semi-consolidated gravel, sand, silt, and clay.

Natural recharge to the Pipes and Reche subbasins is represented primarily by subsurface inflow fed by runoff generated in the upland areas of the adjacent San Bernardino Mountains, where average annual precipitation ranges from 6 to 16 inches. Runoff percolates through the permeable alluvial sediments to the water table and enters the Pipes Subbasin as groundwater. Subsurface inflow is concentrated beneath three dry washes – Pipes Wash, Whalen's Wash, and an unnamed wash associated with Ruby Mountain Creek (Figure 3). Recharge from precipitation that falls directly on the groundwater basin area is considered negligible due to low precipitation (about 4 inches per year) and high evaporation rates.

Groundwater flows in an east/northeast direction across the Pipes and Reche subbasins and exits through specific areas along the Homestead Valley Fault to the Giant Rock Subbasin (Figures 2 and 4). Clay gouge and low permeability zones associated with the Johnson Valley Fault and Pipes Barrier impede groundwater flow from Pipes Subbasin to Reche Subbasin, although groundwater does seep through these partial barriers. The Homestead Valley Fault similarly impedes groundwater flow from the Reche Subbasin to the Giant Rock Subbasin.

Groundwater has served as the sole source of water supply historically in the Study Area. Service areas for three water agencies overlie portions of the Pipes and Reche subbasins, including BDVWA, HDWD, and CSA 70 W-1 (Figure 5). In addition to the water service providers, a small amount of groundwater is pumped from private wells. Several commercial water haulers purchase water from BDVWA and serve outlying areas. Also shown on Figure 5 is the Morongo Basin Pipeline, which conveys SWP water through the High Desert region.

For the past several decades, groundwater pumping has been the major outflow of groundwater from the Pipes and Reche subbasins. BDVWA is the only major pumper in the Pipes Subbasin, while BDVWA, HDWD, and CSA 70 W-1 represent the major pumpers in the Reche Subbasin. Since routine groundwater level monitoring began in 1990, groundwater level declines have been observed in municipal production wells. Most of the total groundwater level decline in the subbasin occurred from 1993 to 1999 due to increased groundwater production during those years. Since 1999, the average rate of groundwater level declines has decreased in response to decreased groundwater production.

Groundwater quality in the Reche Subbasin is generally high, as represented by average total dissolved solids (TDS) concentrations of less than 300 milligrams per liter (mg/L). No elevated concentrations of inorganic or organic constituents above drinking water standards were identified from available groundwater quality data prior to this Study.

1.3 Study Objectives

The primary purpose of this Study was to evaluate the feasibility of recharging up to 1,500 acre-feet per year (AFY) of imported SWP water through the Reche Spreading Grounds. The 1,500 AFY represents the maximum amount of SWP water likely to be available for recharge in the Reche Subbasin. Specific project objectives included the following:

1. Characterize subsurface conditions beneath the Reche Spreading Grounds to determine the feasibility of long-term infiltration of SWP water
2. Evaluate the hydraulic impacts of recharge operations at various rates and schedules, including water table mounding beneath the spreading grounds and groundwater flow to downgradient discharge points
3. Characterize groundwater quality establishing baseline conditions to evaluate future water quality impacts from recharge operations
4. Identify regulatory permit requirements to construct and operate the Reche Spreading Grounds

1.4 Scope of Work

The scope of work for this Study was divided into the following tasks: 1) conduct a field investigation to characterize the geologic and groundwater conditions in the vicinity of the Reche Spreading Grounds and 2) develop a numerical groundwater flow model to evaluate potential groundwater impacts from recharge operations, including identification of groundwater flow paths and fate of recharged water, and 3) communicate with regulatory agencies having oversight responsibilities for the proposed recharge project to identify permitting requirements.

The field investigation task was comprised of the following technical components:

1. Drill two deep exploratory soil borings and complete each soil boring as a 4-inch diameter, PVC groundwater monitoring well for future monitoring of water levels and quality.

2. Record lithology of formation samples collected during drilling and laboratory analyze selected formation samples to estimate hydraulic properties of the vadose zone beneath the proposed Reche Spreading Grounds.
3. Perform aquifer pumping tests on water supply well HDWD 24 (using one of the new monitoring wells as an observation well) to confirm hydraulic properties including aquifer transmissivity, hydraulic conductivity, and storativity.
4. Collect and analyze groundwater quality samples from both monitoring wells to establish baseline groundwater quality conditions

Figure 6 shows the locations of the two soil borings/monitoring wells (BDVWA MW1 and MW2) and HDWD 24 in relation to the proposed Reche Spreading Grounds. Also shown on the figure are the limits of environmental and biological surveys performed previously in support of this Study.

BDVWA MW1 was drilled primarily to identify the lithologic and hydraulic properties of the vadose zone in beneath the Reche Spreading Grounds. Selected formation samples were submitted to a laboratory for hydraulic testing, and the soil boring was subsequently completed as a monitoring well to confirm the current depth to groundwater and to allow for future monitoring of groundwater levels and water quality. An initial water quality sample was obtained from BDVWA MW1 and laboratory analyzed to characterize the ambient groundwater quality and establish baseline conditions to evaluate potential water quality impacts of recharge operations.

BDVWA MW2 was drilled and installed approximately 38 feet west of HDWD 24, an active water supply well located approximately 4,300 feet northeast (downgradient) of the Reche Spreading Grounds. BDVWA MW2 was drilled in close proximity to HDWD 24 to serve as an observation well during aquifer testing of HDWD 24. A water quality sample was obtained from BDVWA MW2 and analyzed to characterize the water quality at this location.

Results of the field investigation were evaluated and incorporated with other hydrogeologic information in a numerical groundwater flow model of the Pipes and Reche subbasins constructed using the MODFLOW code to complete the recharge feasibility analysis. The model area is shown on Figure 7. The groundwater flow model includes variable aquifer thickness and hydraulic conductivity, hydraulic barriers represented by faults, and time-varying subsurface inflow, septic return flow, production well pumping, and outflow from the Pipes and Reche subbasins. The model was calibrated to steady-state and transient flow conditions and then used to predict water table mounding response to different recharge volumes. Groundwater flowpaths from the recharge site to downgradient areas including local water supply wells were simulated to assess fate of the recharged water.

2. WELL DRILLING, CONSTRUCTION AND DEVELOPMENT

To characterize the geologic and groundwater conditions in the vicinity of the Reche Spreading Grounds, two deep exploratory soil borings were drilled and completed as 4-inch diameter groundwater monitoring wells (BDVWA MW1 and MW2). Selected formation core samples were submitted to a laboratory for analysis of hydraulic properties relevant to the recharge feasibility analysis. Well drilling, construction, and development activities, as well as subsurface conditions encountered and results of hydraulic property testing are described in this section.

2.1 Pre-Drilling Activities

On Monday August 2, 2010, preliminary well drilling sites were verified in the field by staff from Todd Engineers, BDVWA's biological consultant, Circle Mountain Biological Consultants, Inc., BDVWA, and HDWD. Final drilling sites were chosen based on geologic and hydrogeologic criteria, property access, and biological considerations. Final locations for BDVWA MW1 and MW2 are shown on Figure 6. BDVWA MW1 is located approximately 150 feet from the southeastern edge of Pipes Wash. BDVWA MW2 is located approximately 35 feet due west from HDWD 24.

Prior to field mobilization, drilling permits were obtained from San Bernardino County Health Department (Appendix A), and land access was granted by the U.S. Department of the Interior, Bureau of Land Management.

The Study Area includes critical habitat of the endangered Desert Tortoise. As such, protective measures described in the Technical Memorandum *Biological monitoring during well exploratory activities* (Circle Mountain Biological Consultants, Inc., August, 2010) were also taken to ensure no harm to habitat or animals during the field investigation. Protective measures included installation and maintenance of a tortoise fence around each drilling site, and protocol for entry to and exit from the drilling site. All onsite workers reviewed the technical memorandum and attended a protective measures training workshop on August 16, 2010, prior to commencing field activities.

2.2 Technical Approach

The sonic method was chosen to drill the two deep soil borings and install the monitoring wells. The sonic drilling method is known by several names including Rotasonic, Rotosonic, Sonicore, Vibratory, or Resonant Sonic drilling. Sonic drilling is a "dry" drilling method, meaning no materials (air, fluid, or additives) are added to the borehole during drilling. Sonic drilling is a dual-cased drilling system that uses high frequency mechanical vibrations to advance flush-threaded casing while collecting continuous, relatively undisturbed core samples. An added benefit of the sonic drilling method is that there are very few waste products to be disposed of at the completion of the project as nearly all the subsurface materials are preserved in the inner core casing. Because it does not require the use of downhole drilling muds or other fluids, the sonic method also minimizes the time needed for well development.

During sonic drilling for this investigation, an 8-, 9-, or 10-inch diameter outer casing (i.e., drill string) was vibrated into the ground using a sonic drill head to stabilize and hold open the borehole. An inner casing (i.e., 6-inch core casing) was vibrated ahead of the outer casing to collect undisturbed formation materials as the core sample. At 10-foot intervals, the core barrel was brought up to the surface to retrieve the core sample, which was extruded into visqueen sleeves.

2.3 Drilling

On August 16, 2010, Boart-Longyear Drilling Company, Inc. (Upland, CA) mobilized a track-mounted sonic drill rig and support vehicles to the BDVWA MW1 site. The track-mounted rig was necessary to negotiate the soft terrain of Pipes Wash. Initial drilling was conducted between August 16 and August 22, 2010 to a total depth of about 250 feet. However, while placing the cement seal, attempts to remove the 8-inch diameter casing were unsuccessful, and the PVC well casing eventually broke at about 20 feet above the top of the well screen (at a depth of 210 feet). The entire 8-inch diameter casing could not be removed from the borehole even after over-drilling using 9-inch and 10-inch diameter drill casings. Therefore, on September 7, 2010, the soil boring was abandoned and grouted to the surface. Prior to abandonment a borehole destruction permit was obtained from the San Bernardino County Health Department, along with a new drilling permit for the replacement soil boring/monitoring well. BDVWA MW1 was drilled approximately 20 feet northeast of the original location. BDVWA MW1 was drilled and completed to a total depth of 256 feet (and screened from 236 to 256 feet) between September 7 and 11, 2010.

On September 7, 2010, a second truck-mounted sonic drill rig was mobilized to the BDVWA MW2 site. BDVWA MW2 was drilled to a total depth of 348.5 feet and completed to 348.5 feet (and screened from 298 to 348 feet) between September 7 and 16, 2010.

Figure 8 shows the sonic drilling rig setup at both monitoring well locations.

2.4 Subsurface Lithology

The lithology of each section of core sample was recorded and classified according to the Unified Soil Classification System (USCS) Visual Method by a Professional Geologist.

Figure 9 shows the lithologic log for BDVWA MW1, drilled at the site of the proposed Reche Spreading Grounds. Based on collected continuous core samples, subsurface lithology beneath the proposed recharge site is comprised predominantly of clean fine- to coarse-grained sand. Well- to poorly-graded sand (USCS classifications SW and SP) was logged from the ground surface to a depth of 226 feet bgs. A seven-foot thick low-plasticity silt layer (USCS classification ML) was logged from 226 to 232, which was underlain by a 3.5-feet thick silty sand layer (USCS classification SM). Well- to poorly-graded sand was logged from 236 to 256.5 feet bgs, the total depth of the well. The water table in BDVWA MW1 was encountered at 236 feet bgs.

Based on the lithology encountered during drilling, no continuous fine-grained soil layers are present in the upper portions of the vadose zone that could significantly impede vertical infiltration beneath the proposed spreading grounds. Minor pooling of recharge water could occur above the finer-grained silt layer at 226 feet bgs, but recharge water would subsequently infiltrate (albeit at a slower rate) through the silt and/or flow sub-horizontally along the top of the silt before ultimately reaching the water table.

Figure 10 shows the lithologic log for BDVWA MW2, located adjacent to HDWD 24. Similar to BDVWA MW1, subsurface lithology in BDVWA MW2 is also predominantly coarse-grained well- to poorly-graded sand (USCS classifications SW and SP) in the upper 206 feet of the vadose zone. Several thin silty sand and low-plasticity silt layers (USCS classifications SM and ML) were logged in the intervals between 206 and 211 feet bgs (SM), 223 and 227 feet bgs (ML), 255 and 262 feet bgs (ML) and 292 and 303 feet bgs (ML-SM). Well- to poorly-graded sand (USCS classifications SW and SP) was logged from 303 to 348.5 feet bgs, the total depth of the well. The water table in BDVWA MW2 was encountered at 298 feet bgs. Well BDVWA MW2 monitors the uppermost 50 feet of the aquifer under semi-confined conditions.

2.5 Hydraulic Properties of Selected Soil Samples

Selected formation sample cores from BDVWA MW1 were sealed in their respective plastic sleeves and transported under chain-of-custody to Keantan Laboratories (Diamond Bar, CA) for analysis of hydraulic properties relevant to the recharge feasibility analysis, including total and effective porosities and vertical hydraulic conductivity (K_V). Core samples were partially re-molded in the laboratory and, therefore, are not considered undisturbed. However, the laboratory measurements of total and effective porosity and K_V are reasonable estimates. Saturated K_V tests were conducted in accordance with ASTM Standard D 5084 using a permeameter in combination with a constant-head system. Total and effective porosity tests were conducted using the ASTM D 854/2937 and SWRCB test methods, respectively. Prior to performing the measurements, Modified Proctor Compaction tests were performed in accordance with the American Society for Testing and Materials (ASTM) Procedure D 1557.

Selected core samples were chosen to ensure representative subsurface lithologies observed during drilling were characterized. In total, six 2.5-foot sample cores from BDVWA MW1 ranging from 10 to 245 feet were selected for laboratory analyses. Vadose zone samples included the following depth intervals: 10-12.5 feet, 25-27.5 feet, 50-52.5 feet, 100-102.5 feet, and 150-152.5 feet. One sample core (242.5-245 feet) just below the water table was also analyzed.

The results of the laboratory analyses of the six core samples are summarized in Table 1. The laboratory report is presented in Appendix B. As shown in the table, the total and effective porosities and vertical hydraulic conductivity of the six samples are relatively uniform. Total porosity ranges from 41 to 45 percent. Effective porosity ranges from 22 to 23 percent. Vertical hydraulic conductivity ranges from 1.60 to 6.21 feet/day with a mean value of 4.13 feet/day. The lowest hydraulic conductivity value was measured for the deepest sample tested (242.5-245 feet). Overall, the physical property values are consistent with the identified soil types of well- to poorly-graded sand.

2.6 Well Construction

BDVWA MW1 and MW2 were constructed using four-inch diameter, flush-threaded, Schedule 80 PVC casing with 0.020-inch slotted screen. Equipment, well materials, and tools that entered the borehole were steam cleaned by a pressure washer before use. No glues or adhesives were used to connect the casing sections or screen. PVC slip caps were used to cover the top of the well and the bottoms of wells. Filter pack material (washed, graded Monterey No.2/12 Lapis Lustre silica sand) was tremied through the annulus between the drill casing and the well casing as the drill casing was lifted. The filter pack extended five feet above the top of the screen. The level of filter pack in the annulus was verified by tag-line measurement during placement.

The well seal consisted of bentonite pellets and cement-bentonite grout . A three-foot bentonite pellet seal was placed directly above the filter pack. The level of the top of the bentonite seal was verified by tag-line measurement. Adequate time for hydration of the pellets was allowed prior to sealing the remaining annulus with cement-bentonite grout. A tremie pipe was used to slowly emplace the cement-bentonite grout seal in 50-foot lifts while the drive casing was removed. Sealing was continued until grout returned to the ground surface. The seal was allowed to cure for at least 24 hours prior to well development. After the grout had set, it was inspected for shrinkage and additional grout was added, as necessary. Monitoring wells were sealed to the ground surface, and a concrete well pad and locking enclosure was constructed at each well head.

Table 2 summarizes the well construction details for BDVWA MW1 and MW2. As shown in the table, BDVWA MW1 was drilled to a total depth of 257 feet bgs. The groundwater level in BDVWA MW1 was estimated at 236 feet based on the water content of formation samples and observation by the geologist and sounding of the water level in the open borehole. The completed total depth of monitoring well BDVWA MW1 is 256 feet, with a screened interval of 236 to 256 feet. For BDVWA MW1, a three-foot above grade stand pipe was set in a 36-inch square by 6-inch thick concrete pad, surrounded by four steel pipe bollards constructed for protection of the wellhead.

BDVWA MW2 was drilled to a total depth of 348.5 feet. The groundwater level in BDVWA MW2 was estimated at 298 feet based on the water content of formation samples and observation by the geologist and sounding of the water level in the open borehole. The completed total depth of the well was 348 feet, with a screened interval of 298 to 348 feet. BDVWA MW2, was completed at-grade using a flush-mounted well vault set in a 36-inch square by 6-inch thick concrete pad.

2.7 Well Development

The monitoring wells were developed on September 23 and 24, 2010 using a combination of bailing, swabbing, and pumping. Water bailed and pumped from the wells was transported to the BDVWA office in Landers for disposal. Well development records are included in Attachment C. A Smeal Rig with a wire-line winch was used to rapidly bail the wells using a 4-inch diameter by 8- or 5-foot long PVC bailer and swab the wells using a 4-inch diameter surge block. For each well, multiple cycles of bailing and swabbing were performed prior to pumping with a submersible pump. During development of BDVWA MW1, a total of 38 gallons of groundwater were removed by bailing and 200 gallons were removed by pumping. During development of BDVWA MW2, a total of 35 gallons of groundwater were removed by bailing and 338 gallons were removed by pumping. During pumping, water quality parameters including temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation-reduction potential were monitored. In general, the field-measured water quality parameters stabilized rapidly indicating representative water quality samples could be obtained. Water quality samples were obtained from each monitoring well after development and submitted to an analytical laboratory as described in Section 2.5.

2.8 Hydrogeologic Cross Section

Figure 11 shows a hydrogeologic cross-section through the Pipes and Reche subbasins and the proposed Reche Spreading Grounds, including the well profiles of BDVWA MW1 and MW2, HDWD 24, and other wells in the vicinity (the location of the cross section is shown on Figure 6). The cross-section shows the spatial relationship between the alluvial aquifer in the vicinity of the Reche Spreading Grounds, bedrock, the Pipes Barrier, and the water table. As illustrated on the cross-section, the spreading grounds are located downgradient of the Pipes Barrier (a significant barrier to groundwater flow) and significant storage capacity (greater than 200 feet) exists beneath and adjacent to the proposed spreading grounds.

3. AQUIFER TESTING

Aquifer pumping tests, including a step-drawdown test and constant-discharge test, were performed on HDWD 24 to confirm aquifer hydraulic parameters. These parameters were used to estimate the travel time and ultimate fate of recharged SWP water through the saturated zone (see Section 4 Groundwater Flow Analysis). Although a constant-discharge pumping test conducted for HDWD 24 in 1988 provided some useful information on well specific capacity, time-drawdown data were of poor quality and consequently did not allow for reliable estimation of aquifer parameters. The installation of BDVWA MW2 close to HDWD 24 and subsequent observation of water level drawdown in BDVWA MW2 during the constant-discharge pumping test allowed for a more reliable estimation of aquifer hydraulic parameters.

3.1 Technical Approach

Pumping tests were conducted on HDWD 24 using the existing well pump, wellhead appurtenances, and water conveyance system features. The water generated during the pumping tests was discharged to HDWD's existing conveyance system. Discharge rates were controlled with an in-line gate valve, while discharge measurements were recorded with an in-line totalizing flow meter down-stream from the gate value. A pressure gauge was installed upstream from the gate value to evaluate pump back-pressure during restricted and reduced flows. The flow meter provided both an odometer (cumulative volume) and instantaneous discharge reading from 0 to 3,000 gpm in 50 gpm increments.

Water level measurements on the pumping well and observation well were made before during and after the pumping tests. Water levels were recorded manually in HDWD 24 with an airline installed to a depth of 438 feet (as reported by HDWD). An example of how airline water level measurements are computed follows: a measurement of 62.5 psi represents a water column of 144 feet (62.5 psi x 2.31 feet/psi) above the bottom (438 feet) of the airline tubing and corresponds to a water level depth of 294 feet (438 feet - 144 feet).The airline measurements could not be calibrated since direct water level measurements with an electric sounder was not possible. The airline pressure gauge was divided into increments of one pound per square inch (psi) from 0 to 300 psi; the gauge accuracy is +/- 0.5 psi, or 1.15 feet. Compressed nitrogen gas was used to pressurize the airline.

The water level in BDVWA MW2 was monitored continuously using a Level TROLL 700, 30 psi gauge pressure transducer and data logger (In-Situ, Inc., Fort Collins, CO). Transducer accuracy was confirmed with an electric sounder.

HDWD was requested not to operate HDWD 24 for at least 72 hours prior to testing. On the morning of October 4, 2010, the static water level in HDWD 24 was 294 feet below the top of the pressure gauge. The static water level for BDVWA MW2 was 287.63 feet below the top of the PVC well casing. The difference in height between the pressure gauge at HDWD 24 and the top of the casing at BDVWA MW2 was approximately 6 feet.

3.2 Well Construction of HDWD 24

HDWD 24 was installed in 1988 by Hacker Drilling, Inc., Hemet, California. A 30-inch diameter surface casing was installed to 50 feet, cemented in place, and serves as the sanitary well seal (DWR Water Well Completion Report No. 192872). A 24-inch diameter boring was drilled to 604 feet by reverse rotary drilling methods. Geophysical logging was conducted on the boring, but the logs are not available. The 14-inch diameter well was constructed with 360 feet (between 220 and 580 feet) of louver-type perforations with 3/32-inch aperture size or slots (GSI/Water, November 30, 2000). The non-pumping or static water level at the time of well construction was about 252 feet below ground surface. Based on the static water level measurement of 294 feet on October 4, 2010, the saturated thickness of the alluvial aquifer adjacent to HDWD 24 is about 290 feet. Other single well pumping tests have been conducted on HDWD 24 but have not generated sufficient information on the well and aquifer parameters (see GSI/Water, November 30, 2000).

BDVWA MW2 is located about 38 feet from HDWD 24. BDVWA MW2 is screened between 298 and 348 feet bgs (50 feet in length) and overlaps about 17 percent of the submerged screened interval of HDWD 24.

3.3 Step-Drawdown Pumping Test Details

On October 4, 2010, a step-drawdown test was performed, during which the well was pumped at rates of between 600 and 800 gallons per minute (gpm). The pump was turned on at 11:51AM PST with the discharge valve wide open. The pumping rate was about 800 gpm. The pumping water level (PWL) in HDWD 24 stabilized at about 302 feet corresponding to a water level drawdown of 8 feet (302 feet - 294 feet). The control valve was throttled down to about 600 gpm, resulting in substantial back-pressure. The pumping water level in HDWD 24 at this reduced rate was about 299 feet, equivalent to about 5 feet of drawdown. The pump was turned off at 2:30 PM. The elapsed time of pumping was 159 minutes. The average pumping rate during the step-drawdown test was 671 gpm. The maximum drawdown observed in BDVWA MW2 during the step-drawdown test was 1.62 feet.

3.4 Constant-Discharge Pumping Test

A 24-hour constant-discharge pumping test was performed on HDWD 24 between 8:00 AM October 5, 2010 and 8:00 AM October 6, 2010. Prior to the test, static water levels in HDWD 24 and BDVWA MW2 were measured at 293 feet and 287.60 feet, respectively. The average discharge rate during the test was 759 gpm. Water level recovery measurements were collected in HDWD 24 and BDVWA MW2 for four hours after the pump was turned off. Water levels in the pumping well were periodically measured with the airline during the pumping test but were not very useful in estimating well or aquifer parameters. The maximum drawdown in the pumping well was 11 feet at 469 minutes (the accuracy of airline measurements in the pumping well was insufficient to measure water level changes after 469 minutes), and the specific capacity (SC) was 69 gallons per minute per foot of water level drawdown (gpm/ft of dd) after about 8 hours of pumping. The SC provides a normalized measurement of the productivity of a pumping well and is calculated by dividing the discharge in gpm by the feet of drawdown. The SC varies with time and discharge. In general, the greater the elapsed time of pumping the smaller the SC and similarly, the greater the discharge the smaller the SC.

The SC is also related to the aquifer transmissivity and the well efficiency. The transmissivity can be estimated by multiplying the SC at 24-hours by 1,500 for an unconfined aquifer or 2,000 for a confined aquifer (Driscoll, 1986). Estimated transmissivities based on a SC of 69 gpm/ft of dd range between 103,500 and 138,000 gallons per day per foot (gpd/ft), or 13,800 to 18,500 square feet per day (ft^2/day). These values suggest a very productive and prolific aquifer. Using these transmissivities and a saturated thickness of 290 feet, the estimated aquifer hydraulic conductivity ranges between 48 and 64 feet per day (ft/day).

3.5 Results

Plots of drawdown and recovery over time in BDVWA MW2 are presented on Figures 12 through 14. The aquifer test data were analyzed using well hydraulic equations, and estimates were computed for the transmissivity and hydraulic conductivity. Pumping test results also provided an indication of the overall well efficiency of HDWD 24 and distance to hydraulic boundaries.

Figure 12 shows an arithmetic plot of drawdown in observation well BDVWA MW2 during the constant-discharge pumping and recovery test. The test is divided into two parts, the pumping period from 0 to 1,440 minutes and the recovery period between 1,440 minutes and 1,680 minutes. The manually measured data (red) are super-imposed on the continuous transducer/data logger measurements (black). Note that within the first 30 seconds of pumping the water level in BDVWA MW2 declined by one foot. In addition (because of the lack of a foot valve in the pump column), the water in the pump column discharged into the well resulting in a rapid rise of the water level when the pump was turned off. These higher water levels during the recovery period equilibrated quickly to resume the expected recovery trend. Typically, the shape of the pumping period curve is a mirror image of the recovery period curve. The maximum drawdown in BDVWA MW2 during the constant discharge test was about 2.76 feet. After four hours of recovery, the water level had recovered to within 0.87 feet from the initial static water level, or 68 percent recovery.

The drawdown and recovery data for BDVWA MW2 are plotted on semi-logarithmic charts as shown in Figures 13 and 14, respectively. The data were used to estimate aquifer hydraulic properties using the modified non-equilibrium equation referred to as the Cooper-Jacob method (Driscoll, 1986). Figure 13 shows drawdown during the pumping period. The figure shows that instead of the linear relationship expected for a homogeneous aquifer of infinite lateral extent, the drawdown curve continues to steepen with time. This steepening suggests that the cone of depression has encountered multiple barrier boundaries. The barrier boundaries define the areal extent of the aquifer. This response is consistent with the hydrogeologic conceptual model of this area of the Reche Subbasin, where the alluvial aquifer is unsaturated (i.e., no-flow boundary) both southeast of HDWD 24 beneath the Mesa and to the east, where bedrock is encountered. Casing storage (Schafer, 1978 and Driscoll, 1986) of the pumping well can affect observation well data and was estimated to occur prior to 5 minutes. In addition, the pumping discharge fluctuated during the first few minutes of pumping due to the reduced pressure in the conveyance system. Because of these limitations, early time-drawdown data prior to 10 minutes was not used in the pumping test analysis.

A relatively short and linear segment between 10 and 100 minutes of pumping suggests that the transmissivity is 489,000 gpd/ft, or 65,400 ft^2/day (Figure 13). The period between 40 and 400 minutes indicates a transmissivity of 334,000 gpd/ft, or 44,700 ft^2/day. Using these transmissivities and a saturated thickness of 290 feet, the hydraulic conductivity ranges from 154 to 226 ft/day. The Theis method analysis of the pumping period data indicates that the transmissivity is 300,000 gpd/ft, or 40,100 ft^2/day. Based on the transmissivity estimated using the Theis method and a saturated thickness of 290 feet, the hydraulic conductivity is 138 ft/day.

Analysis of recovery period data (Figure 14) plotted as elapsed time since pumping began divided by the elapsed time since pumping stopped suggests a similar transmissivity of 466,000 gpd/ft or 62,300 ft^2/day. Using this transmissivity and a saturated thickness of 290 feet, the hydraulic conductivity is 215 ft/day. Note that the early recovery data (right side of Figure 14), after the pump was turned off, shows the systematic effect of the water released from the pump column due to the lack an effective foot valve; this recovery anomaly lasted for about 10 minutes.

The well efficiency of the pumping well can be estimated by dividing the transmissivity derived from the actual SC of the pumping well (13,800 to 18,500 ft^2/day) by the transmissivity derived from time-drawdown analysis methods (40,100 ft^2/day [Theis method] to 65,400 ft^2/day [Cooper-Jacob method]). Comparison of the estimated transmissivity suggests that HDWD 24 is between 30 and 50 percent efficient. However, it is noted that well efficiencies are probably underestimated due to the influence of the hydraulic barriers on actual SC data.

Note that a reliable storage coefficient could not be estimated from this pumping test because of the early time- drawdown limitations and boundary conditions encountered. The aquifer tapped by HDWD 24 is probably unconfined with a specific yield between 10 and 15 percent.

4. GROUNDWATER MODELING AND ANALYSIS

A water balance and numerical groundwater flow model was constructed and used to assist in characterization of groundwater flow conditions and recharge basin feasibility. The analysis was conducted using the MODFLOW and MODPATH models. The objectives of the modeling were to evaluate hydraulic impacts associated with future operation of the Reche Spreading Grounds, including prediction of water table mounding beneath the recharge site and groundwater flow paths from the site to downgradient discharge locations.

Complete documentation of the model input, construction, calibration process, and results is included in Appendix E. The model area is shown on Figure 7. The model area includes key portions of the Pipes and Reche groundwater subbasins encompassing the spreading grounds, and active water supply wells, including HDWD Well 24, BDVWA Wells 2, 3, 4, 6, 7, 8, and 9, and CSA 70 W-1 Wells 1, 2, and 3. Aquifer properties including heterogeneous aquifer permeability, thickness, and storage coefficients were simulated appropriately across the model area, and appropriate boundary conditions were also developed. The model was calibrated to observed water levels between 1995 and 2009. Once calibrated, planned recharge operations were simulated using the flow model. Water table mounding heights over time and flow paths and travel times between the recharge site and wells were simulated using anticipated recharge and pumping rates and schedules.

4.1 Spreading Basin Size and Capacity

The infiltration rate needed to accept 1,500 AF over a six-month recharge period via a surface spreading grounds area of five acres was compared with the estimated vertical hydraulic conductivity of selected vadose zone soil samples. For a five-acre spreading basin area recharging 1,500 AF/six months, the estimated infiltration rate is 1.64 feet/day. Hydraulic conductivities of the vadose zone soil samples averaged 4.13 feet/day (Table 2). Under a hydraulic gradient of 1 (which is likely to occur for ponded water conditions), the infiltration capacity is equivalent to the hydraulic conductivity. Therefore, the infiltration capacity of the soil materials beneath the proposed recharge site exceeds the planned operational infiltration rate of the five-acre recharge site, and the site is capable of accepting 1,500 AF over a period of six months.

4.2 Flow Modeling Results

Details of the construction, calibration, and results of the Pipes and Reche groundwater basin MODFLOW model are presented in Appendix E. The final model was developed after preliminary and intermediate calibration runs, based on the initial results and modified based on observed model response to input parameter changes. In summary, good calibration quality was achieved with relatively small differences between observed and simulated heads in space and time. The final calibrated steady state models simulate flows within and between the Pipes and Reche subbasins, which are consistent with observed conditions.

The model was subsequently used to predict the mound heights, flow paths, and travel times of recharged water under a 1,500 AF/six month operational scenario. A five-acre recharge area was simulated in Pipes Wash, and transient flow was simulated in response to multiple recharge events. The initial operational scenario simulated was four 1,500 AF/six-month recharge events over alternate years. Groundwater elevations and flowpaths were simulated over time and used to assess performance of the recharge facility and groundwater basin response.

4.3 Groundwater Mounding

For a surface recharge project, water levels rise beneath the recharge area creating a groundwater mound. The height and extent of this mound varies over time with hydraulic properties of the aquifer and the amount of water being recharged. The development of a groundwater mound beneath the spreading grounds was evaluated using the MODFLOW model. The model estimates the groundwater elevations and corresponding height of the groundwater recharge mound as a function of time and distance from the recharge area.

The calculated heights and distribution of the mound at the end of the first six-month recharge period is illustrated on Figure 15. The mound height over time directly beneath the spreading basin is illustrated on Figure 16. As shown on the figures, the maximum mound height beneath the spreading basin is approximately 19 feet after the first six-month recharge period, 20 feet after the second six-month recharge period, and 22 feet after the third six-month recharge period. Groundwater levels are expected to increase 1 foot or more up to 8,000 feet to the northwest of the spreading grounds. As shown on Figure 15, water levels contours stack up against Pipes Barrier due to the low permeability of the fault zone. The predicted maximum groundwater level rise is approximately 5 feet at HDWD 24 (4,300 feet from the center of the spreading grounds).

4.4 Groundwater Flowpaths

Figure 17 shows the simulated groundwater flowpaths from the Reche Spreading Grounds during and after three 6-month recharge events. As shown on the figure, recharge water diverges radially away from the recharge area before trending northeast in the general direction of HDWD 24. The travel time between the recharge site and HDWD 24 is approximately 2 to 3 years.

5. WATER QUALITY EVALUATION

Potential impacts to groundwater quality from proposed recharge of SWP water at the Reche Spreading Grounds were evaluated for this Study. The process of mixing imported SWP water with native groundwater could potentially impact groundwater quality in the Reche Subbasin by introducing contaminants in SWP water to groundwater and/or inducing geochemical reactions in the subsurface that precipitate or dissolve minerals present in the aquifer formation, groundwater, or recharge water. In addition, as imported SWP water percolates through the base of the spreading grounds, recharged SWP water may initially mobilize and transport any soluble salts and/or contaminants in the underlying unsaturated zone to the water table. Finally, as observed in the Warren Subbasin south of the Study Area (Nishikawa et al., 2003), rising groundwater due to enhanced recharge (groundwater mounding) can also entrain naturally occurring or anthropogenic contaminants in the unsaturated zone (e.g., nitrate) or cause migration of low quality water away from the spreading grounds.

This section presents the water quality results for samples collected from BDVWA MW1 and MW2 for this Study. These results, in combination water quality data for BDVWA MW1 and MW2 and major production wells in the Reche Subbasin, were used to evaluate each of the potential water quality impacts from recharging SWP water.

5.1 Water Quality Sampling and Analysis for BDVWA MW1 and MW2

After installation and development of the monitoring wells, groundwater quality samples were obtained from BDVWA MW1 and MW2 on September 23 and 24, 2010, respectively. The sample from monitoring well BDVWA MW1 was analyzed for the following water quality parameters:

- General Chemicals (inorganic parameters and major anions)
- Metals (heavy metals and major cations)
- Volatile Organic Compounds (VOCs)
- Semi-volatile Organic Compounds (SVOCs)
- Pesticides and Herbicides
- Radionuclide's including Gross Alpha and Beta Radiation, Uranium, Radium 226 and 228, Strontium, and Tritium

The sample from monitoring well BDVWA MW2 was analyzed for general chemicals, metals, and gross alpha radiation only. The water samples were transported under chain-of-custody to Clinical Laboratory San Bernardino (Grand Terrace, CA).

Table 4 summarizes the water quality sampling results for BDVWA MW1 and MW2; the Certified Analytical Laboratory Report is included as Attachment F. Ambient groundwater quality beneath the proposed spreading grounds as measured in the water quality samples from

BDVWA MW1 and MW2 is generally good, with relatively low TDS, nitrates, and heavy metals. TDS concentrations in BDVWA MW1 and MW2 are 270 and 320 milligrams per liter (mg/L), respectively. Low concentrations of two volatile organic compounds TCE and PCE were detected in the sample from BDVWA MW1 but the concentrations were below State and Federal MCLs. Detectable concentrations of uranium and gross alpha radiation were also measured in the water quality samples, but the concentrations were below State and Federal MCLs.

5.2 Impacts of Mixing SWP Water and Native Groundwater

The predominant beneficial use of groundwater in the Study Area is municipal water supply. Therefore, the significance of potential impacts is defined by drinking water standards, including maximum contaminant levels (MCLs) and health advisory levels. Primary MCLs are enforceable standards based on potential impacts to human health; secondary MCLs are associated with aesthetic impacts such as taste, color, or odor, but are not considered to be a risk to human health.

For an assessment of the potential groundwater quality impacts associated with mixing SWP water and native groundwater, SWP water quality data were obtained, evaluated, and compared to current groundwater quality in the Reche Subbasin.

5.2.1 SWP Water Quality

The quality of SWP water was evaluated using analytical results from discrete monthly grab samples and continuous automated station water quality data downloaded from the California Department of Water Resources Division of Operations and Maintenance State Water Project website. Based on communications with MWA, it was determined that the Check 41 water quality monitoring station located on the California Aqueduct is representative of current SWP water quality for the Morongo Basin Pipeline.

Inorganic and Physical Water Quality

Table 5 summarizes the inorganic water quality data for monthly grab water quality samples collected at SWP Check 41 from January 2008 through September 2009. As shown in the table, detected concentrations of constituents in SWP water analyzed at Check 41 are generally below their respective primary or secondary MCL. Manganese was detected in one month above its secondary MCL, but for the other 18 months was not detected above its reporting limit. In addition, turbidity in SWP water is consistently detected above the secondary MCL; however, turbidity is not expected to impact groundwater quality, as any suspended solids in SWP water will be filtered out by the aquifer formation prior to reaching the groundwater table. The average TDS concentration and specific conductance (or electrical conductivity (EC)) of SWP from

January 2008 to September 2009 was 286 milligrams per liter (mg/L) and 495 microSiemens per centimeter (μS/cm), respectively.

To characterize the inorganic water chemistry for SWP, major cation and anion data are plotted on a Trilinear Diagram, shown on Figure 18. Data from separate samples are grouped together in the yellow highlighted fields on the three portions of the plot. These data provide information on the general water chemistry of SWP and indicate that SWP water is generally neutral and can be categorized as sodium/chloride-type water.

In addition to monthly grab samples, DWR also continuously monitors for several physical properties in SWP water, including EC and pH. Using a conversion factor, EC values can also be used to estimate TDS, providing data to supplement the measured TDS concentrations in the monthly grab samples. Figure 6 shows the daily EC data and estimated TDS values for SWP water at Check 41 from January 2000 to December 2009. As shown on the figure, the EC varied during this period generally between 300 and 700 μS/cm, with an average of 452 μS/cm, similar to average EC in 2008 and 2009. The average EC value equates to a TDS concentration of 262 mg/L (based on the average conversion factor of 0.58 EC (μS/cm) = TDS (mg/L) derived from monthly grab sample data). The average pH value of SWP water at Check 41 from January 2000 to December 2009 was 8.05.

Organic Water Quality

DWR routinely monitors SWP water for over 150 organic compounds, including pesticides, herbicides, and volatile organic compounds (VOCs). Grab samples are collected and analyzed in March, June, and September of each year. Based on water quality results obtained from eight quarterly sampling events from March 2007 through September 2009, only two organic contaminants (the herbicide simazine and the pesticide diuron) were detected in four of the eight quarterly sampling events of SWP water at Check 41. Detected concentrations of simazine were 0.03, 0.05, 0.1, and 3.35 micrograms per liter (μg/L), which are below the MCL for simazine of 4 μg/L. Currently, no MCL has been established for diuron; detected concentrations of diuron in SWP water at Check 41 were 0.25, 0.99, 1.65 and 7.72 μg/L, which are below the USEPA maximum health advisory level of 10 μg/L.

5.2.2 Groundwater Quality in the Reche Subbasin

Groundwater quality in the Reche Subbasin was characterized from water quality samples collected from BDVWA MW1 and MW2 for this Study and from 2008 and 2009 groundwater quality data for the seven major water supply wells located in the subbasin. Water supply wells include those operated by BDVWA, CSA 70 W-1, and HDWD.

Inorganic and Physical Water Quality

Table 6 summarizes the most recent inorganic and physical water quality data from BDVWA MW1 and MW2 and for major production wells in the Reche Subbasin. The table shows that inorganic and physical water quality in BDVWA MW1 and MW2 and in major water supply wells in the Reche Subbasin are very similar. Overall, groundwater quality in the Reche Subbasin is high, with all constituents meeting primary and secondary drinking water standards. TDS concentrations in all wells range from 180 to 320 mg/L, with an average TDS concentration of 253 mg/L. Based on the comparison of TDS concentrations for SWP water in the Morongo Basin Pipeline (average TDS concentration of 262 mg/L since 2000) and native groundwater, recharge of SWP water is not expected to significantly increase the concentration of soluble salts in the Reche Subbasin. These findings are in agreement with a recent study completed by MWA (2007) that evaluated the effect of importing 1,000 AFY of SWP water on TDS concentrations in the Ames Valley Basin and found that there would be effectively no change in TDS concentrations in the Ames Valley Basin from importation of SWP water. In addition, the pH of native groundwater in the Reche Subbasin ranges from 7.8 to 8.1, similar to the average pH of SWP water (8.05). Therefore, recharge of SWP water is not expected to change the pH of native groundwater significantly.

Figure 18 shows the inorganic water quality data for production wells in the Reche Subbasin compared with SWP water on a Trilinear Diagram. The figure shows that although the inorganic composition of native groundwater and SWP water are slightly different, mixing of the two waters will result in a relatively neutral water type and, as such, is not expected to degrade groundwater quality in the Reche Subbasin (a neutral water type is indicated by water chemistry that plots in the central portion of the center diamond on Figure 18). Water chemistry resulting from the mixing of SWP water and local groundwater will plot along the mixing lines in between the two water signatures). Collectively, these data do not indicate a significant impact to groundwater quality from the mixing of SWP water in the Reche Subbasin.

Organic Water Quality

Based on results of 2008 and 2009 water quality results from major water supply wells, no organic compounds, including VOCs, pesticides, and herbicides, have been detected in groundwater. Low concentrations of two volatile organic compounds (TCE and PCE) were detected in the sample collected from BDVWA MW1, but concentrations are below State and Federal MCLs.

As described in Section 5.2.1, only two organic constituents (simazine and diuron) have been detected during four of last eight quarterly sampling events of SWP water at Check 41. However, in each case, detected concentrations are below respective MCL and health advisory levels and are not expected to significantly impact groundwater quality.

Radionuclide Water Quality

Detectable concentrations of uranium and gross alpha radiation were also measured in water quality samples from BDVWA MW1 and MW2, but concentrations are below State and Federal MCLs.

5.3 Impacts from Percolation of SWP Water

Previous studies have demonstrated that soils in environments with limited areal recharge like the High Desert may contain naturally elevated concentrations of salts (Graham et al., 2008, Izbicki, 2008). Naturally-occurring nitrate in soil is a concern in some High Desert environments. These constituents and others can be leached by artificially recharged water and transported to groundwater (Izbicki, 2008). Previous researchers have identified such conditions in areas capped by desert pavement (Graham et al., 2008) or where geomorphic process lead to channel abandonment and stranding of infiltrated water in the unsaturated zone (Izbicki, 2007). Although the possibility of naturally occurring salts including nitrate in the unsaturated zone beneath Pipes Wash is not precluded, desert pavement does not occur within Pipes Wash, and Pipes Wash is deeply incised through the landscape, indicating that the wash has not migrated significantly from its current position in a relatively long time. In addition, this leaching process is most likely to occur during the initial period (or first flush) of recharge water through the unsaturated zone and would not represent a sustained source of constituents, even if present. Monitoring wells BDVWA MW1 and MW2 have also been installed to monitor changes in groundwater quality in the future.

Previous studies have also found that concentrated anthropogenic contaminants in the unsaturated zone (e.g., septic tank return flows) can be leached by artificially recharged water to groundwater (Umari, et al., 1993). The potential for recharge water percolating through the unsaturated zone to leach anthropogenic contaminants, such as nitrate, beneath the proposed spreading basin is likely to be low, because there is no development within Pipes Wash. Results of queries from the State Water Resources Control Board (SWRCB) *Geotracker* and Department of Toxic Substances Control (DTSC) *Envirostor* databases also show that there are currently no active regulated environmental contamination facilities within the entire Ames Valley Groundwater Basin. Historically, there have been two minor soil contamination cases located more than 2 miles west of the proposed spreading grounds: 1) a diesel tank leak at Hero Market located at 1160 Old Woman Springs Road in 2004, and 2) a gasoline spill as a result of vandalism at the BDVWA maintenance yard in 2009. In both instances, contamination was limited to shallow soils and immediately remediated. Based on these findings, the potential for groundwater impacts related to mobilized subsurface contamination from industrial facilities is considered insignificant.

In addition to the potential leaching of constituents in the vadose zone, percolation of constituents in SWP water could result in higher dissolved organic carbon (DOC) in groundwater. If sufficiently high, this condition could result in elevated trihalomethanes (TTHMs), a by-product of drinking water chlorination, once groundwater is extracted and treated. DOC values for SWP water are shown on Table 5 and average 2.3 mg/L, a value typical for surface waters. These concentrations are expected to decline prior to reaching groundwater due to bacterial assimilation of DOC in the relatively thick vadose zone. In addition, HDWD has been recharging SWP water in the nearby Warren Valley Subbasin since 1995, and TTHM concentrations in HDWD's water supply have always met drinking water standards (HDWD, 2009).

5.4 Impacts from Groundwater Mounding

Nishikawa et al. (2003) found that high nitrate concentrations in groundwater following recharge of SWP water through spreading basins in the Warren Subbasin were caused by the entrainment of septic tank return flows (septage) by a rising groundwater table. Groundwater elevations adjacent to spreading basins in the Warren Subbasin were found to have increased as much as 250 feet.

To evaluate the potential for such rising groundwater associated with recharge operations to entrain contaminants in the unsaturated zone, the MODFLOW model was used to predict the height of the groundwater mound over time, as described in Section 4.3. Conceptually, the imported SWP water percolates through the unsaturated zone to the water table, resulting in a rise in water levels beneath and in the vicinity of the spreading grounds, creating a groundwater mound. Once recharge is halted, the groundwater mound will dissipate. Based on the results of recharge model, only a few feet of mounding are predicted for recharge of 1,500 AF over six months. In comparison to observed groundwater level declines in some wells within the Reche Subbasin over the past 20 years (greater than 25 feet in some areas), recharge operations are not expected to raise groundwater levels even above historical elevations. As such, entrainment of constituents that have not been saturated in the past is not likely to occur.

A review of a recent aerial photograph of the Project area indicates less than about 10 parcels on the outer edge of the potential zone of influence that may have a septic tank. Additionally, as mentioned previously, there are no regulated environmental sites within the Ames Valley Groundwater Basin. Thus, the risk of industrial contamination becoming entrained or mobilized as a result of proposed recharge operations is judged to be insignificant. However, it may be prudent to conduct a septic tank survey in the immediate Project area to provide baseline conditions prior to recharge.

6. REGULATORY PERMIT REQUIREMENTS

6.1 Regulatory Agencies

Todd Engineers and Kennedy/Jenks contacted the local, State, and Federal Regulatory Agencies with oversight responsibilities for the Reche recharge project to inventory and itemize the permits from each Agency required to construct and operate the Reche Spreading Grounds. The following summarizes the required or potentially required permits by agency. Some of this information was previously provided to BDVWA in a Memorandum dated April 29, 2010 and subsequent emails.

County of San Bernardino

The County of San Bernardino has several agencies that may have regulatory oversight responsibilities for this project. If construction of a pipeline will be necessary along the right-of-way of any county dedicated road, then the County of San Bernardino, Public Works Department, Transportation Operations Division, Transportation Permit Section will be responsible for issuing a permit. However, in Township 2 N, Range 5 E, Section 24, the road identified as Winters Road, is not fully dedicated to the County of San Bernardino. This means that the County has only limited jurisdiction over this road. The letter requesting a “no objection permit” was submitted to the County.

The County of San Bernardino, Public Works Department, Transportation Operations Division, Flood Control District was contacted regarding any rights-of-way that might be impacted by the construction of an infiltration basin within Pipes Wash. The County Flood Control District does not have any rights-of-way in the Pipes Wash area and as such they do not require any permits for work within the Pipes Wash.

The County of San Bernardino, Planning Department, Land Development, was contacted. They indicated that they had no additional comments except to ensure that adequate provisions should be made to intercept and conduct the tributary off-site and on-site drainage flows around and though the site in a manner that will not adversely affect adjacent or downstream properties at the time the site is developed.

Mojave Desert Air Quality Management District

The Mojave Desert AQMD is responsible for any projects that may generate or control air pollutants. Since this project may generate dust during the construction of a surface impoundment, the District was contacted to see what requirements may be applicable. If the surface impoundment is greater than 100 acres, then a Dust Control Plan will be required for the project. Otherwise, the project is exempt from specific regulations although the construction may be subject to general best management practices to reduce air pollution affecting neighboring properties.

California Department of Public Health

This Agency regulates the treatment of drinking water once it is removed from the groundwater basin. It does not regulate the discharge into the groundwater recharge basin. No permits are required from the Department of Public Health to construct or operate the spreading grounds.

California Department of Fish and Game

This Agency regulates activities that may impact the fish and game resources of the State of California. As such, they will issue a “stream bed alteration” permit for any work in Pipes Wash, and potentially “take” permits for plants and desert tortoise, if required.

California Regional Water Quality Control Board (Region 7, Colorado River)

The Colorado River RWQCB will be responsible for issuing a permit to discharge water to either Pipes Wash or to the land. During the construction of monitoring wells, if any dewatering activities resulted in the discharge of well purge water to the land, a RWQCB permit would have been required. Such a discharge did not occur during well construction, as water was contained and discharged offsite, so no permit was needed. For future discharges into the Pipes Wash, the General Order No. R7-2009-0300 issued by the RWQCB may be applicable. The Mojave Water Agency may obtain a general permit on behalf of BDVWA for recharge operations.

U.S. Army Corps of Engineers (ACOE)

The ACOE suggested that a request be sent to them asking whether Pipes Wash lies within the “Jurisdictional Waters of the Corps” or whether they are “isolated waters”. If Pipes Wash is subject to the Corps “Jurisdictional Waters”, then any activity such as constructing an infiltration basin will be subject to the Corps Nationwide 404 permit. If Pipes Wash is determined to be an “isolated water”, then the ACOE does not have any jurisdiction unless the project involves filling more than ½ acre of land. Then an individual 404 permit would be required.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service office responsible for the Study Area is the Ventura Office. They believe that the Desert Tortoise is the major endangered species that may be present in the area. Another threatened species is the Parish’s Daisy, a plant that is associated with carbonate formation and that may be washed down the various washes. The Agency indicated that once the project is authorized to proceed, a formal request of the presence of Endangered and Threatened Species within the project area should be submitted to their office. If this project proceeds on BLM land, the BLM must request a Section 7 Consultation with the US Fish and Wildlife Service. One of their concerns will be with the potential impact to wildlife species from the construction of this project.

U.S. Bureau of Land Management

This agency was not contacted by Todd Engineers or Kennedy/Jenks because BVWDA directly communicated with the U.S. Bureau of Land Management. Todd Engineers did comply with the desert tortoise mitigation measures during field investigation activities as required by BLM.

6.2 Regulatory Permit Status

US Army Corps of Engineers

The US ACE has been requested to make a determination as to whether Pipes Wash is a "jurisdictional water" under the Corps authority. On November 5, 2010 ACOE staff indicated they would be providing a letter within 21 days indicating the area is “non jurisdictional”.

U.S. Fish and Wildlife Service and U.S. Bureau of Land Management

A Federal Endangered Species "Take" permit (A Section 10 permit) is required for any activity that occurs on Federal Lands (e.g., Bureau of Land Management) and that involves the destruction or "taking" of an endangered or threatened species (Desert Tortoise, etc.). This permit is called a Consultation Permit. BDVWA is directly negotiating this permit with the Bureau of Land Management.

Final permits or confirmations that permits will not be required will be obtained from agencies after design specifications are completed.

7. CONCLUSIONS

The following conclusions can be made based on the assessment of soil and aquifer properties, evaluation of water quality, performance of a preliminary field investigation, development of a site conceptual model and numerical groundwater flow model, and analysis of available storage and groundwater mounding.

- The vadose (unsaturated) and saturated zones beneath the proposed Reche Spreading Grounds are comprised primarily of sand and sufficiently permeable to provide for surface recharge. No significant low-permeability layers appear to be present in the vadose zone that would impede the percolation of recharge water to the water table.
- The current thickness of the vadose zone (determined by depth to water) is about 230 feet beneath the recharge site, providing sufficient vadose zone capacity for recharge and increased water table elevations.
- Measured soil and aquifer hydraulic properties including porosity and hydraulic conductivity indicate that recharge of 1,500 AF over six months is feasible.
- Analyses of water table mounding using the MODFLOW model indicate that more than 1,500 AF could potentially be stored on a seasonal basis for recovery.
- Ambient groundwater quality beneath the proposed spreading grounds as measured in the water quality samples from BDVWA MW1 and MW2 is generally good, with relatively low TDS nitrates and heavy metals. Low concentrations of two volatile organic compounds TCE and PCE were detected in the sample from BDVWA MW1, but concentrations were below State and Federal MCLs. Detectable concentrations of uranium and gross alpha radiation were also measured in the water quality samples, but the concentrations were below State and Federal MCLs.
- Based on a water quality evaluation comparing native groundwater and SWP water quality and potential impacts associated with groundwater mounding, recharge of SWP water at the Reche Spreading Grounds is not expected to degrade groundwater quality in the Reche Subbasin.
- Local, state, and federal regulatory agencies were contacted to identify permitting requirements for construction and operation of the recharge project. The recharge facility is located on Federal land under BLM jurisdiction. Permits will not be required by local county regulatory agencies. A general discharge permit may be required by the RWQCB, and a consultation permit may be required by BLM. Final permits or confirmations that permits will not be required will be obtained from agencies after design specifications are completed.

8. REFERENCES

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Tables

Table 1
BDVWA MW1 Soil Sample Hydraulic Properties
Reche Spreading Grounds Recharge Feasibility Study
Bighorn Desert View Water Agency

Sample Depth feet	Lithology	Moisture Content %	Dry Density (pcf)	Total Porosity %	Effective Porosity %	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (feet/day)
10.0 - 12.5	Well-Graded SAND (SW)	7.9	98.19	45	23	1.42E-03	4.03
25.0 - 27.5	Well-Graded SAND (SW)	7.8	101.88	43	22	1.43E-03	4.05
50.0 - 52.5	Well-Graded SAND (SW)	7.6	99.48	44	22	2.19E-03	6.21
100.0 - 102.5	Well-Graded SAND (SW)	9.8	104.36	41	22	1.76E-03	4.99
150.0 - 152.5	Well-Graded SAND (SW)	10.0	99.82	44	23	1.37E-03	3.88
242.5 - 245	Poorly-Graded SAND (SP)	10.4	103.12	42	23	5.63E-04	1.60
Average Value		8.9	101.14	43	23	1.46E-03	4.13

Samples analyzed by Keantan Testing Laboratories (Diamond Bar,California)

Table 2
Monitoring Well Construction Details
Reche Spreading Grounds Recharge Feasibility Study
Bighorn Desert View Water Agency

Well Name	UTM 83 Northing[1]	UTM 83 Easting[1]	Monitoring Well Casing Elevation[1]	Date Completed	Well Depth	Screen Interval	Filter Pack Interval	Seal Interval	Water Level Date	Depth to Groundwater	Groundwater Elevation
	feet	feet	feet msl		feet	feet	feet	feet		feet	feet msl
BDVWA MW1	553813	3788804	3240	9/11/2010	256.5	236 - 256	231 - 256.5	0 - 231	9/23/2010	236	3004
BDVWA MW2	554669	3789565	3282	9/16/2010	348.5	298 - 348	293 - 348.5	0 - 293	9/23/2010	298	2984

[1]Northing and easting coordinates and elevations were obtained from GPS and are approximate; survey to be perfromed in the future.

Table 3
HDWD Well No. 24 Aquifer Test Results
Reche Spreading Grounds Recharge Feasibility Study Report
Bighorn-Desert View Water Agency

HDWD 24 Constant-Rate Pumping Test	
Test Date	5-Oct-10
Test Duration	1440 minutes
Average Pumping Rate	759 gpm
Drawdown in Pumping Well	11 feet (approximate)
Specific Capacity	69 gpm/foot
Radial Distance to Observation Well BDVWA MW2	35 feet
Drawdown in Observation Well at end of test	2.76 feet
Aquifer Saturated Thickness	290 feet
Aquifer Transmissivity from Specific Capacity	13,800 to 18,500 feet^2/day
Hydraulic Conductivity from Specific Capacity	48 to 64 feet/day
Aquifer Transmissivity from Drawdown in BDVWA MW2	44,700 feet^2/day
Hydraulic Conductivity from Drawdown in BDVWA MW2	154 feet/day
Aquifer Transmissivity from Recovery in BDVWA MW2	62,300 feet^2/day
Hydraulic Conductivity from Recovery in BDVWA MW2	215 feet/day

Table 4
Groundwater Quality Sampling Results Summary
Reche Spreading Grounds Recharge Feasibility Study
Bighorn-Desert View Water Agency

Analyte	Test Method	Reporting Limit and Units[1]	BDVWA MW1 Result	BDVWA MW2 Result
General Chemical Analytes				
Alkalinity Total as CaCO3	SM2320 B	5.0 mg/L	190	170
Bicarbonate	SM2320 B	5.0 mg/L	230	210
Calcium	SM3500CaD	1.0 mg/L	49	43
Carbonate	SM 2320 B	5.0 mg/L	ND	ND
Chloride	EPA 300.0	1.0 mg/L	17	34
Langelier Index at Source Temp	SM 203	NA	0.11	NT
Langelier Index at 60 C	SM 203	NA	0.81	NT
Aggressive Index	SM 203	NA	12.06	NT
Cyanide	SM 4500 CNF	100 ug/L	ND	ND
Specific Conductance	SM 2510 B	2.0 umhos/cm	530	440
Fluoride	EPA 300.0	0.10 mg/L	0.83	1.1
Total Hardness as CaCO3	SM 2340 C	5.0 mg/L	140	130
Hydroxide	SM 2320 B	5.0 mg/L	ND	ND
MBAS	SM 5540 C	0.10 mg/L	ND	ND
Nitrate	EPA 353.2	2.0 mg/L	2.5	2.2
Nitrate + Nitrite as N	EPA 353.2	10,000 ug/L	580	500
Nitrite as N	EPA 353.2	1,000 ug/L	ND	ND
Perchlorate	EPA 314	4.0 ug/L	ND	ND
pH Lab	SM 4500HB	NA, pH units	7.7	7.9
Sulfate	EPA 300.0	0.50 mg/L	21	35
TFS/Total Dissolved Solids	SM5440 C	5.0 mg/L	270	320
Metals				
Aluminum	EPA 200.7	50 ug/L	400	610
Antimony	SM 3113 B	6.0 ug/L	ND	ND
Arsenic	SM 3113 B	2.0 ug/L	ND	ND
Barium	EPA 200.7	100 ug/L	ND	ND
Beryllium	SM 3113 B	1.0 ug/L	ND	ND
Boron	EPA 200.7	100 ug/L	180	160
Cadmium	SM 3113 B	1.0 ug/L	ND	ND
Chromium (Total)	SM 3113 B	10 ug/L	ND	ND
Copper	EPA 200.7	50 ug/L	ND	ND
Iron	EPA 200.7	100 ug/L	300	490
Lead	SM 3113 B	5.0 ug/L	ND	ND
Magnesium	EPA 200.7	1.0 mg/L	9.3	8.8
Manganese	EPA 200.7	20 ug/L	220	110
Mercury	EPA 245.1	1.0 ug/L	ND	ND
Nickel	SM 3113 B	10 ug/L	ND	ND
Potassium	EPA 200.7	1.0 mg/L	4.6	4.8
Selenium	SM 3113 B	5.0 ug/L	ND	ND
Silver	SM 3113 B	10 ug/L	ND	ND
Sodium	EPA 200.7	1.0 mg/L	63	45
Thallium	EPA 200.7	1.0 ug/L	ND	ND
Vanadium	EPA 200.7	3.0 ug/L	4.2	3.1
Zinc	EPA 200.7	50 ug/L	ND	ND
Radiochemistry				
Gross Alpha	EPA 900.0	3.0 pCi/L	11	7.3
Gross Alpha Counting Error	EPA 900.0	pCi/L	2.3	1.7
Gross Alpha Min Detection Activity	EPA 900.0	pCi/L	1.4	1.0
Gross Beta	EPA 900.0	4.0 pCi/L	ND	NA
Gross Beta Counting Error	EPA 900.0	pCi/L	1.5	NA
Gross Beta Min Detection Activity	EPA 900.0	pCi/L	1.3	NA
Uranium	EPA 900.0	1.0 pCi/L	14	NA
Uranium Counting Error	EPA 900.0	pCi/L	1.6	NA
Uranium Min Detection Activity	EPA 900.0	pCi/L	0.87	NA
Total Alpha Radium 226	EPA 903.0	0.549 pCi/L	0.000 +/- 0.340	NA
Radium 228	Ra - 05	0.279 pCi/L	0.000 +/- 0.653	NA
Strontium 90	EPA 905.0	1.06 pCi/L	1.33 +/- 0.747	NA
Tritium	EPA 906.0	386 pCi/L	0.000 +/- 222	NA

Table 4
Groundwater Quality Sampling Results Summary
Reche Spreading Grounds Recharge Feasibility Study
Bighorn-Desert View Water Agency

Analyte	Test Method	Reporting Limit and Units[1]	BDVWA MW1 Result	BDVWA MW2 Result
Volatile Organic Compounds				
Trichloroethene (TCE)	EPA 524.2	0.5 ug/L	0.57	NA
Tetrachloroethene (PCE)	EPA 524.2	0.5 ug/L	3.5	NA
All other EPA 524.2 analytes	EPA 524.2	0.5 - 5.0 ug/L	ND	NA
VOC Pesticides				
Ethylene Dibromide (EDB)	EPA 504.1	0.05 ug/L	ND	NA
Dibromochloropropane (DBCP)	EPA 504.1	0.2 ug/L	ND	NA
Semi-Volatile Organic Compounds				
All EPA 508.1 analytes	EPA 508.1	0.01 - 25 ug/L	ND	NA
Other Pesticides				
Endothall	EPA 548.1	45 ug/L	ND	NA
Diquat	EPA 549.2	4.0 ug/L	ND	NA
2,3,7,8-TCDD	EPA 1613 B	5.0 pg/L	ND	NA
Other Analytes				
Asbestos	EPA 600/R-94/134	0.19 million fibers/L	ND	NA

Explanations
NA - Not analyzed
ND - Not detected above reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
pg/L - picograms per liter
MBAS - Methyl blue active substances
1 - Reporting Limit includes miniumum detectable activity for radionucleides

Table 5
SWP Water Quality Summary
Reche Spreading Grounds Recharge Feasibility Study
Bighorn-Desert View Water Agency

	Drinking Water Standards	SWP Water Quality Data		
		Mininum	Maximum	Average
	(all values in mg/L unless designated otherwise)			
MAJOR IONS				
Calcium		15	34	27
Magnesium		5	15	10
Potassium		--	--	--
Sodium		24	71	59
Bicarbonate[1]		64	111	96
Chloride	250[b]	28	100	74
Sulfate	250[b]	19	81	48
MINOR IONS				
Boron		0.1	0.3	0.2
Bromide		0.10	0.37	0.26
Iron	0.3[b]	ND	0.010	0.007
Manganese	0.050[b]	ND	0.067	ND
Nitrite and Nitrate, as N	10[a]	0.10	1.80	0.93
PHYSICAL PARAMETERS AND OTHER PROPERTIES				
Specific Conductance (uS/cm)	900[b]	233	600	495
Total Dissolved Solids (TDS)	500[b]	152	350	286
pH (units)		--	--	--
Alkalinity, as $CaCO_3$		52	91	78
Hardness, as $CaCO_3$		70	138	108
Turbidity (NTU)	5[b]	1	18	5
Organic Carbon, Dissolved		1.0	3.7	2.3
Organic Carbon, Total		1.0	3.9	2.5
Phosphate, Ortho, as P		0.01	0.10	0.04
Phosphorus, Total		0.02	0.15	0.06
TRACE METALS				
Aluminum	0.1[a]	--	--	--
Antimony	0.006[a]	--	--	--
Arsenic	0.010[a]	0.002	0.006	0.004
Barium	1[a]	--	--	--
Beryllium	0.004[a]	ND	ND	ND
Cadmium	0.005[a]	--	--	--
Chromium	0.050[a]	0.001	0.005	0.002
Copper	1[b]	0.001	0.003	0.002
Lead	0.015[a]	ND	ND	ND
Mercury	0.002[a]	--	--	--
Nickel	0.1[a]	--	--	--
Selenium	0.050[a]	0.001	0.002	0.001
Silver	0.1[b]	--	--	--
Thallium	0.002[a]	--	--	--
Zinc	5.0[b]	ND	ND	ND

Notes:
mg/L = milligrams per liter
uS/cm = microSiemens per centimeter
NTU = nephelometric turbidity units
-- = Not Analyzed
ND = Not detected above reporting limit
[1] Calculated bicarbonate concentration: Alkalinity x 1.2192
[a] Primary Maximum Contaminant Level (MCL)
[b] Secondary MCL

Table 6
Comparison of SWP and Groundwater Quality
Reche Spreading Grounds Recharge Feasibility Study
Bighorn-Desert View Water Agency

	Drinking Water Standards (MCLs)	MONITORING WELL		PRODUCTION WELL						
		BDVWA MW1	BDVWA MW2	BDVWA 6	BDVWA 7	BDVWA 9	HDWD 24	CSA W-70 1	CSA W-70 2	CSA W-70 3
		09/23/10	09/24/10	12/08/08	12/08/08	07/27/09	11/24/09	11/06/08	11/06/08	11/06/08
		(values in mg/L unless designated otherwise)								
MAJOR IONS										
Calcium		49	43	42	40	39	45	26	33	35
Magnesium		9	9	7	7	66	8	4	5	5
Potassium		5	5	3	3	3	2	2	2	3
Sodium		63	45	49	49	53	37	43	46	42
Bicarbonate[1]		230	210	190	200	170	210	140	160	170
Chloride	250[b]	17	34	18	18	24	12	18	20	17
Sulfate	250[b]	21	35	34	33	48	22	28	30	28
MINOR IONS										
Boron		0.18	0.16	0.15	0.13	0.12	--	ND	ND	0.15
Bromide		--	--	--	--	--	--	--	--	--
Iron	0.3[b]	0.3	0.5	ND	ND	ND	ND	ND	ND	ND
Manganese	0.050[b]	0.2	0.1	ND	ND	ND	ND	ND	ND	ND
Nitrite and Nitrate, as N	10[a]	0.6	0.5	1.5	1.6	2.3	1[c]	1.4	1.6	1.4
PHYSICAL PARAMETERS AND OTHER PROPERTIES										
Specific Conductance (mS/cm)	900[b]	530	440	440	450	480	440	350	390	390
Total Dissolved Solids (TDS)	500[b]	270	320	280	290	290	250	180	200	200
pH (units)	6.5-8.5[b]	7.7	7.9	7.9	7.9	8.1	7.8	8	8	7.9
Alkalinity, as $CaCO_3$		190	170	160	160	140	170	110	130	140
Hardness, as $CaCO_3$		140	130	130	130	120	150	80	110	110
Turbidity (NTU)	5[b]			0.1	0.3	ND	ND	ND	ND	ND
Organic Carbon, Dissolved		--	--	--	--	--	--	--	--	--
Organic Carbon, Total		--	--	--	--	--	--	--	--	--
Phosphate, Ortho, as P		--	--	--	--	--	--	--	--	--
Phosphorus, Total		--	--	--	--	--	--	--	--	--
TRACE METALS										
Aluminum	0.1[a]	0.4	0.61	ND	ND	ND	ND	ND	ND	ND
Antimony	0.006[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	0.010[a]	ND	ND	ND	ND	ND	0.0034	0.0041	0.0041	0.039
Barium	1[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beryllium	0.004[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.005[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (total)	0.050[a]	ND	ND	ND	ND	ND	0.0068	ND	ND	ND
Copper	1[b]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	0.015[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	0.002[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	0.1[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	0.050[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	0.1[b]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	0.002[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	5.0[b]	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
Data are from most recent water quality sample available for each well
mg/L = milligrams per liter
mS/cm = microSiemens per centimeter
NTU = nephelometric turbidity units
-- = Not Analyzed
ND = Not detected above reporting limit
[1] Calculated bicarbonate concentration: Alkalinity x 1.2192
[a] Primary Maximum Contaminant Level (MCL)
[b] Secondary MCL
[c] Calculated from nitrate (as NO_3) result

Figures

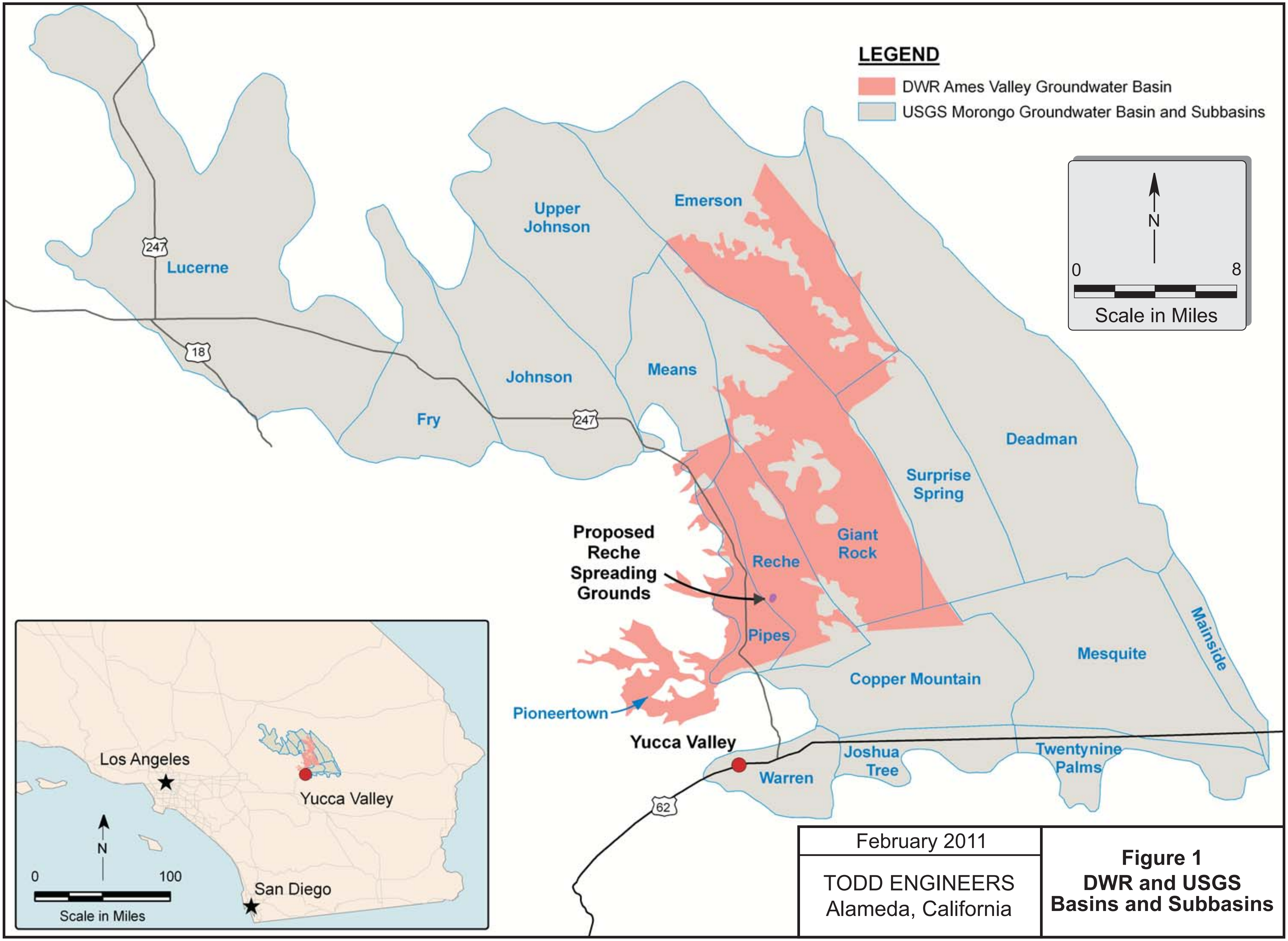

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Figure 1
DWR and USGS Basins and Subbasins

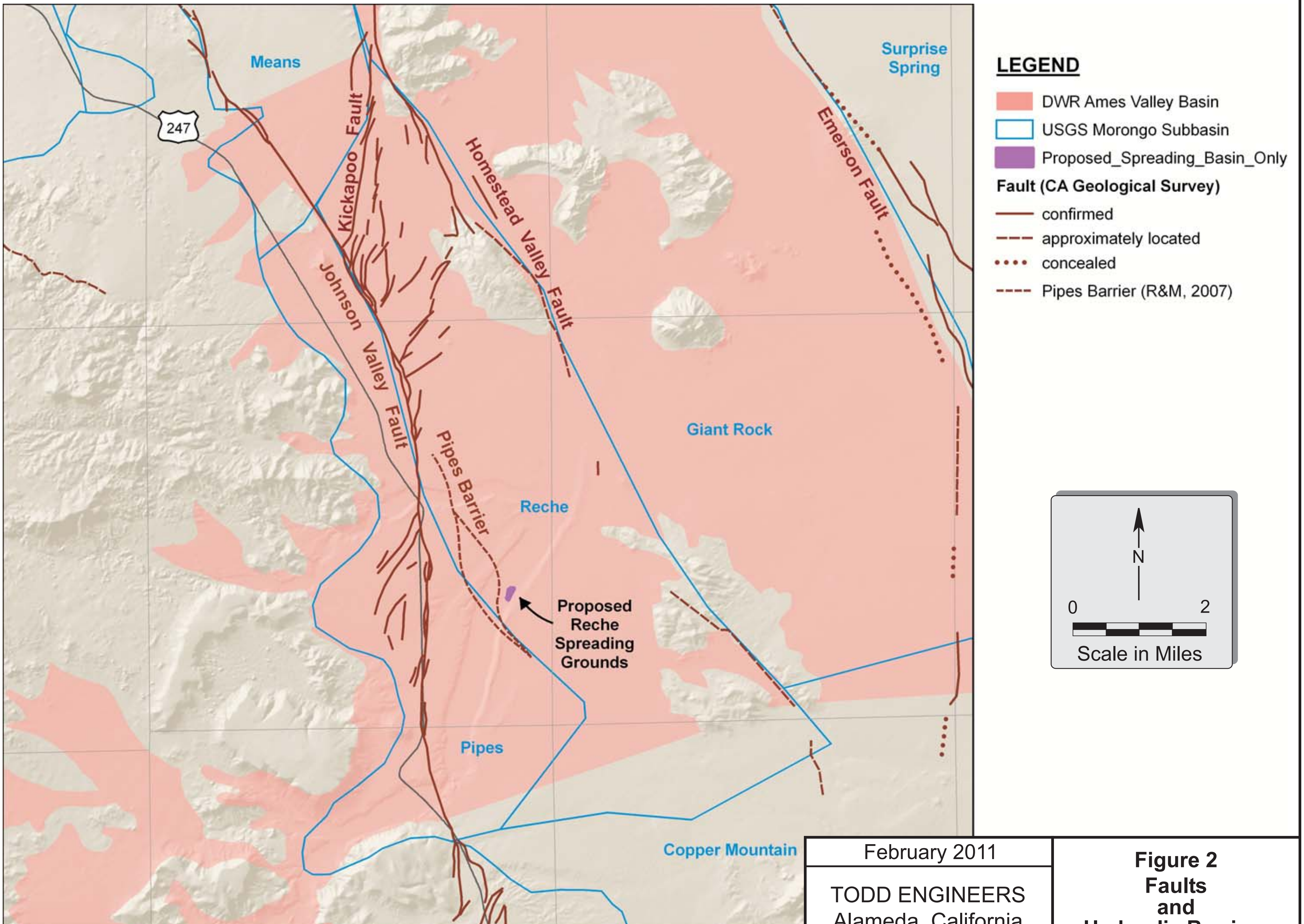

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Figure 2
Faults and Hydraulic Barriers

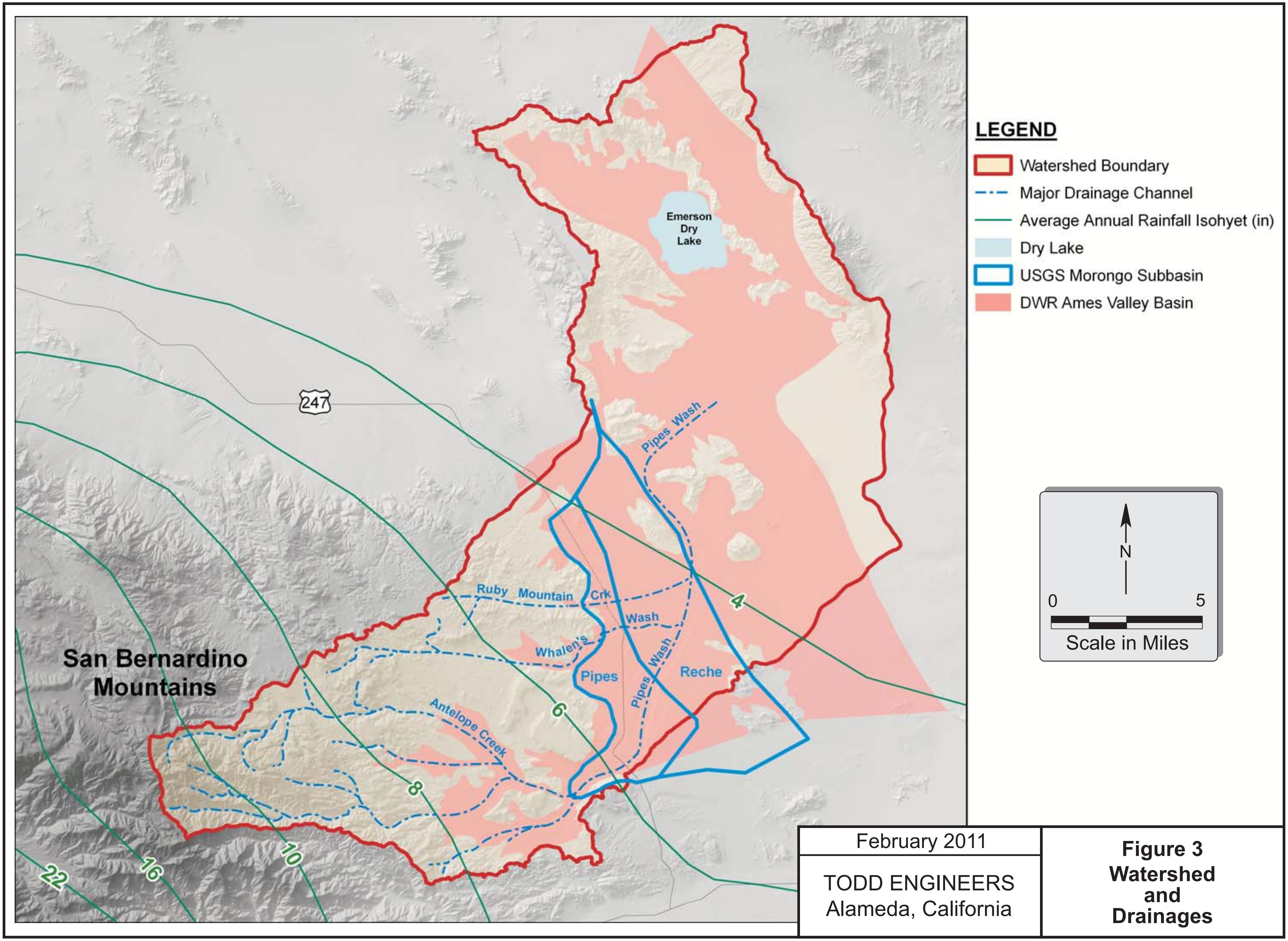

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Figure 3
Watershed and Drainages

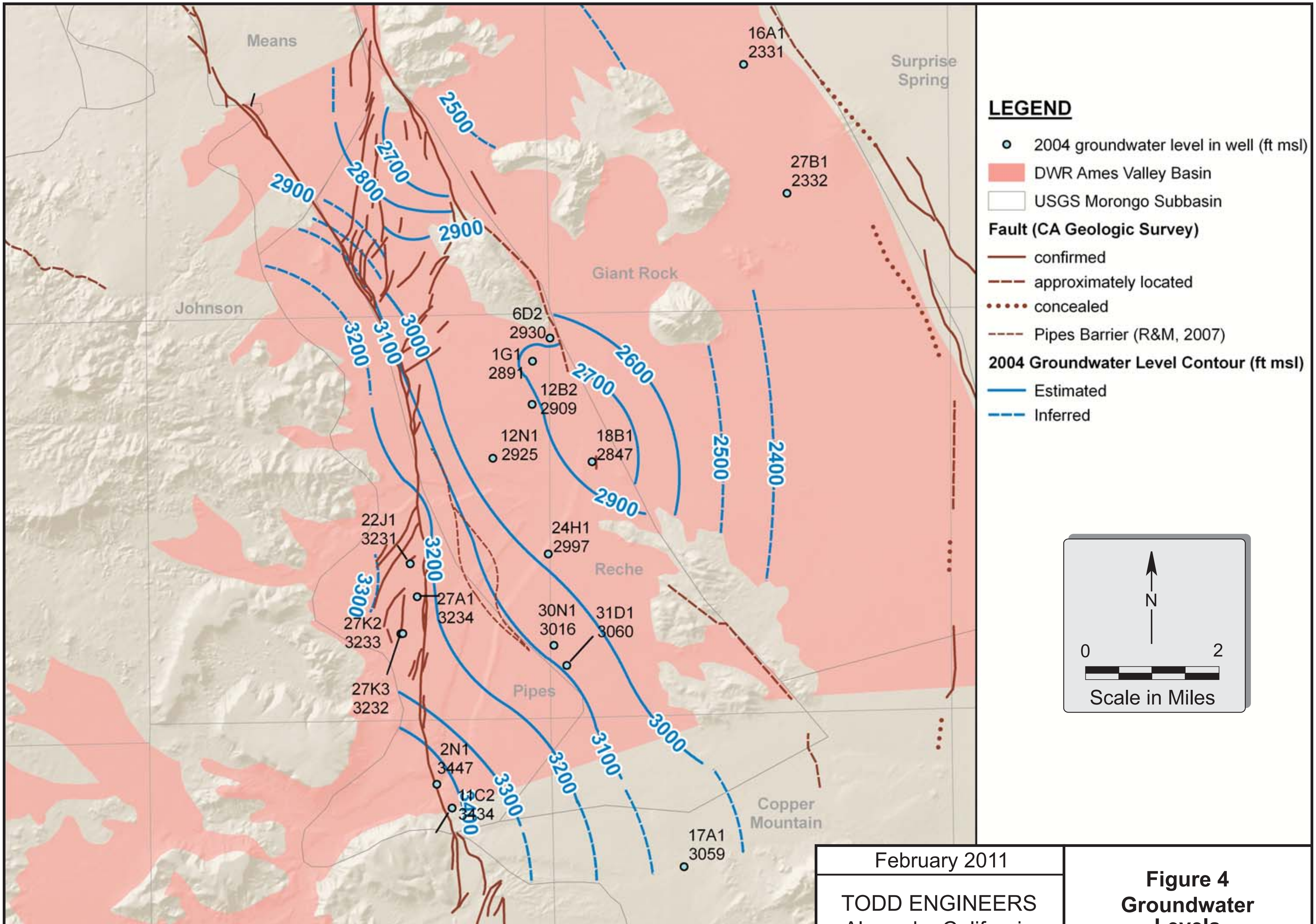

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Figure 4
Groundwater Levels

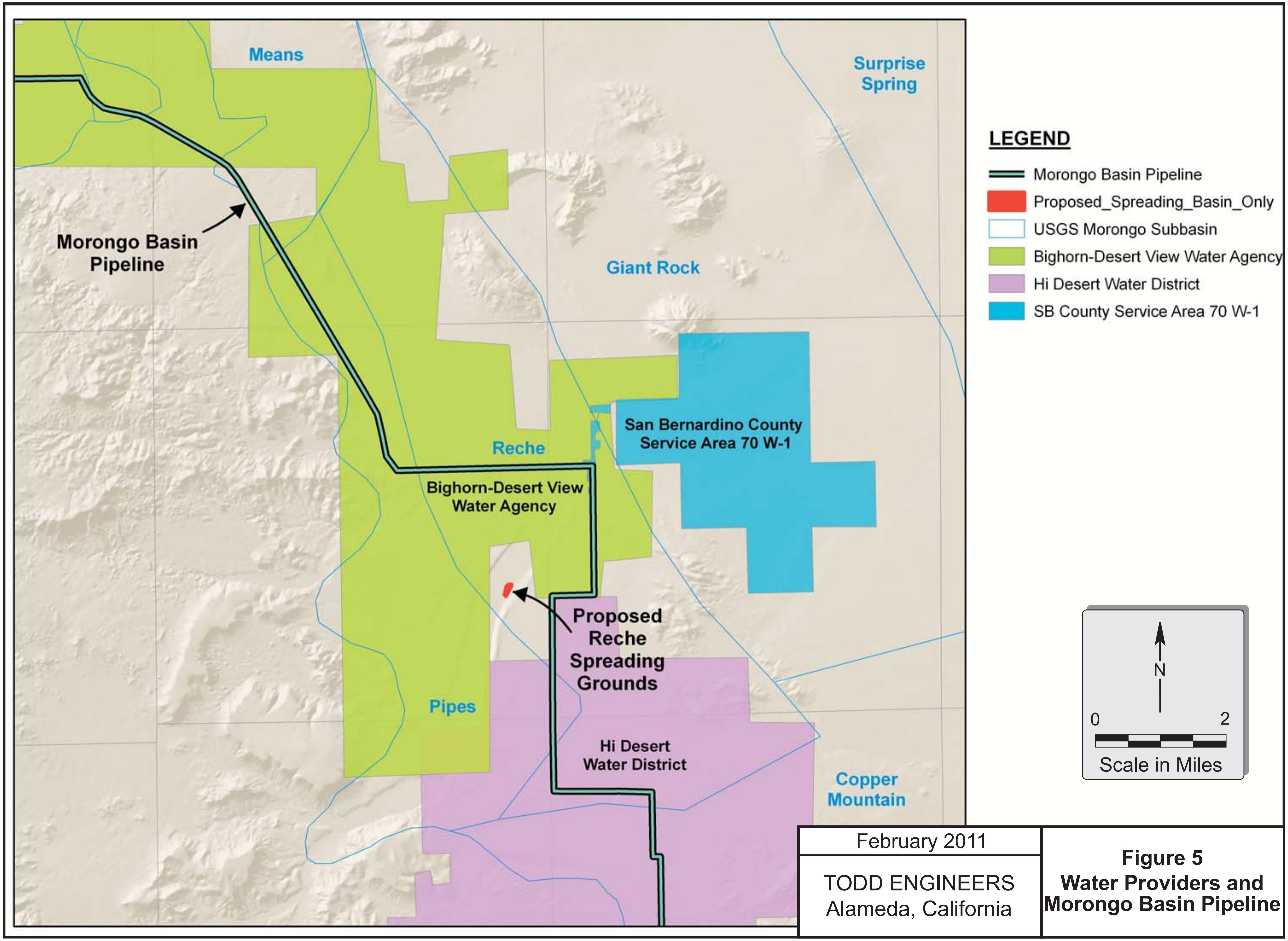

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Figure 5
Water Providers and Morongo Basin Pipeline

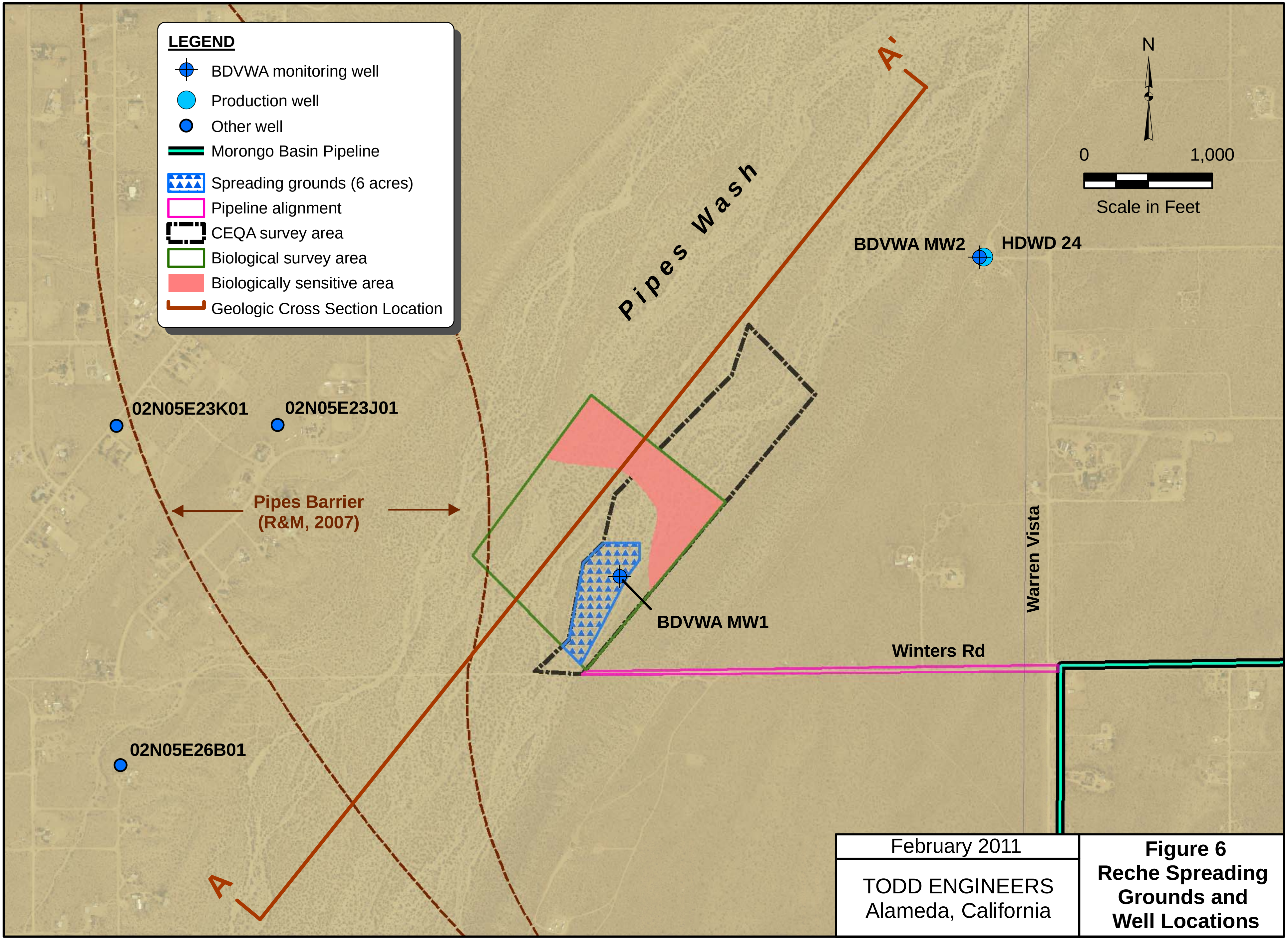

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Figure 6
Reche Spreading Grounds and Well Locations

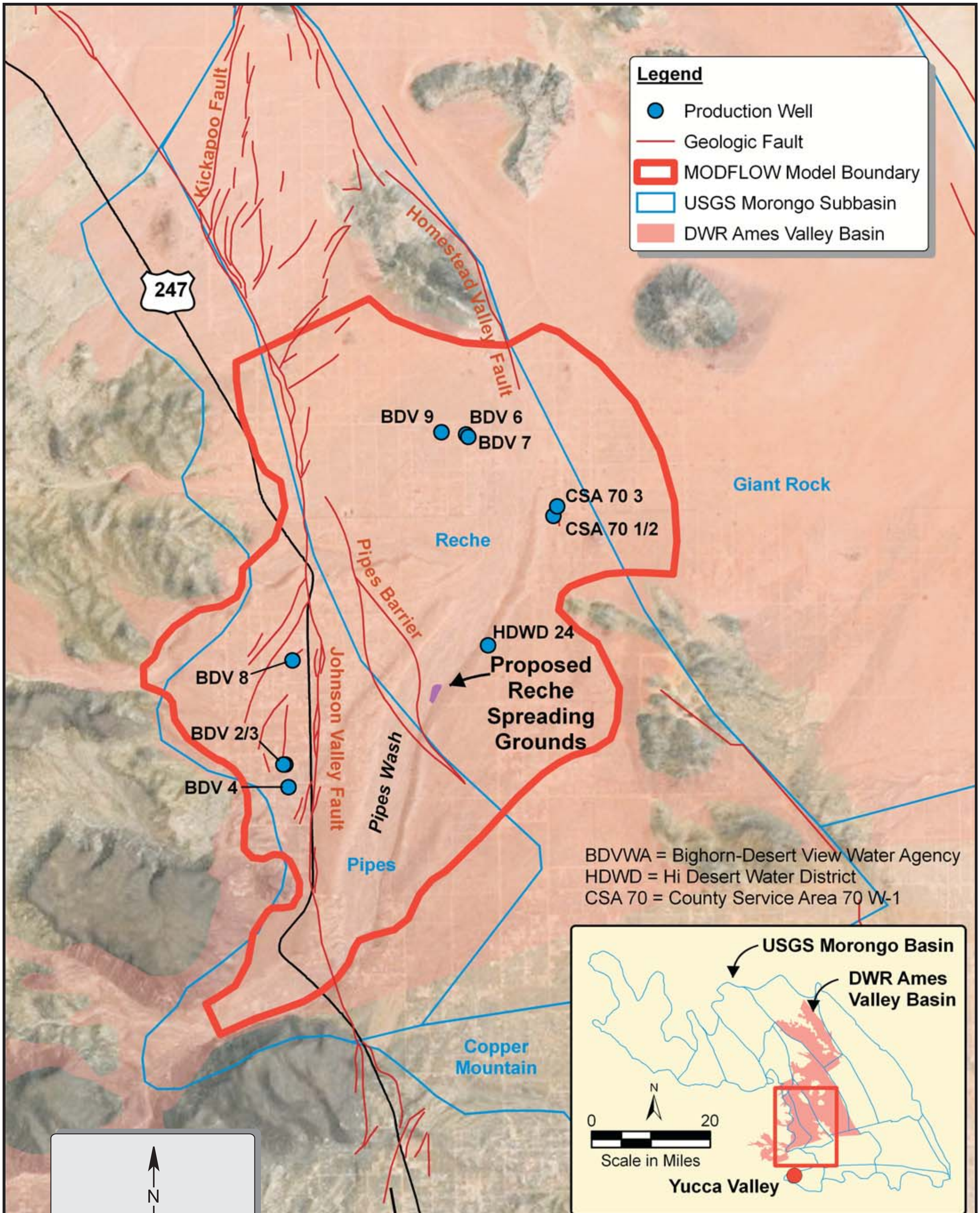

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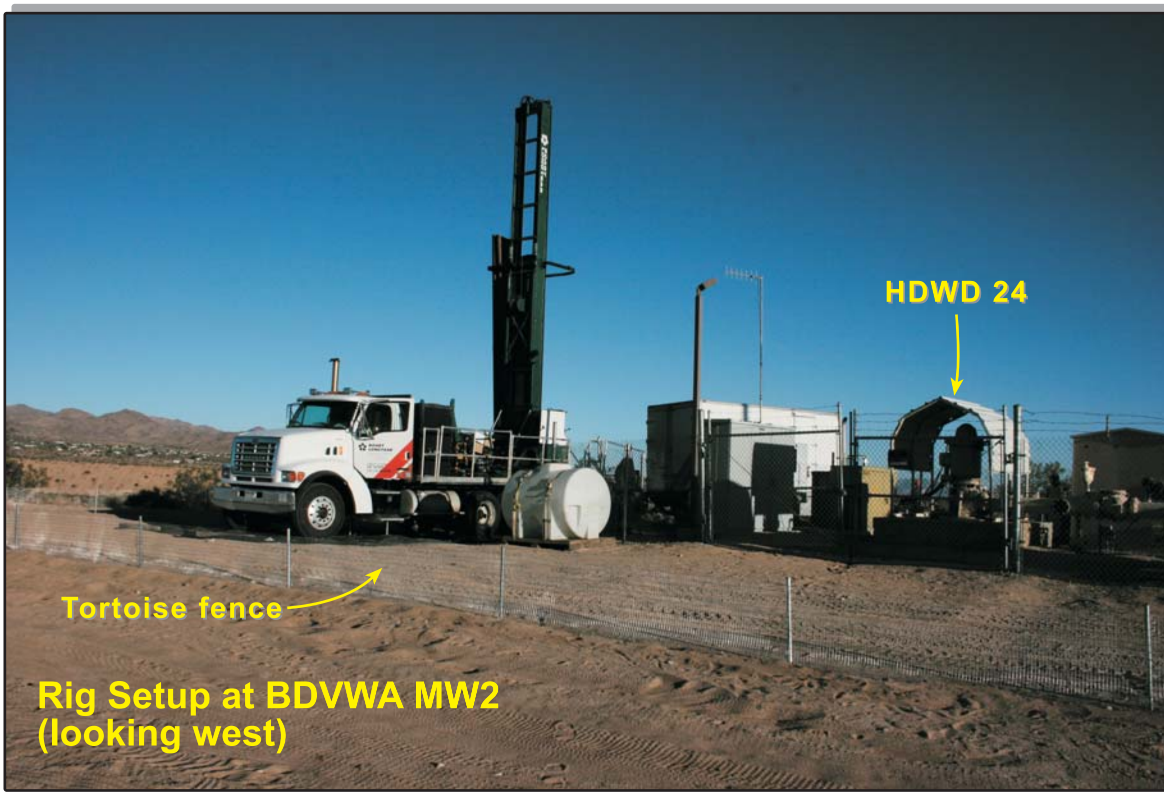
Figure 7
Groundwater Flow Model Area



February 2011	Figure 8 Sonic Drilling Rig Setup
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FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

PROJECT NO.: 62602
HOLE NO.: BDVWA MW1
ELEVATION: 3,230 (approx.)
DATE STARTED: 8/17/2010
Lat 34'14.336" Long 116'24.941"

PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE LOCATION: Pipes Wash
LOGGED BY: Ryan Strandberg
DATE FINISHED: 9/11/2010

DRILLING INFORMATION

DRILLING AGENCY: Boart Longyear
DRILLER: Ken
DRILLING EQUIPMENT: Track-mounted Sonic
DRILLING METHOD: Sonic
DRILL BIT: 8-inch
SAMPLE TYPE: Core
SAMPLES TAKEN: Continuous
FIRST WATER: 236 feet
TOTAL DEPTH: 257 feet

COMPLETION/INFORMATION

CASING SIZE & TYPE: 4-inch PVC Schedule 80
CASED INTERVAL: 0 - 236 feet
SCREEN SIZE AND TYPE: PVC Schedule 80 0.020 slot
SCREENED INTERVAL: 236 - 256 feet
FILTER PACK: #2/12 Lapus Lustre Sand
PACKED INTERVAL: 231 - 256.5 Feet
SEAL/BUFFER TYPE: Enviroplug Medium
SEAL/BUFFER INTERVAL: 228 - 231 feet
SURFACE SEAL TYPE: Cement - bentonite
SURFACE SEAL INTERVAL: 0 - 228 feet
WELLHEAD: Above Grade Riser 3' stovepipe

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
0	Well graded Sand (SW) 2.5YR 6/3 Fine to coarse with trace pea gravel, subangular to subrounded, loose, dry.				
4	Sand (SP) 10YR 5/3 Fine with trace medium, subangular to subrounded, medium dense, damp.				
5	Trace Coarse Sand				
10	Sand (SW) 10YR 5/4 Fine to coarse, subangular to subrounded, dense, damp to dry.			10 - 12.5	10 - 12.5
15	Trace Fine to coarse Gravel				
20					
23	Trace Cobbles (3"), subrounded, dry				
25	No trace Gravel/Cobbles. Few Silt (10 to 15%)			25 - 27.5	25 - 27.5
30					
35					

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FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

PROJECT NO.: 62602
PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE NO.: BDVWA MW1
HOLE LOCATION: Pipes Wash
ELEVATION: 3,230 (approx.)
LOGGED BY: Ryan Strandberg
DATE 8/17/2010
DATE FINISHED: 9/11/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
	Tough Drilling (large rock fragments in core barrel) Sand (SW) 10YR 5/4 Fine to Coarse with trace of fine gravel, subangular to subrounded, very dense, dry.				
40					
	Sand (SP) 10YR 6/3 Fine to medium with trace of coarse, subangular to subrounded, very dense, dry.				
45	Sand (SW) 10YR 6/3 Fine to coarse with gravel, subangular to subrounded, medium dense, dry.				
50	Few gravel (10 - 15%) from 50’ to 55’ bgs				50 - 52.5
55					
	Sand (SP) 10YR 6/3 Fine to medium with trace coarsw, subangular to subrounded, dense, dry.				
60	Trace fine gravel				
65					
	1” silty SAND, dense, fine, very dense, damp to dry.				
	Sand (SW) 10YR 6/4 Fine to coarse with trace fine to coarse gravel, subangular to subrounded, very dense, damp.				
70					
75					

TODD ENGINEERS Alameda, California	FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1
	PROJECT NO.: 62602 — PROJECT LOCATION: BDVWA - Reche Recharge FS
	HOLE NO.: BDVWA MW1 — HOLE LOCATION: Pipes Wash
	ELEVATION: 3,230 (approx.) — LOGGED BY: Ryan Strandberg
	DATE 8/17/2010 — DATE FINISHED: 9/11/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
80					
	10YR 5/4. No trace fine to coarse gravel				
	10YR 6/1. 4" dense (same as above) with few (10%) silt				
85	Sand (SW) 10YR 6/4 Fine to coarse with fine gravel, subangular to subrounded, very dense, dry to damp.				
90	Fine to coarse gravel.				
	Cobbles up to 5" from 93' to 95'.				
95					
	6" cobbles at 98.5' bgs. Trace fine to coarse gravel				
100					100 - 102.5
105					
110	Sand (SW) 10YR 5/4 Fine to medium with few (10-15%) coarse and trace fine gravel, subangular to subrounded, very dense, dry to damp.				
115	Sand (SW) 10YR 7/2 Fine to coarse with fine to coarse gravel subangular to subrounded, very dense, dry.				

TODD ENGINEERS Alameda, California	FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

PROJECT NO.:	62602	PROJECT LOCATION:	BDVWA - Reche Recharge FS
HOLE NO.:	BDVWA MW1	HOLE LOCATION:	Pipes Wash
ELEVATION:	3,230 (approx.)	LOGGED BY:	Ryan Strandberg
DATE	8/17/2010	DATE FINISHED:	9/11/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
	Higher % coarse sand at 120' bgs				
	Degraded cobble at 122.5'				
125					
	Sand (SW) 10YR 6/4 Fine to medium with trace coarse, subangular to subrounded, dense, dry.				
130	Slightly cemented material from 129.5' to 130' bgs				
135					
140	Trace fine to coarse gravel and cobbles (~4")				
145	Sand (SW) 10YR 6/4 Fine with trace fine to coarse gravel, subangular to subrounded, very dense, dry to damp.				
150				Sample	150 - 152.5
155	Sand (SW) 10YR 6/4 Fine to medium with trace coarse, subangular to subrounded, very dense, dry to damp.				
160					

TODD ENGINEERS
Alameda, California

FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

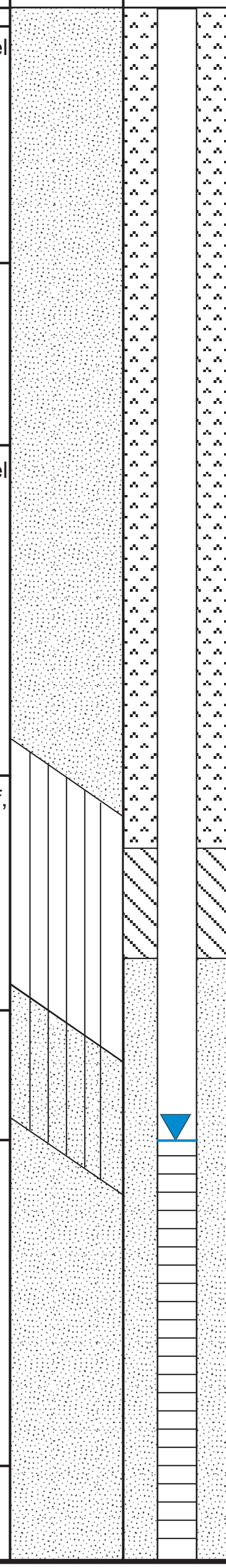
PROJECT NO.: 62602 PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE NO.: BDVWA MW1 HOLE LOCATION: Pipes Wash
ELEVATION: 3,230 (approx.) LOGGED BY: Ryan Strandberg
DATE 8/17/2010 DATE FINISHED: 9/11/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
165	Sand (SW) 10YR 6/4 Fine to coarse with trace fine gravel, subangular to subrounded, very dense, damp.				
170					
175					
	3" silty clayey Sand (same as above), dense at 178" bgs.				
180					
185	Sand (SW) 10YR 6/4 Fine to coarse with trace fine to coarse gravel, subangular to subrounded, very dense, damp.				
	4" cobble observed in sample.				
190					
195					
200					
	Sand (SP) 10YR 5/3 Fine to medium, subangular to subrounded, medium.				

TODD ENGINEERS Alameda, California	FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

PROJECT NO.:	62602	PROJECT LOCATION:	BDVWA - Reche Recharge FS
HOLE NO.:	BDVWA MW1	HOLE LOCATION:	Pipes Wash
ELEVATION:	3,230 (approx.)	LOGGED BY:	Ryan Strandberg
DATE	8/17/2010	DATE FINISHED:	9/11/2010

GRAPHIC LOG: LITHOLOGY, WELL COMPLETION



DEPTH (FEET)	LITHOLOGIC DESCRIPTION	LABORATORY SAMPLES INTERVAL	REMARKS
	Sand (SW) 10YR 6/4 Fine to coarse with fine to coarse gravel and trace cobbles (up to 5”), subangular to subrounded, very dense, dry to damp.		
210			
	Sand (SP) 10YR 6/2 Fine to medium with trace coarse, and trace fine gravel, subangular to subrounded, dense, damp.		
215			
	Sand (SW) 10YR 6/2 Fine to coarse with fine to coarse gravel and cobbles (up to 4”), subangular to subrounded, very dense, damp.		
220			
225	Very tough drilling conditions. Large boulder. Driller estimates ~3’ thick.		
	Sandy Silt (ML) 10YR 4/3 Fine to medium Sand, medium stiff, very low plasticity, damp.		
230			
	Silty Sand (SM) 10YR 5/3 Fine to medium, subangular to subrounded, medium dense, damp.		
235	Trace gravel (fine to coarse) from 235’ - 236’		
	Sand (SP) 10YR 5/3 Fine to medium, subangular to subrounded, very dense, wet.		
	6” Fine to coarse Sand, dense, 239’ - 239.5’		
240	Slight Silt component 240.5’ - 241’		
		242.5 - 245	242.5 - 245
245	Sand (SW) 10YR 5/3 Fine to coarse with trace fine to coarse gravel, subangular to subrounded, dense, wet.		

TODD ENGINEERS Alameda, California	FIGURE 9 EXPLORATORY BORING/WELL LOG FOR BDVWA MW1

PROJECT NO.:	62602	PROJECT LOCATION:	BDVWA - Reche Recharge FS
HOLE NO.:	BDVWA MW1	HOLE LOCATION:	Pipes Wash
ELEVATION:	3,230 (approx.)	LOGGED BY:	Ryan Strandberg
DATE	8/17/2010	DATE FINISHED:	9/11/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
250					
	Silty Sand dense (same as above) from 253' - 253.5' bgs.				
255					
	Total Depth = 256.5' bgs				
260					

TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2

PROJECT NO.: 62602	PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE NO.: BDVWA MW2	HOLE LOCATION: Pipes Wash adazcent to HDWD 24
ELEVATION: 3,307 (approx.)	LOGGED BY: Ryan Strandberg
DATE STARTED: 9/08/2010	DATE FINISHED: 9/16/2010
Lat 34'14.700" Long 116'24.380"	

DRILLING INFORMATION	COMPLETION/INFORMATION
DRILLING AGENCY: Boart Longyear	CASING SIZE & TYPE: 4-inch PVC Schedule 80
DRILLER: Ken	CASED INTERVAL: 0 - 298 feet
DRILLING EQUIPMENT: Truck-mounted Sonic	SCREEN SIZE AND TYPE: PVC Schedule 80 0.020 slot
DRILLING METHOD: Sonic	SCREENED INTERVAL: 298 - 348 feet
DRILL BIT: 8-inch SAMPLE TYPE: Core	FILTER PACK: #2/12 Lapus Lustre Sand
SAMPLES TAKEN: Continuous	PACKED INTERVAL: 293 - 348.5 Feet
FIRST WATER: 298 feet	SEAL/BUFFER TYPE: Enviroplug Medium
TOTAL DEPTH: 348.5 feet	SEAL/BUFFER INTERVAL: 288 - 293 feet
	SURFACE SEAL TYPE: Cement - bentonite
	SURFACE SEAL INTERVAL: 0 - 228 feet
	WELLHEAD: At grade Christy box

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
0	Sand (SP) 10YR 5/4 Fine to medium, subangular to subrounded, dense, dry.				
5					
10					
15					
20					
25	Trace coarse grains				
25	Sand (SW) 10YR 5/6 Fine to coarse with trace fine gravel, subangular to subrounded, very dense, dry.				
30					
35					

TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2	
	PROJECT NO.: 62602	PROJECT LOCATION: BDVWA - Reche Recharge FS
	HOLE NO.: BDVWA MW2	HOLE LOCATION: Pipes Wash
	ELEVATION: 3,307 (approx.)	LOGGED BY: Ryan Strandberg
	DATE 9/08/2010	DATE FINISHED: 9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
40	Sand (SP) 10YR 5/4 Fine to medium with trace of coarse Sand and fine Gravel, subangular to subrounded, very dense, dry.				
45	Fine to coarse Gravel lenses from 46’ - 46.5’ bgs				
	Sand (SW) 10YR 5/4 Fine to coarse with trace of fine Gravel, subangular to subrounded, very dense, dry.				
50	Increased fine to coarse Gravel (~25%) observed at 53’ bgs				
55	Sand (SP) 10YR 6/3 Fine with trace medium to coarse Sand and fine Gravel, subangular to subrounded larger grains, medium dense, dry.				
	Sand (SW) 10YR 6/4 Fine to coarse with trace of fine to coarse Gravel, subangular to subrounded, very dense, dry.				
60					
65					
70	Higher percent fines (~60%) from 73’ - 77.5’ bgs				
75					

TODD ENGINEERS Alameda, California	**FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2**

PROJECT NO.:	62602	PROJECT LOCATION:	BDVWA - Reche Recharge FS
HOLE NO.:	BDVWA MW2	HOLE LOCATION:	Pipes Wash
ELEVATION:	3,307 (approx.)	LOGGED BY:	Ryan Strandberg
DATE	9/08/2010	DATE FINISHED:	9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
80					
85	Sand (SP) 10YR 6/4 Fine to medium, subangular to subrounded, dense, dry. 1" Silt, dense @ 85.5' bgs				
	Sand (SW) 10YR 6/4 Fine to coarse with trace fine to coarse, Gravel, subangular to subrounded, very dense, dry.				
90					
95					
100					
105	Increased coarse Gravel from 105' - 106.5' bgs				
110					
115					

TODD ENGINEERS
Alameda, California

FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2

PROJECT NO.: 62602
PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE NO.: BDVWA MW2
HOLE LOCATION: Pipes Wash
ELEVATION: 3,307 (approx.)
LOGGED BY: Ryan Strandberg
DATE: 9/08/2010
DATE FINISHED: 9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
	Sand (SP) 10YR 6/4 Fine to medium with trace coarse Sand, subangular to subrounded, dense, dry.				
	Sand (SW) 10YR 6/4 Fine to coarse with fine to coarse Gravel, subangular to subrounded, very dense, dry.				
	Increased Gravel from 122.5' - 123.5 bgs				
125					
	4" cobble observed at 127' bgs				
	1-foot silty Sand lens from 127' - 128' bgs				
130					
135					
	Sand (SW) 10YR 5/4 Fine to coarse, subangular to subrounded, very dense, dry to damp.				
140					
	Fine to coarse gravels present from 141' - 143' bgs				
145					
	Trace fine Gravel present				
150					
	3" silty Sand lens				
155	4" cobble at 155' bgs				
	Sand (SW) 10YR 6/4 Fine to coarse with trace fine to coarse Sand, subangular to subrounded, very dense, dry to damp.				
160	Cobbles (~3") at 159' bgs				

TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2
	PROJECT NO.: 62602 — PROJECT LOCATION: BDVWA - Reche Recharge FS
	HOLE NO.: BDVWA MW2 — HOLE LOCATION: Pipes Wash
	ELEVATION: 3,307 (approx.) — LOGGED BY: Ryan Strandberg
	DATE 9/08/2010 — DATE FINISHED: 9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
163	Cobbles (~4") at 163' bgs				
165					
170					
175					
177	Cobbles up to 5" observed at 177' bgs				
178	Sand (SP) 10YR 6/4 Fine to medium with trace coarse, subangular to subrounded, very dense, dry to damp.				
180	Sand (SW) 10YR 6/4 Fine to coarse with trace fine to coarse, subangular to subrounded, very dense, dry to damp.				
185					
190					
195					
196	No trace Gravel				
200					
204	Fine to coarse Gravel from 204' - 205' bgs				

TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2	
	PROJECT NO.: 62602	PROJECT LOCATION: BDVWA - Reche Recharge FS
	HOLE NO.: BDVWA MW2	HOLE LOCATION: Pipes Wash
	ELEVATION: 3,307 (approx.)	LOGGED BY: Ryan Strandberg
	DATE 9/08/2010	DATE FINISHED: 9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
	Silty Sand (SM) 10YR 5/4 Fine to coarse, subangular to subrounded, dense, dry to damp.				
210					
	Sand (SW) 10YR 6/4 Fine to coarse with trace fine Gravel, subangular to subrounded, very dense, dry.				
215					
220					
	Coarse Gravel and cobbles (up to 5") observed from 222.5' - 223' bgs				
	Sandy Silt (ML) 10YR 5/4 Fine Sand, medium stiff, very low plasticity, damp.				
225					
	Sand (SW) 10YR 6/3 Fine to coarse with trace fine to coarse Gravel, subangular to subrounded, very dense, dry.				
230					
235					
	Increased fine to coarse Gravel from 238.5' - 239' bgs				
240					
	Higher percentage fines (~35%) at 242'				
245					
	4" cobble observed at 246.5' bgs				

TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2

PROJECT NO.:	62602	PROJECT LOCATION:	BDVWA - Reche Recharge FS
HOLE NO.:	BDVWA MW2	HOLE LOCATION:	Pipes Wash
ELEVATION:	3,307 (approx.)	LOGGED BY:	Ryan Strandberg
DATE	9/08/2010	DATE FINISHED:	9/16/2010

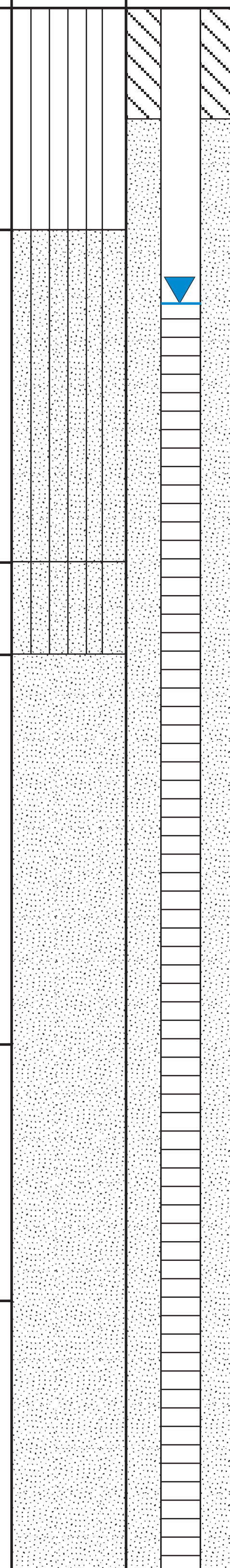
DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
250	Sand (SP) 10YR 5/3 Fine to medium, subangular to subrounded, dense, damp to dry.				
	Sand (SW) 10YR 6/4 Fine to coarse with fine to coarse Gravel, subangular to subrounded, very dense, dry.				
255	Sandy Silt (ML) 10YR 4/4 Fine to medium Sand, stiff, very low plasticity, damp. Fine to coarse Sand lens from 258.5' - 259.5' bgs. Cobble lens to large fractured rock from 261' - 262.5' bgs.				
260					
	Sand (SW) 10YR 6/3 Fine to coarse with trace fine Gravel, subangular to subrounded, very dense, dry.				
265	Sand (SP) 10YR 7/3 Fine to medium with trace coarse, subangular to subrounded, dense, dry. Slightly Silty from 269 - 270' bgs.				
270	Sand (SW) 10YR 7/3 Fine to coarse with fine to coarse Gravel, subangular to subrounded, very dense, dry.				
275					
	Sand (SP) 10YR 7/2 Fine to medium with fine to coarse Gravel, trace coarse grains, subangular to subrounded, very dense, dry.				
280	Sand (SW) 10YR 6/3 Fine to coarse with fine to coarse Gravel, subangular to subrounded, very dense, dry. Medium Sand lens from 281' - 282' bgs. Silt lens from 282.5' - 283' bgs.				
285	Sand (SP) 10YR 6/4 Fine to medium with trace coarse grains and trace fine to coarse Gravel, subangular to subrounded, very dense, dry.				
	Silty Sand (SM) 10YR 5/4 Fine to medium with trace coarse, subangular to subrounded, dense, moist to wet.				

TODD ENGINEERS
Alameda, California

FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2

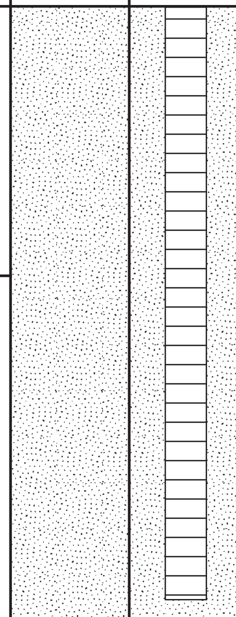
PROJECT NO.: 62602
PROJECT LOCATION: BDVWA - Reche Recharge FS
HOLE NO.: BDVWA MW2
HOLE LOCATION: Pipes Wash
ELEVATION: 3,307 (approx.)
LOGGED BY: Ryan Strandberg
DATE 9/08/2010
DATE FINISHED: 9/16/2010

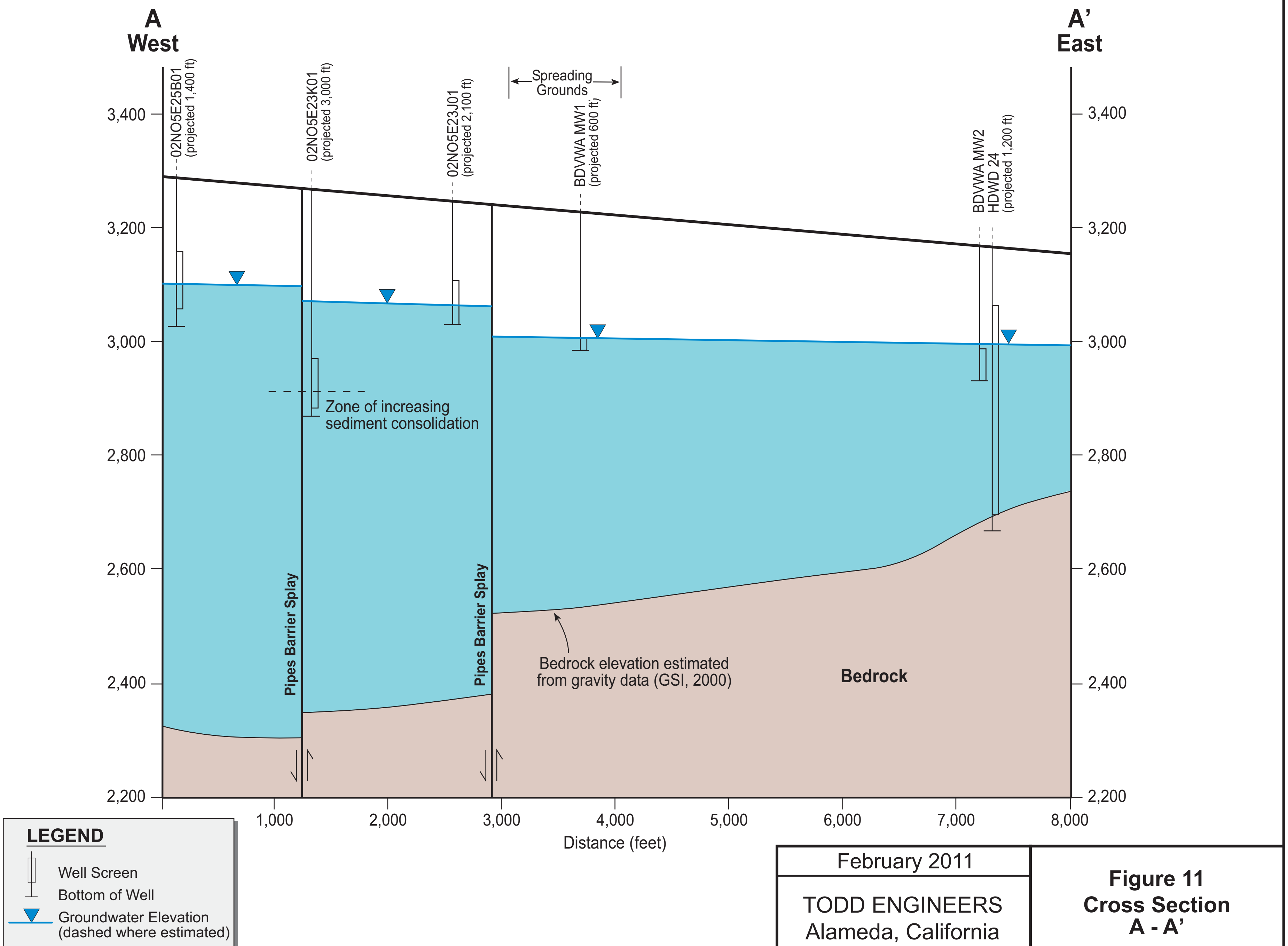
DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
295	Sandy Silt (ML) 10YR 4/3 Fine to coarse Sand, medium stiff, low plasticity, moist. 6” cobble observed at 294’ bgs.				
300	Silty Sand (SM) 10YR 5/3 Fine to coarse, subangular to subrounded, dense, moist to wet. Wet. 6” fine to medium Sand and lense from 300.5’ - 301’ bgs.				
305	Sandy Silt to Silty Sand (ML/SM) 10YR 5/4 Fine to coarse Sand, medium stiff, low plasticity, moist to wet. Fine to coarse Gravel observed at 306’ bgs Silty Sand at 306.5 bgs				
310, 315	Sand (SW) 10YR 5/3 Fine to coarse with trace fine to coarse Gravel, subangular to subrounded, very dense, wet.				
320	Sand (SP) 10YR 5/3 Fine to medium, subangular to subrounded, dense, wet.				
325, 330	Sand (SW) 10YR 5/3 Fine to coarse with trace fine to coarse Gravel, subangular to subrounded, very dense, wet.				



TODD ENGINEERS Alameda, California	FIGURE 10 EXPLORATORY BORING/WELL LOG FOR BDVWA MW2	
	PROJECT NO.: 62602	PROJECT LOCATION: BDVWA - Reche Recharge FS
	HOLE NO.: BDVWA MW2	HOLE LOCATION: Pipes Wash
	ELEVATION: 3,307 (approx.)	LOGGED BY: Ryan Strandberg
	DATE 9/08/2010	DATE FINISHED: 9/16/2010

DEPTH (FEET)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: LITHOLOGY	GRAPHIC LOG: WELL COMPLETION	LABORATORY SAMPLES INTERVAL	REMARKS
335					
	4” cobble observed at 248’ bgs				
340	Sand (SP) 10YR 5/3 Fine to medium, subangular to subrounded, dense, wet.				
	Silty Sand lens from 344’ - 345’ bgs.				
345	Trace fine Gravel present from 345’ - 352’ bgs.				
350	**Total Depth = 348.5’ bgs**				





February 2011

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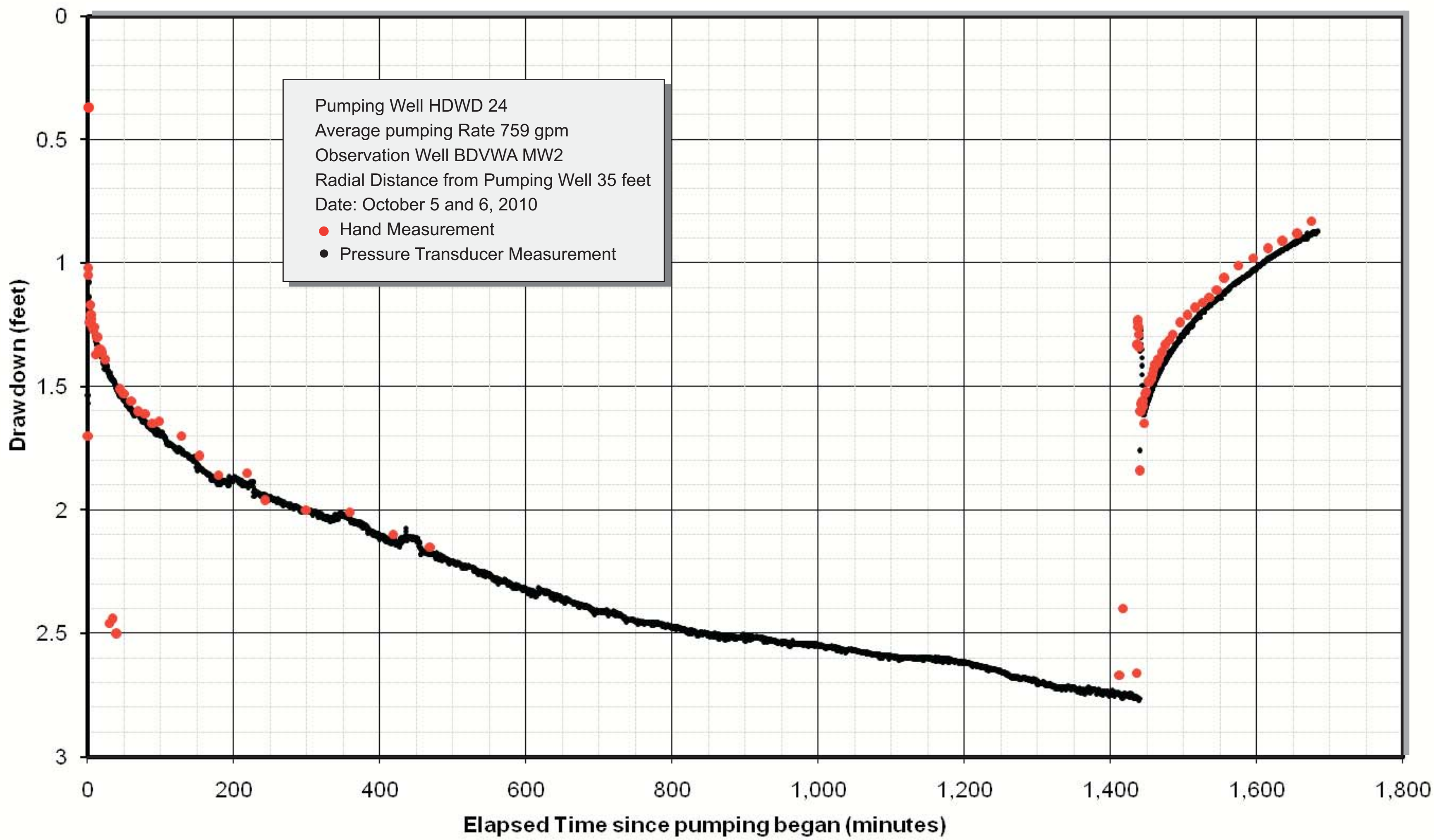
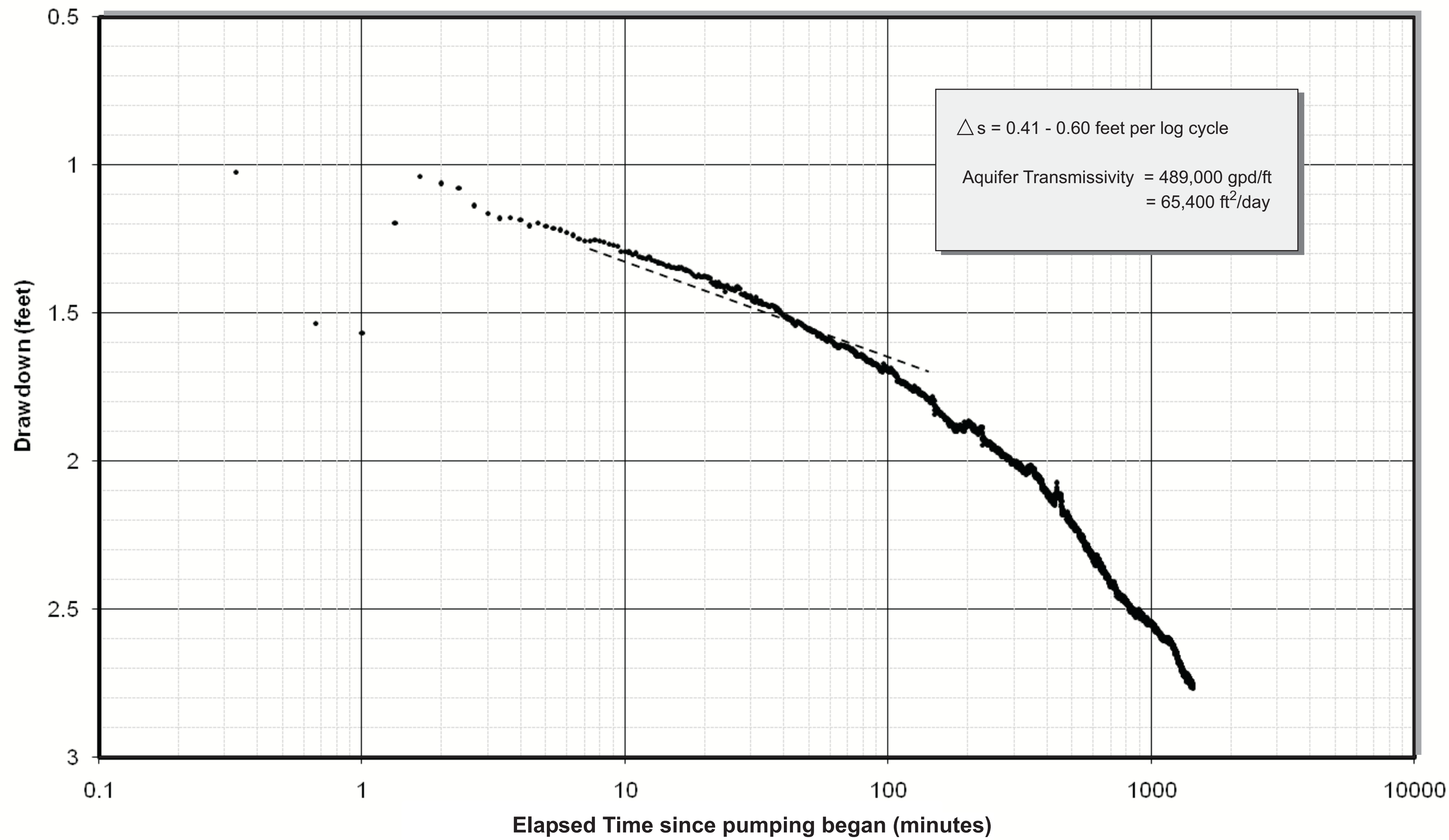
Alameda, California

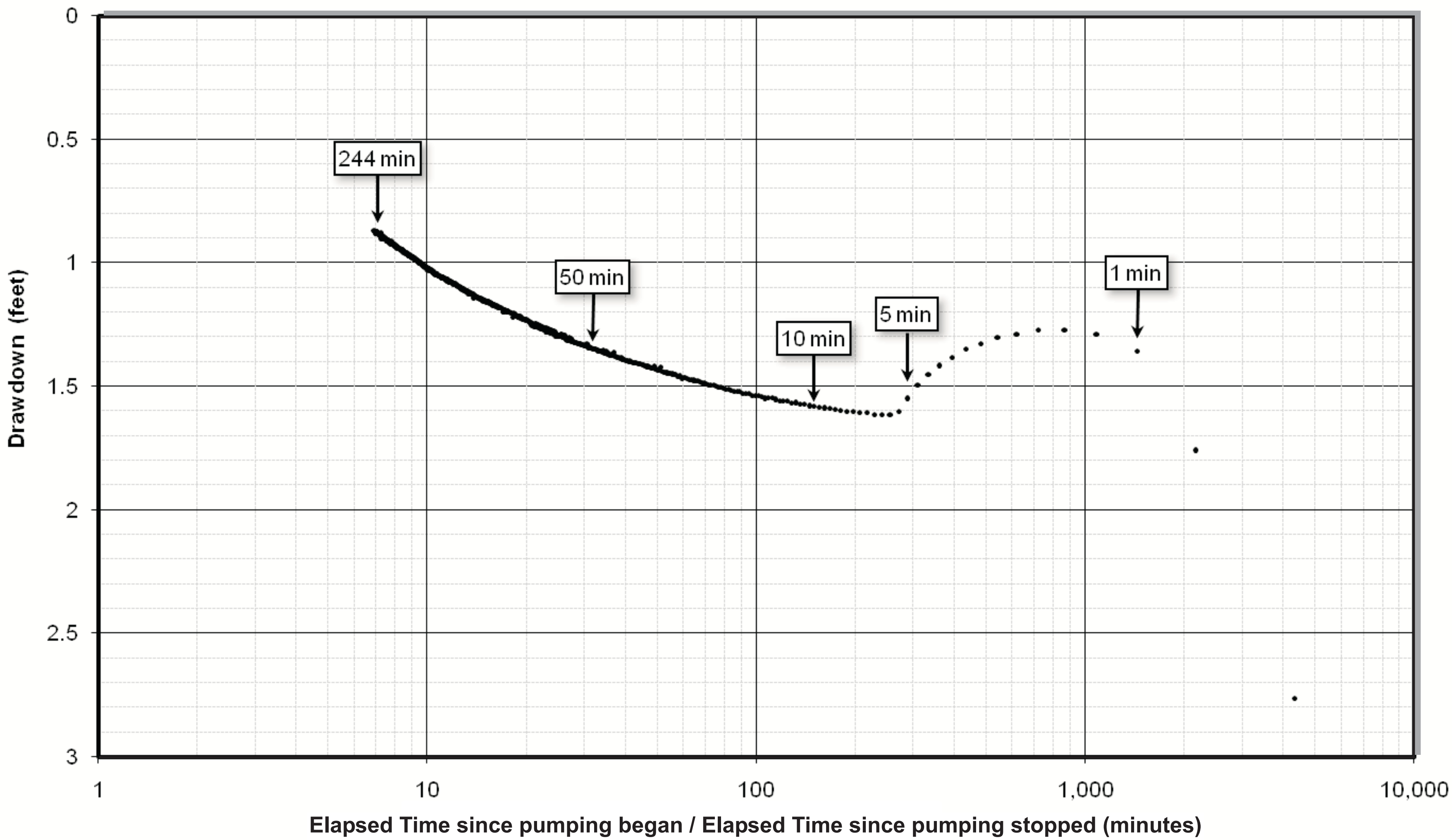
Figure 11
Cross Section
A - A'



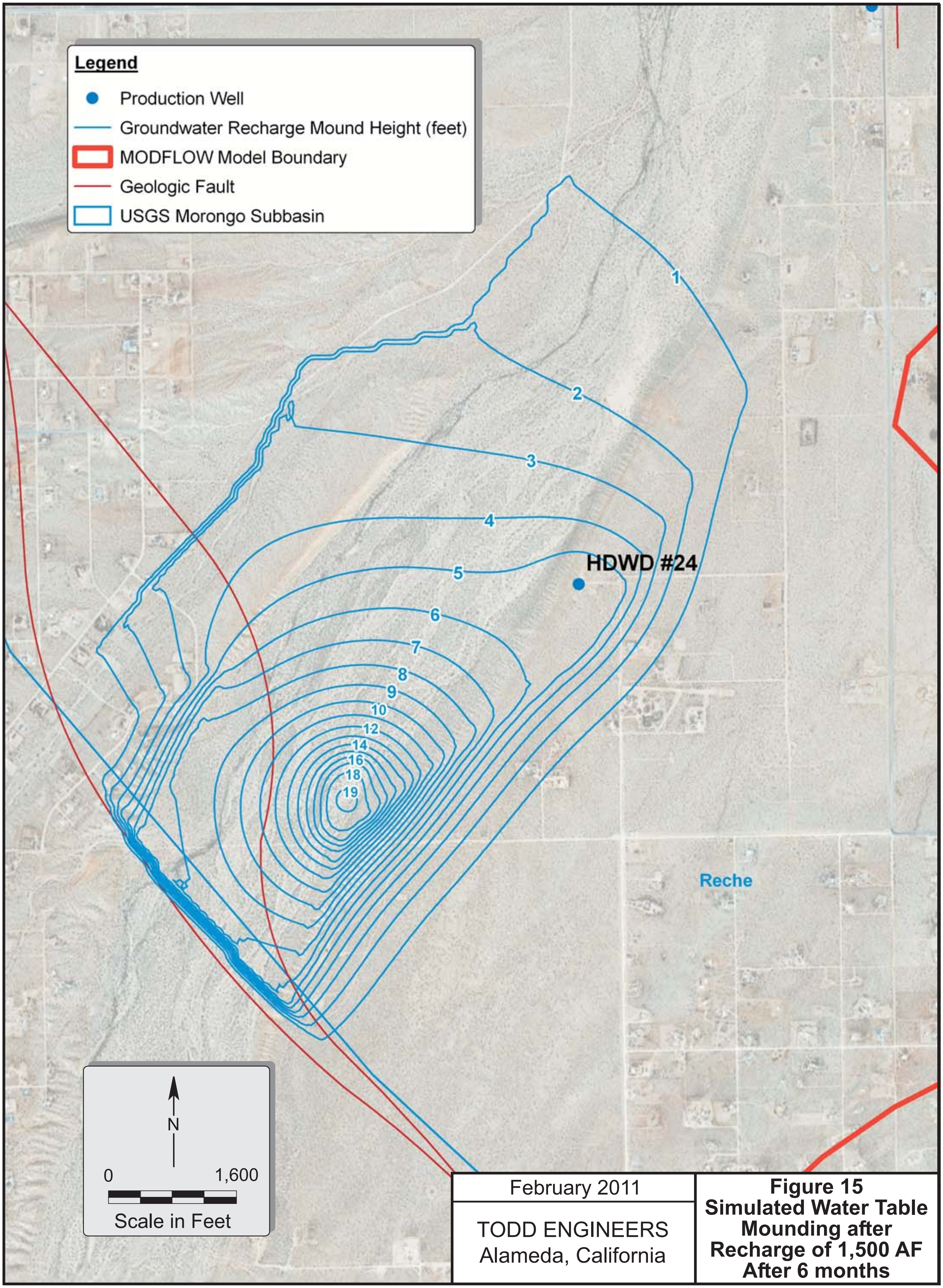
February 2011	**Figure 12 Drawdown and Recovery over Time in Observation Well BDVWA MW2**
TODD ENGINEERS Alameda, California	



February 2011	**Figure 13 Drawdown over Log Time in Observation Well BDVWA MW2**
TODD ENGINEERS Alameda, California	



February 2011	**Figure 14 Recovery over Dimensionless Time in Observation Well BDVWA MW2**
TODD ENGINEERS Alameda, California	



February 2011

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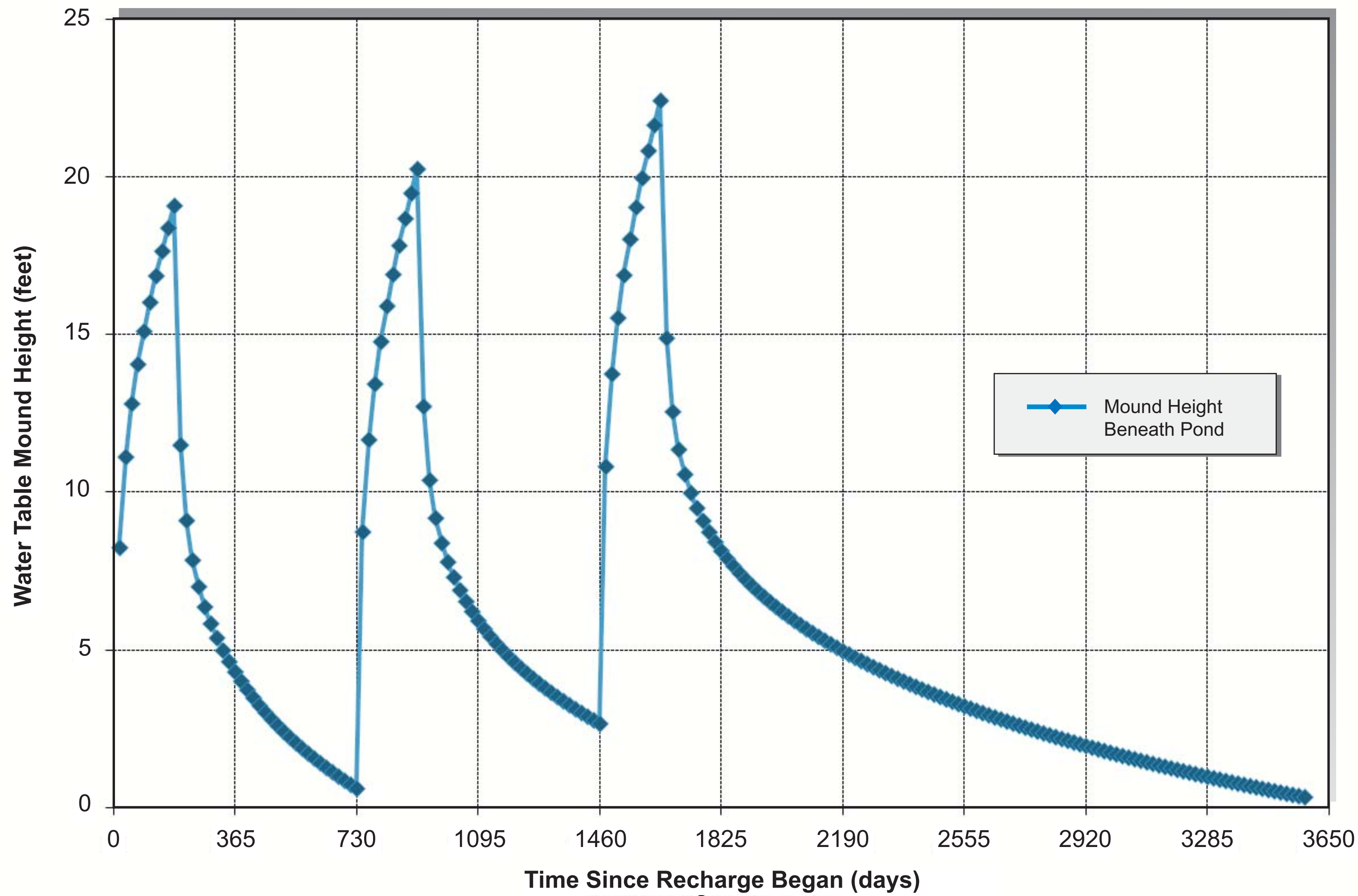
Alameda, California

Figure 15
Simulated Water Table Mounding after Recharge of 1,500 AF After 6 months



February 2011	**Figure 16 Simulated Water Table Elevations over Time in Response to Recharge**
TODD ENGINEERS Alameda, California	

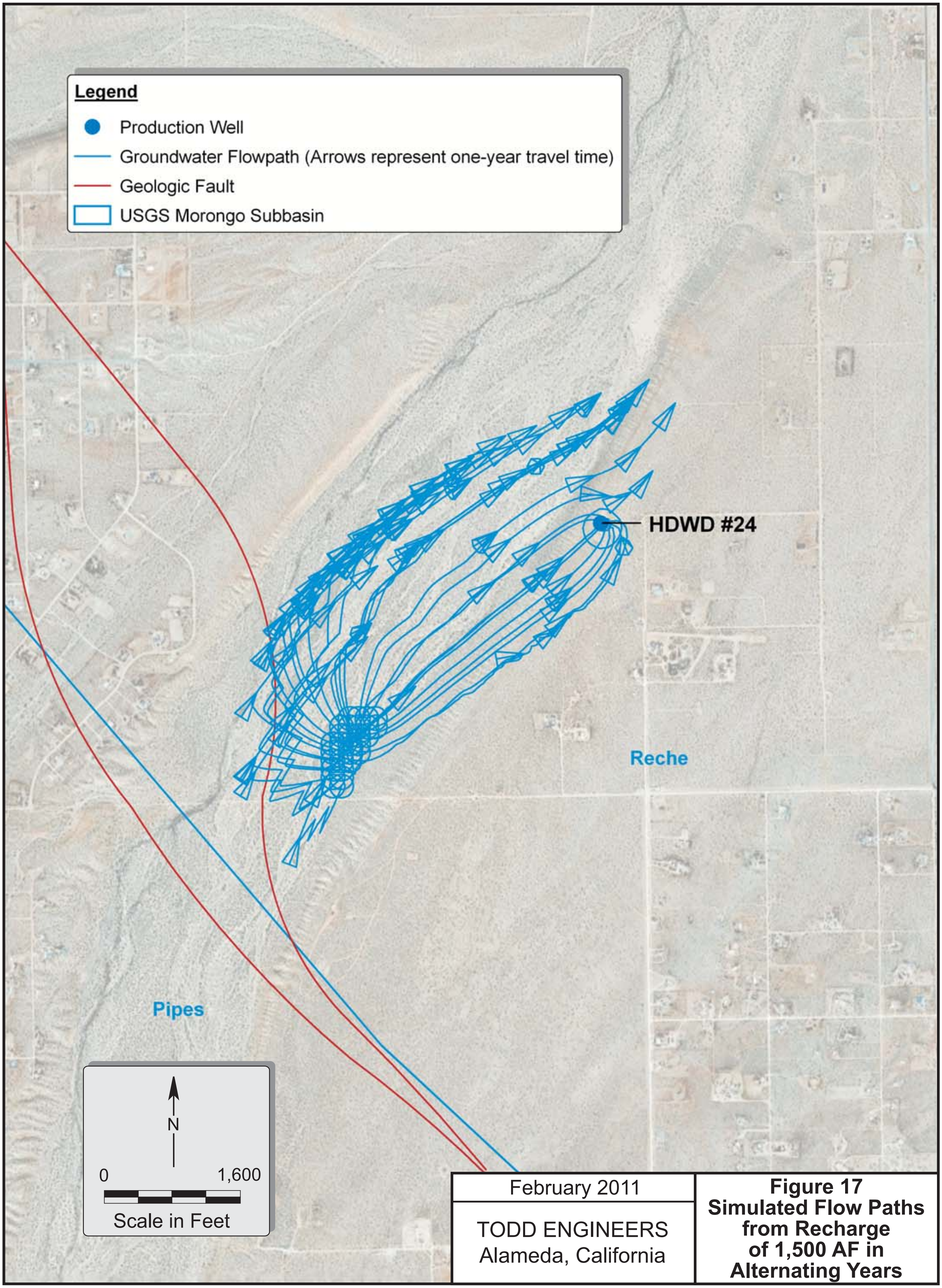


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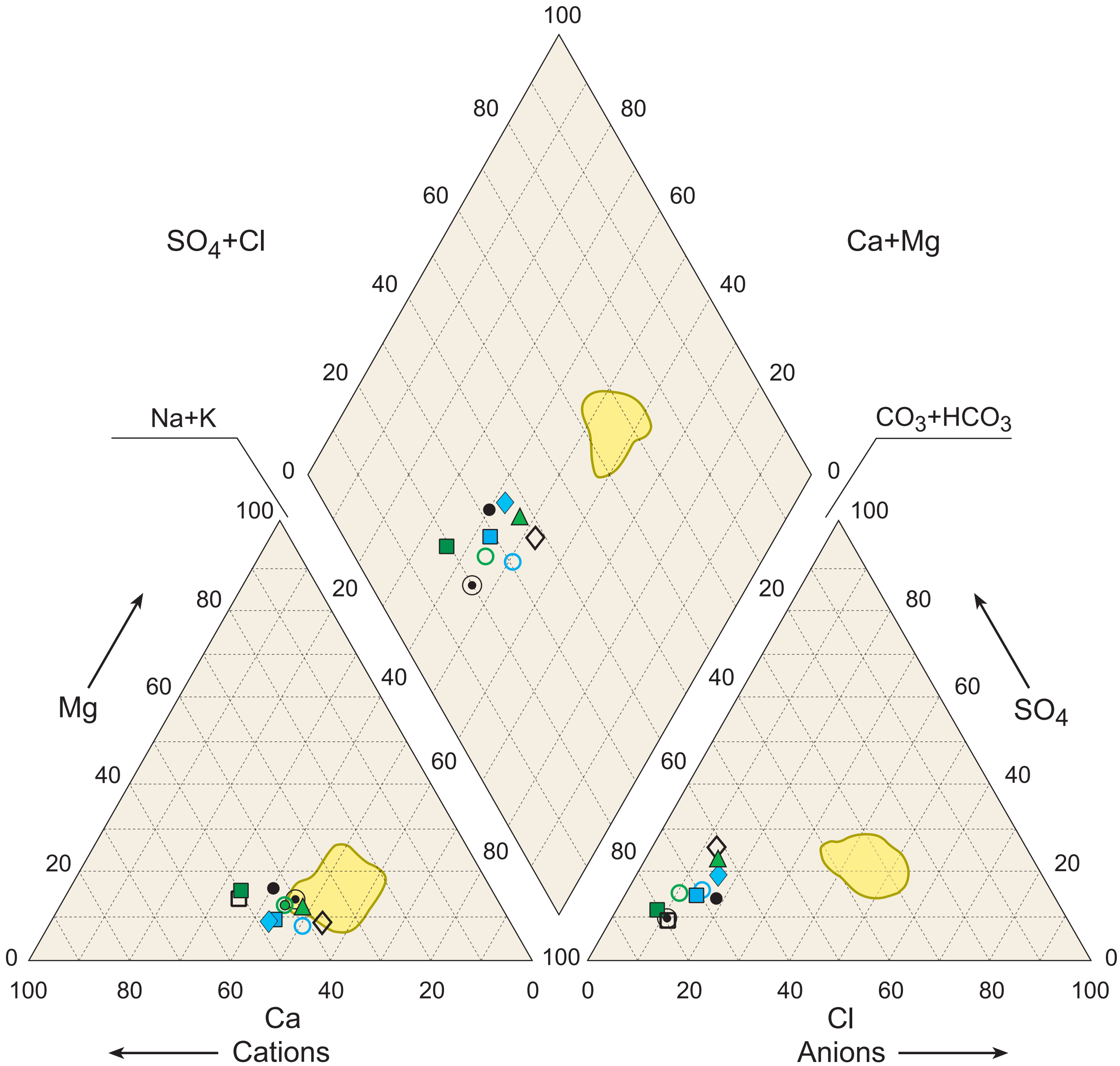
Figure 17
Simulated Flow Paths from Recharge of 1,500 AF in Alternating Years



LEGEND

BDVWA #6	12/8/08	CSA 70 W-1	2/16/05
BDVWA #7	12/8/08	CSA 70 W-2	2/16/05
BDVWA #9	7/12/09	CSA 70 W-3	2/16/05
HDWD #24	11/30/09	BDVWA MW1	8/23/10
HDWD #24	11/24/09	BDVWA MW2	9/24/10
HDWD #6	7/18/97	SWP Water	

February 2011

TODD ENGINEERS
Alameda, California

Figure 18
Cation/Anion Composition of Groundwater and SWP Water

Appendix A

Drilling Permits

County of San Bernardino
Department of Public Health
Division of Environmental Health Services
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0160

FAX

Date 8/9/2010

Number of pages including cover sheet 5

To: Bighorn Desert View Water

Phone

Fax Phone (760) 364-3412

CC:

From:

Marvyn Cerdenio

Phone (909) 387-4666

Fax Phone (909) 387-4323

REMARKS:

☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please comment

Copy of approved well permits for 2 monitoring wells in Yucca Valley

SR 43890

DO NOT FILL IN	
Permit Number	201008039l
Record ID	WP6619
Expiration	02-06-11
FF	
FA	
SN	

County of San Bernardino
DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SERVICES
385 N. Arrowhead Ave., 2nd Floor
San Bernardino, CA 92415-0160
(909) 884-4056
www.sbcounty.gov/dehs

WELL PERMIT

(Please Print)

DO NOT FILL IN	
Date	08-06-10
Amount $	269—
Check #	10370
Receipt Number	87501
Paid by	BIG HORN DESERT VIEW WA
City Code	73

1. OWNER: Name BIGHORN DESERTVIEW WATER
   Site Address 622 S. JEMEZ TRAIL
   City YUCCA VALLEY Zip 92284
   Mailing Address SAME
   City ______ Zip ______
   Telephone Number (760) 364 2315

2. WELL DRILLER: BOART LONGYEAR
   Business Name
   AUGUST 23, 2010 — *Start Date*
   AUGUST 26, 2010 — *Completion Date*

3. INTENDED WELL USE (check):
   ☐ Agricultural ☐ Horizontal ☐ Test
   ☐ Cathodic ☒ Monitoring/Observation ☐ Dairy
   ☐ Ind/Domestic ☐ Community/PWS/City ☐ Other

4. TYPE OF WORK (check):
   ☒ New ☐ Reconstruction ☐ Destruction

Items 6 through 9 to be estimated for new wells, exact for all other wells

5. ANNULAR SEAL: Seal Depth 175 ft.
   Furnished by: ☐ Owner ☒ Contractor
   ☐ Driven Conductor Dia. ______ in., Wall (Gage) ______
   ☒ Sealing Material GROUT, Thickness 3 in.

6. DEPTH OF WELL (feet):
   Proposed 200 Existing ______
   DIAMETER OF BORE (in.): 10

7. CASING INSTALLED:
   ☐ Steel ☒ Plastic ☐ Other

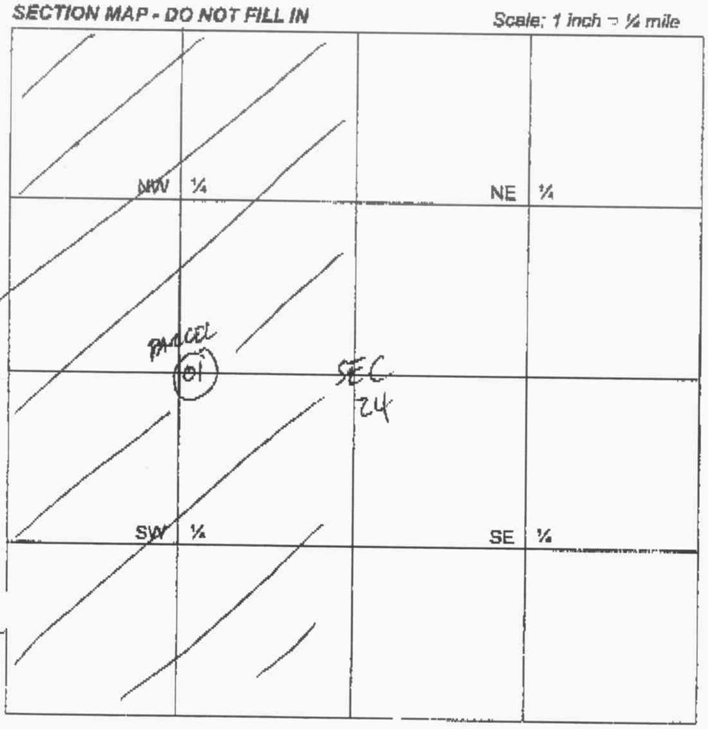
From (ft.)	To (ft.)	Dia. (in.)	Wall (Gage)
0	180	4	SCH. 80

   Gravel Pack: ☒ Yes ☐ No
   From 175 to 200 ft.

8. PERFORATIONS (*if applicable*):
   From 180 to 200 ft.
   Pumping rate (gpm) ______

9. SEALED ZONES (*if applicable*):
   From ______ to ______ ft.

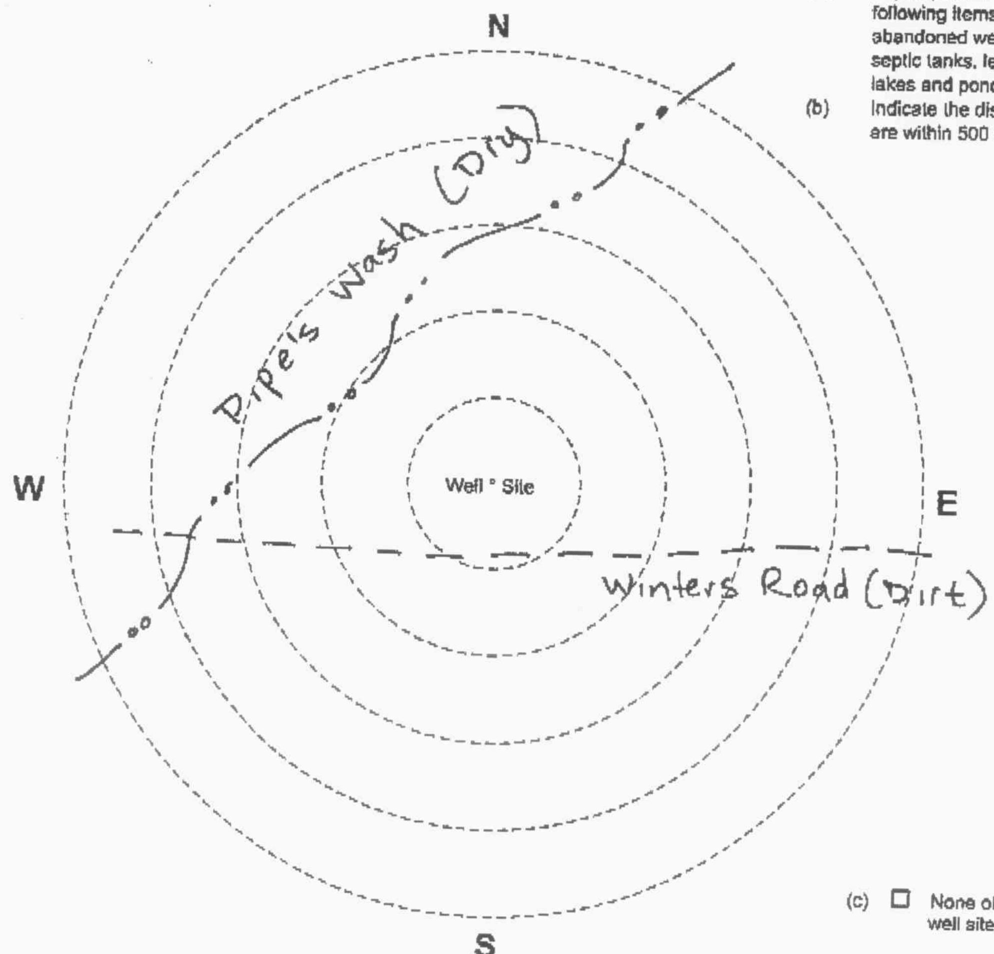
SECTION MAP - DO NOT FILL IN *Scale: 1 inch = ¼ mile*



10. LOCATION INFORMATION TG # 4747 H5-7
    (a) TOWNSHIP:
    Tier 2 (N)/S Range 5 (E)/W Section 24P
    (b) Assessor's Parcel No. 62922201
    (c) Latitude and Longitude
    Lat: 34 °, 14 ', 22 " N/S
    Long: 116 °, 24 ', 55 " N/S
    (d) Solid or Liquid Disposal Site within Two Miles
    ☐ Yes ☒ No
    Location ______

DO NOT FILL IN	
Seal	
Cap	
Check Valve	
Electricals	
Slab	
Tag	
Building & Safety Notified	

Assessor's Parcel No. 6 2922201



Scale: ½ inch = 100 feet

11. PLOT PLAN:

(a) In perspective to the well site, sketch and label the following items: well lot property lines, other wells (include abandoned wells), sewage disposal systems (sewers, septic tanks, leaching fields, seepage pits, cesspools), lakes and ponds, watercourses and animals or fowl kept.

(b) Indicate the distance, in feet, of any of the following which are within 500 ft. of the well site:

Other	
Sewers	
Septic tanks	
Leaching fields	
Seepage pits	
Cesspools	
Lakes and ponds	
Watercourses (Pipe's Wash)	100
Animal or fowl kept	

(c) ☐ None of the above are within 500 feet of the well site.

12. I have read this application and agree to comply with all laws regulating the type of work being performed

C-57 Contractor's Signature [signature] Date 7-27-10

County Registration No. 1161 California License No. 694686

DISPOSITION OF PERMIT

(For Department Use Only)

☐ Sent to Water Agency for review.

☐ Water Agency conditions or recommendations attached.

☐ Denied

☑ Approved subject to the following:

A. ☑ Notify the Department, Safe Drinking Water Program, (909) 387-4666, twenty-four (24) hours in advance to make an inspection of the following operations:

☐ Prior to sealing of the annular space or filling of the conductor casing.

☒ After installation of the surface protective slab ~~and pumping equipment~~.

☐ During destruction of wells, prior to pouring the sealing material.

B. ☑ Submit to the Department, within thirty (30) days after completion of work, a copy of:

☒ Water Well Driller's Report ☐ Bacterial Analysis ☐ Inorganic Chemical Analysis

☐ Radiological Analysis ☐ General Mineral ☐ Organic Chemical analysis ☐ General Physical

Comments

SR 43891

DO NOT FILL IN	
Permit Number	2010080392
Record ID	WP6620
Expiration	02-06-11
FF	
FA	
SN	

County of San Bernardino
DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SERVICES
385 N. Arrowhead Ave., 2nd Floor
San Bernardino, CA 92415-0160
(909) 884-4056
www.sbcounty.gov/dehs

WELL PERMIT

(Please Print)

DO NOT FILL IN	
Date	08-06-10
Amount $	269
Check #	10370
Receipt Number	87501
Paid by	BIGHORN DESERT VIEW WATER AGENCY
City Code	73

1. OWNER: Name BIGHORN DESERT VIEW WATER

Site Address 622 S. JEMEZ TRAIL

City YUCCA VALLEY Zip 92284

Mailing Address SAME

City ______ Zip ______

Telephone Number (760) 364 2315

2. WELL DRILLER: BOART LONGYEAR
Business Name

AUGUST 16, 2010 — *Start Date*
AUGUST 20, 2010 — *Completion Date*

3. INTENDED WELL USE (check):

☐ Agricultural ☐ Horizontal ☐ Test
☐ Cathodic ☒ Monitoring/Observation ☐ Dairy
☐ Ind/Domestic ☐ Community/PWS/City ☐ Other

4. TYPE OF WORK (*check*):

☒ New ☐ Reconstruction ☐ Destruction

Items 6 through 9 to be estimated for new wells, exact for all other wells

5. ANNULAR SEAL: Seal Depth 275 ft.

Furnished by: ☐ Owner ☒ Contractor

☐ Driven Conductor Dia. ______ in., Wall (Gage) ______

☒ Sealing Material GROUT, Thickness 2.5 in.

6. DEPTH OF WELL (feet):

Proposed 300 Existing ______

DIAMETER OF BORE (in.): 9

7. CASING INSTALLED:

☐ Steel ☒ Plastic ☐ Other

From (ft.)	To (ft.)	Dia. (in.)	Wall (Gage)
0	280	4	SCH. 80

Gravel Pack: ☒ Yes ☐ No

From 275 to 300 ft.

8. PERFORATIONS (*if applicable*):

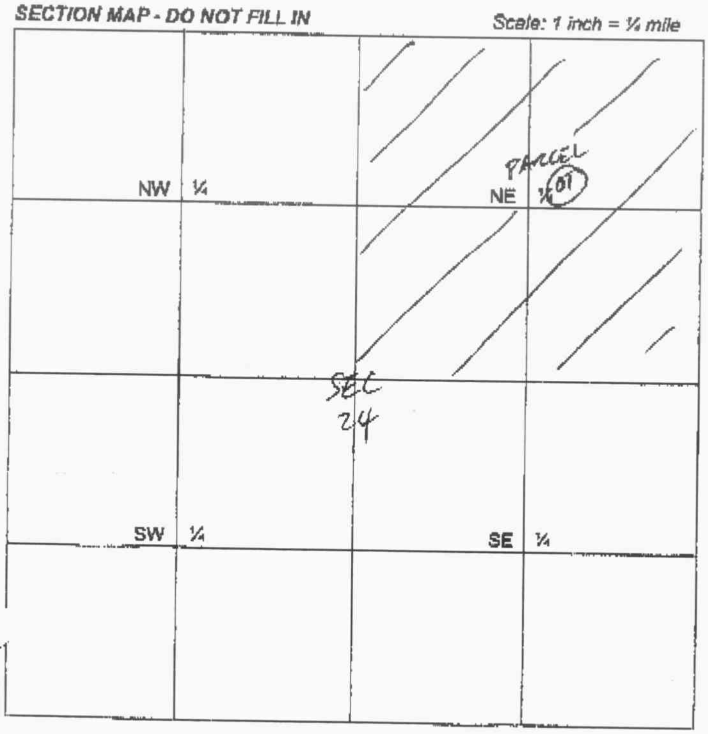
From 280 to 300 ft.

Pumping rate (gpm) ______

9. SEALED ZONES (*if applicable*):

From ______ to ______ ft.

SECTION MAP - DO NOT FILL IN *Scale: 1 inch = ¼ mile*



10. LOCATION INFORMATION TG# 4747 J5/6

(a) TOWNSHIP:

Tier 2 Ⓝ/S Range 5 Ⓔ/W Section 24H

(b) Assessor's Parcel No. 629 21101

(c) Latitude and Longitude

Lat: 34 °, 14 ', 45 " N/S

Long: 116 °, 24 ', 23 " N/S

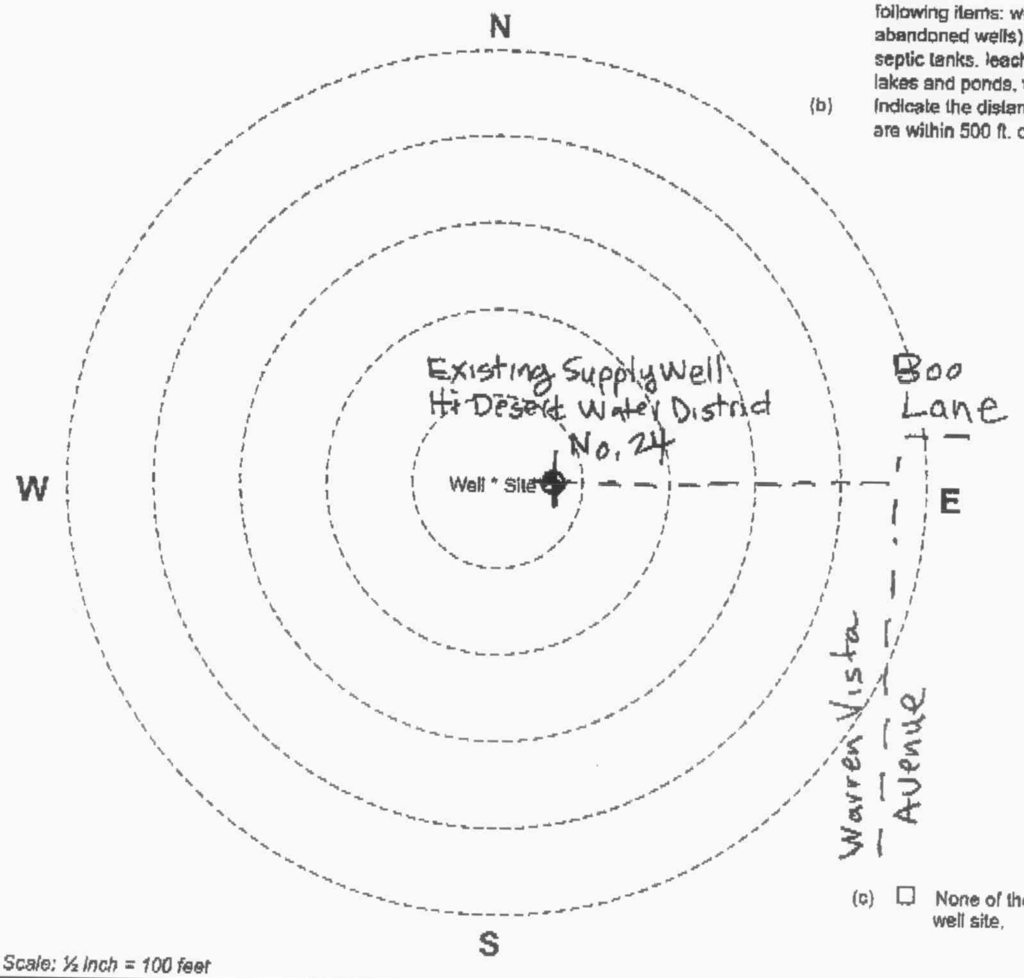
(d) Solid or Liquid Disposal Site within Two Miles

☐ Yes ☒ No

Location ______

DO NOT FILL IN	
Seal	
Cap	
Check Valve	
Electricals	
Slab	
Tag	
Building & Safety Notified	

Assessor's Parcel No. 62921101



11. PLOT PLAN:
(a) In perspective to the well site, sketch and label the following items: well lot property lines, other wells (include abandoned wells), sewage disposal systems (sewers, septic tanks, leaching fields, seepage pits, cesspools), lakes and ponds, watercourses and animals or fowl kept.
(b) Indicate the distance, in feet, of any of the following which are within 500 ft. of the well site:

Other (well No. 24)	50
Sewers	
Septic tanks	
Leaching fields	
Seepage pits	
Cesspools	
Lakes and ponds	
Watercourses	
Animal or fowl kept	

(c) ☐ None of the above are within 500 feet of the well site.

Scale: ½ inch = 100 feet

12. I have read this application and agree to comply with all laws regulating the type of work being performed

C-57 Contractor's Signature W Rich Hach Date 7-27-10

County Registration No. 161 California License No. 694686

DISPOSITION OF PERMIT

(For Department Use Only)

☐ Sent to Water Agency for review.
☐ Water Agency conditions or recommendations attached.
☐ Denied
☑ Approved subject to the following:

A. ☑ Notify the Department, Safe Drinking Water Program, (909) 387-4666, twenty-four (24) hours in advance to make an inspection of the following operations:

☐ Prior to sealing of the annular space or filling of the conductor casing.
☒ After installation of the surface protective slab ~~and pumping equipment~~.
☐ During destruction of wells, prior to pouring the sealing material.

B. ☑ Submit to the Department, within thirty (30) days after completion of work, a copy of:

☒ Water Well Driller's Report ☐ Bacterial Analysis ☐ Inorganic Chemical Analysis
☐ Radiological Analysis ☐ General Mineral ☐ Organic Chemical analysis ☐ General Physical

Comments

Appendix B
Soil Hydraulic Property
Laboratory Report

KEANTAN
LABORATORIES

www.keantanlabs.com
email: info@keantanlabs.com

October 27, 2010

Todd Engineer
2490 Mariner Square Loop, Suite 215
Alameda, California 94501-1080

Attn: Daniel Craig

Subject: **Report/Laboratory Test Results**
Project Name: BDVWA- Reche Recharge
Project Number: N/A
KTL Project No.: 06-344-004

To Daniel Craig

Enclosed are results of the laboratory testing program conducted on samples from the above referenced project. The testing performed for this program was conducted in general accordance with testing procedures as follows:

TYPE OF TEST	TEST PROCEDURE
Permeability	ASTM D 5084
Total Porosity	ASTM D 854/2937
Effective Porosity	SWRCB

Attached herewith are Summary of Permeability Test Result (6), Summary of Total Porosity Test Result (6), and Summary of Effective Porosity Test Result (6).

We appreciate the opportunity to provide testing services to Todd Engineer. If you have any questions regarding the test results, please contact us.

Very truly yours,
Keantan Laboratories

Jonathan Khaw
Laboratory Manager

Kean Tan
RCE # 50498

REGISTERED PROFESSIONAL ENGINEER
KEAN TAN
50498
Exp. 06/11
CIVIL
STATE OF CALIFORNIA

Encls.

KEANTAN
LABORATORIES

www.keantanlabs.com
email: info@keantanlabs.com

SUMMERY OF LABORATORY TEST RESULT

For
Trancas Market/61701

PROJECT NAME.: BDVWA Reche Recharge **KTL NO.:** 06-344-004

PROJECT NO.: N/A **CLIENT.:** Todd Engineering

DATE.: 10/26/2010 **SUMMARIZED BY.:** K. Tan

Boring NO.	DEPTH (FT)	MOISTURE CONTENT (%) ASTM D 2937	DRY DENSITY (pcf) ASTM D 2937	TOTAL POROSITY ASTM D 2937/854	EFFECTIVE POROSITY SWRCB	HYDRAULIC CONDUCTIVITY (cm/sec) ASTM D 5084
MW-1	10-12.5	7.90	98.19	.45	.23	1.42E-03
MW-1	25-28	7.81	101.88	.43	.22	1.43E-03
MW-1	50-52.5	7.61	99.48	.44	.22	2.19E-03
MW-1	100-102	9.80	104.36	.41	.22	1.76E-03
MW-1	150-152.5	9.98	99.82	.44	.23	1.37E-03
MW-1	242-245	10.44	103.12	.42	.23	5.63E-04

KeanTan Laboratories

Total Porosity

ASTM D 854-83

Project Number:	05-344-004	Prepared By jk		Date:	10/28/2010
Project Name:	BDVWA Reche Recharge	Tested by		Date:	10/28/2010
		Checked by		Date:	10/28/2010

Boring Number	MW-1*	MW-1*	MW-1*	MW-1*	MW-1*	MW-1*
Sample Number	1	2	3	4	5	6
Depth (ft)	10-12.5	25-28	50-52.5	100-102	150-152.5	242-245
Specfic Gravity of Soil (ASTM D 854)	2.66	2.66	2.67	2.65	2.66	2.66
Weight of Soil (Wt)+ring	516.40	530.40	520.40	547.50	530.20	545.00
Weight of Ring (Wr)	135.00	135.00	135.00	135.00	135.00	135.00
Weight of Soil (Wt)	381.40	395.40	385.40	412.50	395.20	410.00
Moisture content of soil	7.90	7.81	7.61	9.80	9.98	10.44
Weight of Soil (Dry) (Ws)	353.48	366.76	358.15	375.68	359.34	371.24
Unit weight of of water (γw) (g/cm3)	1	1	1	1	1	1
Volume of Soil (Vs)	132.89	137.88	134.14	141.77	135.09	139.56
Diameter (cm)	6.35	6.35	6.35	6.35	6.35	6.35
Height (cm)	7.62	7.62	7.62	7.62	7.62	7.62
Volume	241.20	241.20	241.20	241.20	241.20	241.20
Total Porosity	**0.45**	**0.43**	**0.44**	**0.41**	**0.44**	**0.42**

* **Remold Samples**

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	1	
SAMPLE DEPTH (FT)	10-12.5	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	7.90	17.39
DRY DENSITY (PCF)	98.19	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	KB-3	KB-13
WT. WET SOIL + CONT.(gm)	1354.4	503.8
WT. DRY SOIL + CONT. (gm)	1261.5	441.6
WT. CONTAINER (gm)	85.55	84
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (cm):	7.62	Length (in):	3
radius:	1.25		
Area:	4.91		
change in time (sec):	45		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	27	1.1	10.63	0.43		
45 sec	10.7	16.4	4.21	6.46	62.02	49.58

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))
a= average cross section area of tube
L= Length of sample
A= Area of sample
h1= Head loss across the permeameter
h2= head loss across the permeameter

Trial # 1 — 1.42E-03 cm/sec

Average Permeability — 1.42E-03 cm/sec

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	2	
SAMPLE DEPTH (FT)	25-28	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	7.81	21.02
DRY DENSITY (PCF)	101.88	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	KB-15	KB-5
WT. WET SOIL + CONT.(gm)	888.4	454.5
WT. DRY SOIL + CONT. (gm)	830.3	390.5
WT. CONTAINER (gm)	88.2	88.1
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (sm):	7.62	Length (in):	3
radius:	1.25		
Area:	4.91		
change in time (sec):	45		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	26.4	1.5	10.39	0.59		
45 sec	10.4	17.1	4.09	6.73	61.90	49.46

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))
a= average cross section area of tube
L= Length of sample
A= Area of sample
h1= Head loss across the permeameter
h2= head loss across the permeameter

Trial # 1 1.43E-03 cm/sec

Average Permeability 1.43E-03 cm/sec

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	3	
SAMPLE DEPTH (FT)	50-52.5	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	7.61	16.42
DRY DENSITY (PCF)	99.48	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	M-500	KB-21
WT. WET SOIL + CONT.(gm)	746.9	500.1
WT. DRY SOIL + CONT. (gm)	706.9	441.6
WT. CONTAINER (gm)	181.61	85.4
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (cm):	7.62	Length (in)	3
radius:	1.25		
Area:	4.91		
change in time (sec):	30		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	25.9	1.5	10.20	0.59		
30 sec	9.4	17.4	3.70	6.85	62.10	49.34

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))
a= average cross section area of tube
L= Length of sample
A= Area of sample
h1= Head loss across the permeameter
h2= head loss across the permeameter

Trial # 1 2.19E-03 cm/sec

Average Permeability 2.19E-03 cm/sec

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	4	
SAMPLE DEPTH (FT)	100-102	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	9.80	18.24
DRY DENSITY (PCF)	104.36	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	KB-9	KB-36
WT. WET SOIL + CONT.(gm)	541.9	499
WT. DRY SOIL + CONT. (gm)	501.3	435.4
WT. CONTAINER (gm)	87.02	86.7
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (cm):	7.62	Length (in)	3
radius:	1.25		
Area:	4.91		
change in time (sec):	45		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	27.2	1.3	10.71	0.51		
45 sec	7.2	20.3	2.83	7.99	63.47	48.12

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))
a= average cross section area of tube
L= Length of sample
A= Area of sample
h1= Head loss across the permeameter
h2= head loss across the permeameter

Trial # 1 1.76E-03 cm/sec

Average Permeability 1.76E-03 cm/sec

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	5	
SAMPLE DEPTH (FT)	150-152.5	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	9.98	16.44
DRY DENSITY (PCF)	99.82	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	M-412	KB-8
WT. WET SOIL + CONT.(gm)	881.9	499.4
WT. DRY SOIL + CONT. (gm)	818.4	441.1
WT. CONTAINER (gm)	182	86.5
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (cm):	7.62	Length (in)	3
radius:	1.25		
Area:	4.91		
change in time (sec):	60		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	26.4	1.2	10.39	0.47		
60 sec	5.8	21	2.28	8.27	63.71	47.80

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))

a= average cross section area of tube

L= Length of sample

A= Area of sample

h1= Head loss across the permeameter

h2= head loss across the permeameter

Trial # 1 1.37E-03 cm/sec

Average Permeability 1.37E-03 cm/sec

Keantan Laboratories

ASTM D 5084
Permeability

Project Number:	06-344-004	Tested By:	jk	Date	10/24/2010
Project Name:	BDVWA Reche Recharge	Computed By:		Date	10/24/2010
Boring Number:	MW1	Checked By:		Date	10/24/2010

	Before Permeability	After Permeability
BORING NUMBER	MW-1	
SAMPLE TYPE	Remold (80%)	
SAMPLE NUMBER	6	
SAMPLE DEPTH (FT)	242-245	
WET DENSITY (PCF)		
MOISTURE CONTENT (%)	10.44	18.50
DRY DENSITY (PCF)	103.12	
SOIL DESCRIPTION		
COLOR		
CONTAINER NUMBER	KB-6	KB-29
WT. WET SOIL + CONT.(gm)	1237	532.9
WT. DRY SOIL + CONT. (gm)	1128.1	462.9
WT. CONTAINER (gm)	85.03	84.6
TUBE NUMBER		
SPECIFIC GRAVITY		

Cell Pressure (psi):	83		
Bottom Platen (psi):	80		
Top Platen (psi):	82		
Average Effective Stress (psi):	3		
a (sq in):	0.3685		
Length (cm):	7.62	Length (in)	3
radius:	1.25		
Area:	4.91		
change in time (sec):	150		

Time	Top (cm)	Bottom(cm)	Top (in)	Bottom (in)	h1 Top (in)	h2 Bottom (in)
0	26.5	1	10.43	0.39		
150 sec	5.4	21.4	2.13	8.43	63.91	47.57

K=(((a*L)/(2*A*Δt))*(ln(h1/h2))
a= average cross section area of tube
L= Length of sample
A= Area of sample
h1= Head loss across the permeameter
h2= head loss across the permeameter

Trial # 1 5.63E-04 cm/sec

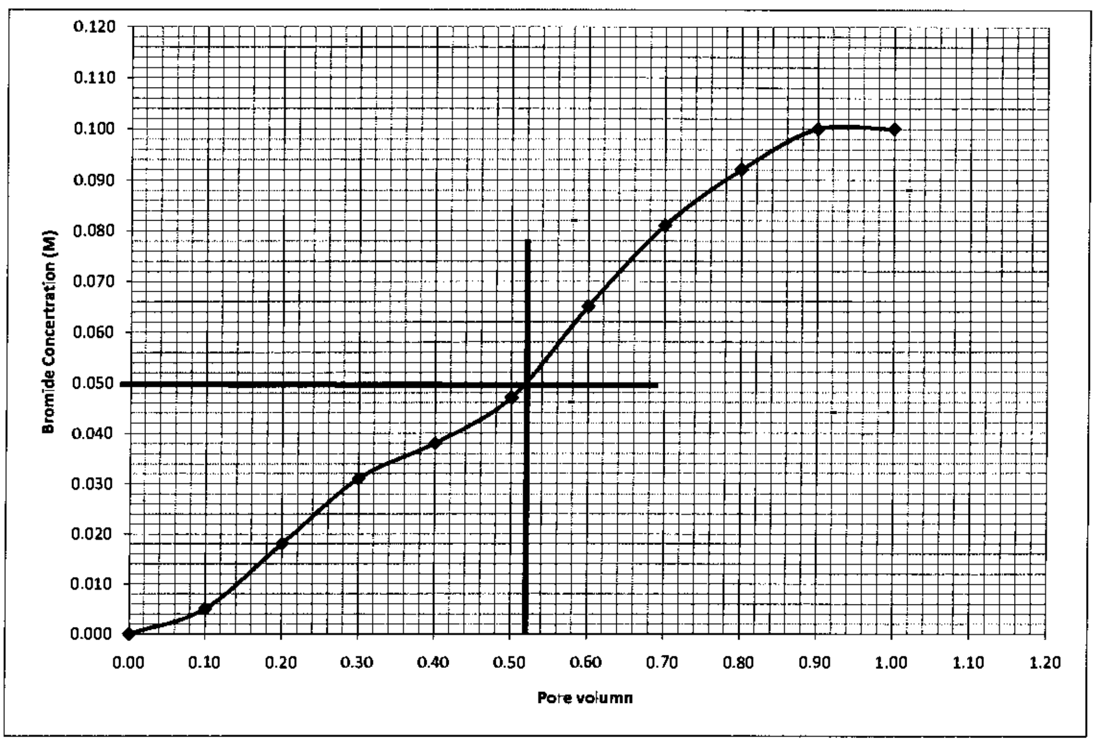
Average Permeability 5.63E-04 cm/sec

KeanTan Laboratories

Effective Porosity

Project Number:	**06-344-004**	Tested By:	**jk**	Date	**10/25/2010**
Project Name:	**BDVWA- Reche Recharge**	Computed By:	**jk**	Date	**10/25/2010**
Boring Number:	**MW-1**	Checked By:		Date	**10/25/2010**
Sample Number:	**1**	Sample Type:	Drive		
Sample Depth:	**10-12.5**	Soil Description:			
Pore Volumn (1/10):	**4.41**				
Initial Bromide Concentration (M)	**0.1**				
Burette Area (Sq.in)	**0.3685**				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concrentration (M)	C/Co
		0.00		0.000	
1		0.10		0.005	
2		0.20		0.018	
3		0.30		0.031	
4		0.40		0.038	
5		0.50		0.047	
6		0.60		0.065	
7		0.70		0.081	
8		0.80		0.092	
9		0.90		0.100	
10		1.00		0.100	



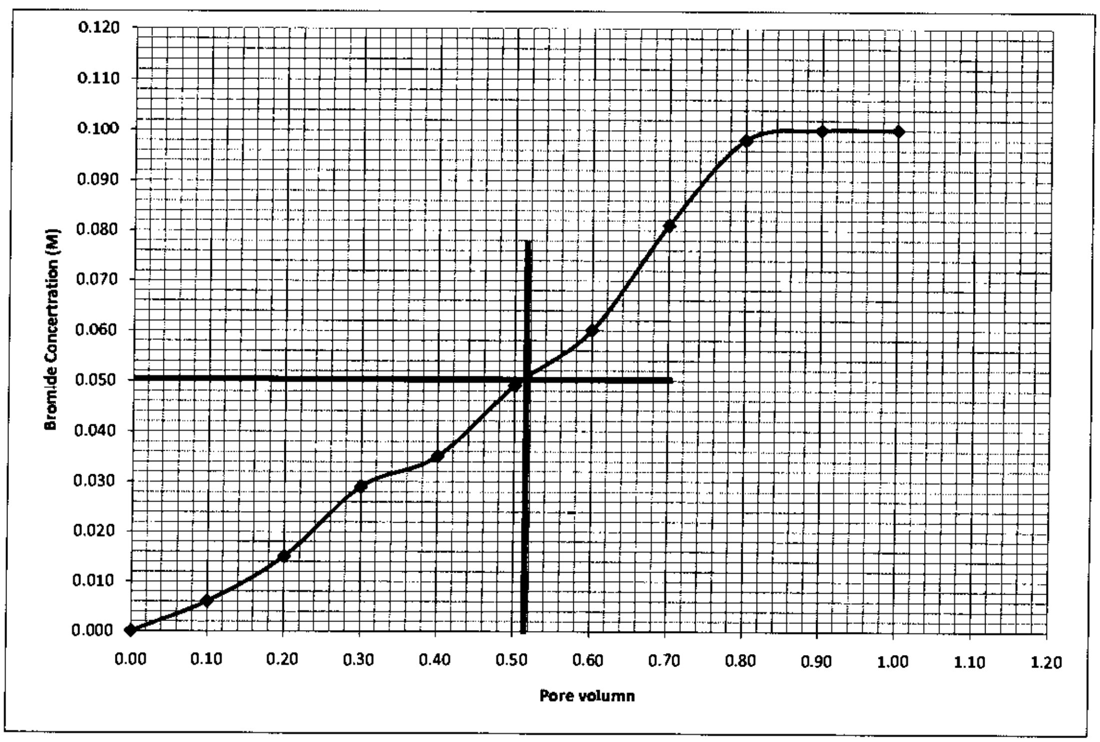
Total Porosity	0.45
Effective Porosity	0.23

KeanTan Laboratories

Effective Porosity

Project Number:	06-344-004	Tested By:	**jk**	Date	**10/25/2010**
Project Name:	**BDVWA- Reche Recharge**	Computed By:	**jk**	Date	**10/25/2010**
Boring Number:	MW-1	Checked By:		Date	**10/25/2010**
Sample Number:	**2**	Sample Type:	Drive		
Sample Depth:	**25-28**	Soil Description:			
Pore Volumn (1/10):	**4.21**				
Initial Bromide Concentration (M)	**0.1**				
Burette Area (Sq.in)	**0.3685**				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concrentration (M)	C/Co
		0.00		0.000	
1		0.10		0.006	
2		0.20		0.015	
3		0.30		0.029	
4		0.40		0.035	
5		0.50		0.049	
6		0.60		0.060	
7		0.70		0.081	
8		0.80		0.098	
9		0.90		0.100	
10		1.00		0.100	



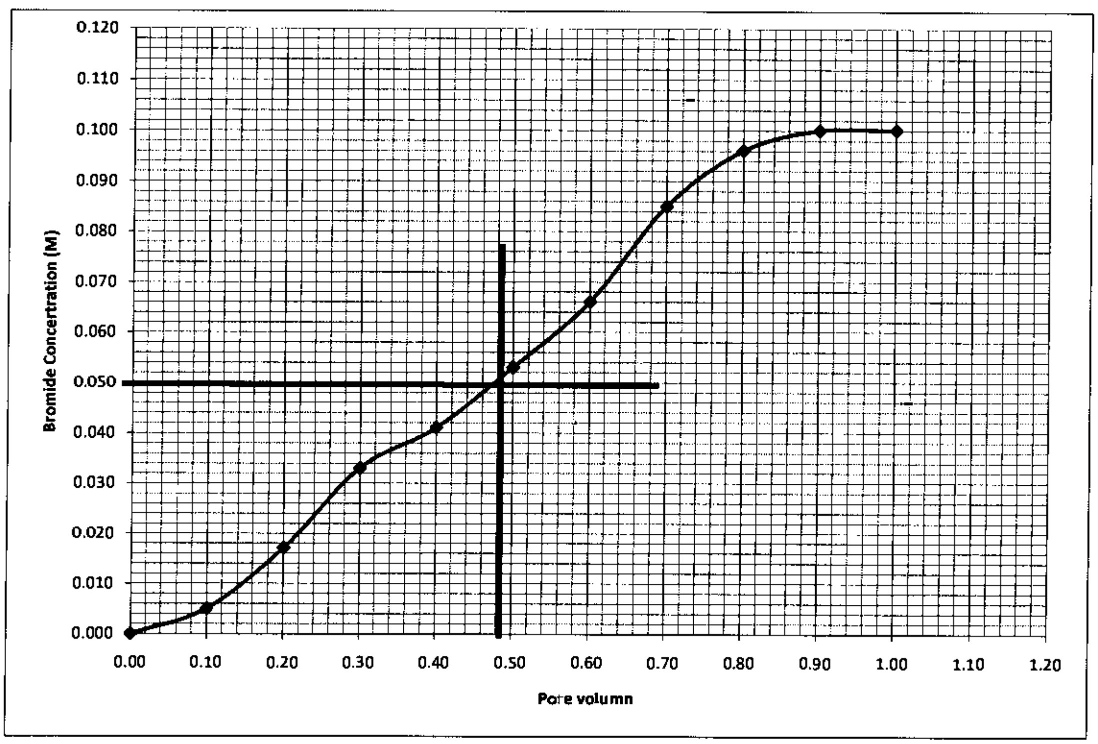
Total Porosity	0.43
Effective Porosity	0.22

KeanTan
Laboratories

Effective Porosity

Project Number:	**06-344-004**	Tested By:	**jk**	Date	**10/25/2010**
Project Name:	**BDVWA- Reche Recharge**	Computed By:	**jk**	Date	**10/25/2010**
Boring Number:	**MW-1**	Checked By:		Date	**10/25/2010**
Sample Number:	**3**	Sample Type:	Drive		
Sample Depth:	**50-52.5**	Soil Description:			
Pore Volumn (1/10):	**4.36**				
Initial Bromide Concentration (M)	**0.1**				
Burette Area (Sq.in)	**0.3685**				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concentration (M)	C/Co
		0.00		0.000	
1		0.10		0.005	
2		0.20		0.017	
3		0.30		0.033	
4		0.40		0.041	
5		0.50		0.053	
6		0.60		0.066	
7		0.70		0.085	
8		0.80		0.096	
9		0.90		0.100	
10		1.00		0.100	



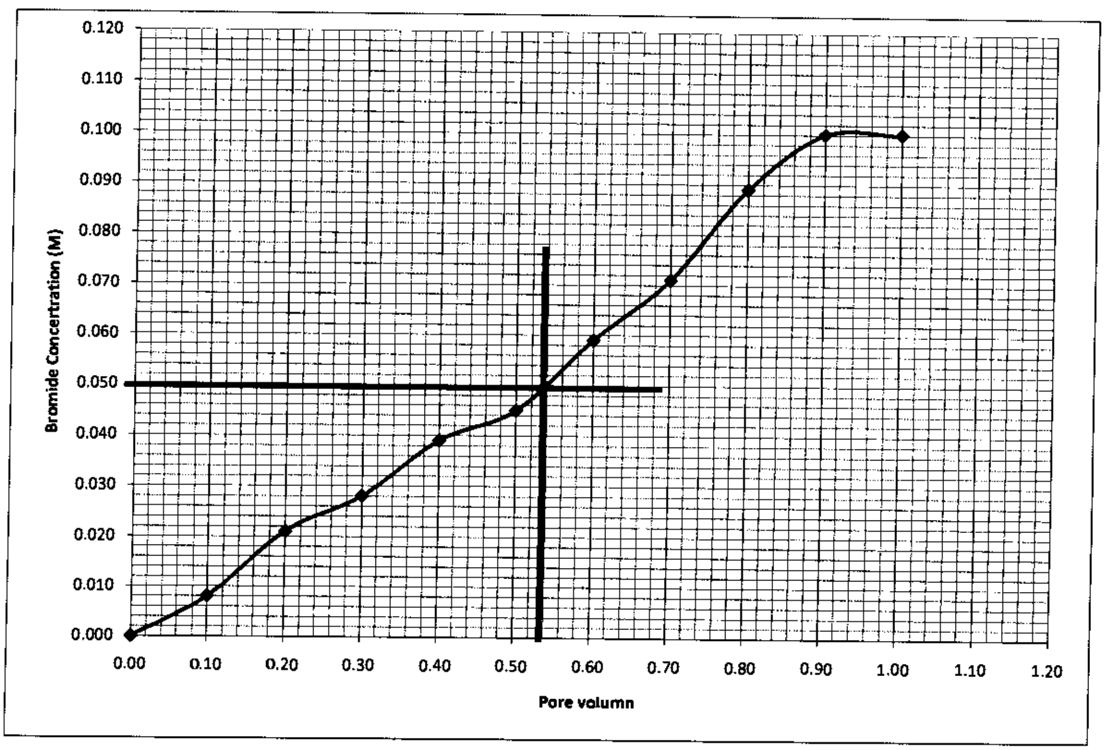
Total Porosity	0.44
Effective Porosity	0.22

KeanTan Laboratories

Effective Porosity

Project Number:	06-344-004	Tested By:	jk	Date	10/25/2010
Project Name:	BDVWA- Reche Recharge	Computed By:	jk	Date	10/25/2010
Boring Number:	MW-1	Checked By:		Date	10/25/2010
Sample Number:	4	Sample Type:	Drive		
Sample Depth:	100-102	Soil Description:			
Pore Volumn (1/10):	4.05				
Initial Bromide Concentration (M)	0.1				
Burette Area (Sq.in)	0.3685				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concrentration (M)	C/Co
		0.00		0.000	
1		0.10		0.008	
2		0.20		0.021	
3		0.30		0.028	
4		0.40		0.039	
5		0.50		0.045	
6		0.60		0.059	
7		0.70		0.071	
8		0.80		0.089	
9		0.90		0.100	
10		1.00		0.100	



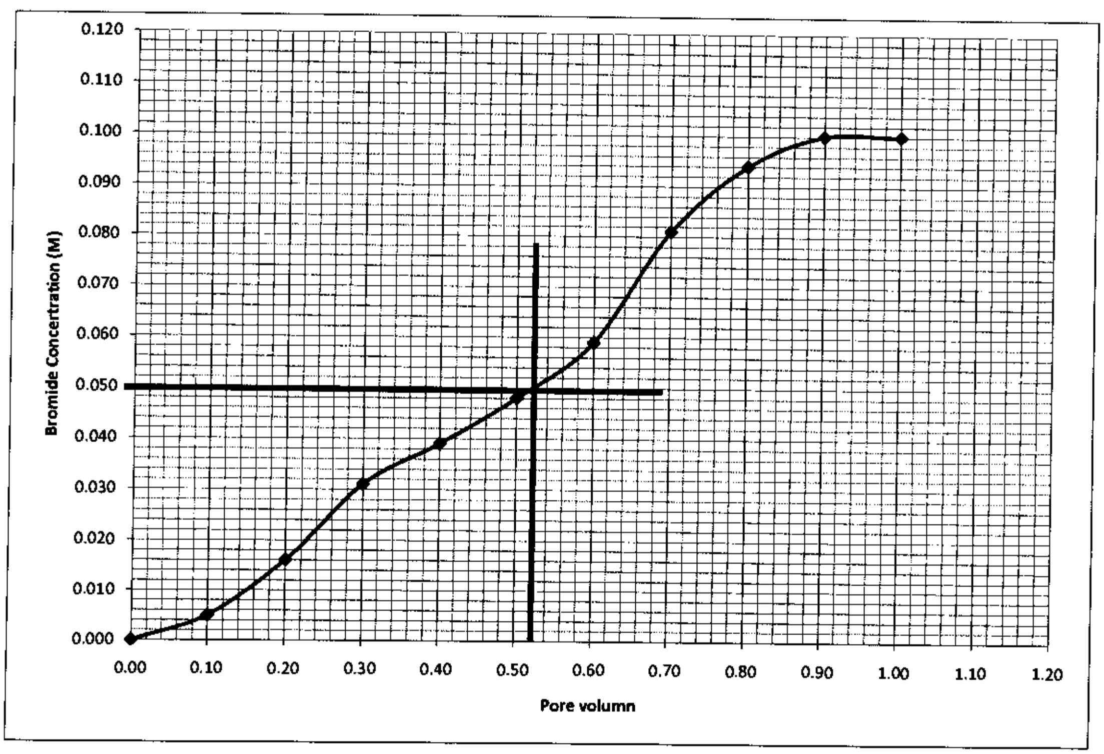
Total Porosity	0.41
Effective Porosity	0.22

KeanTan Laboratories

Effective Porosity

Project Number:	06-344-004	Tested By:	jk	Date	10/25/2010
Project Name:	BDVWA- Reche Recharge	Computed By:	jk	Date	10/25/2010
Boring Number:	MW-1	Checked By:		Date	10/25/2010
Sample Number:	5	Sample Type:	Drive		
Sample Depth:	150-452.5	Soil Description:			
Pore Volumn (1/10):	4.32				
Initial Bromide Concentration (M)	0.1				
Burette Area (Sq.in)	0.3685				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concrentration (M)	C/Co
		0.00		0.000	
1		0.10		0.005	
2		0.20		0.016	
3		0.30		0.031	
4		0.40		0.039	
5		0.50		0.048	
6		0.60		0.059	
7		0.70		0.081	
8		0.80		0.094	
9		0.90		0.100	
10		1.00		0.100	



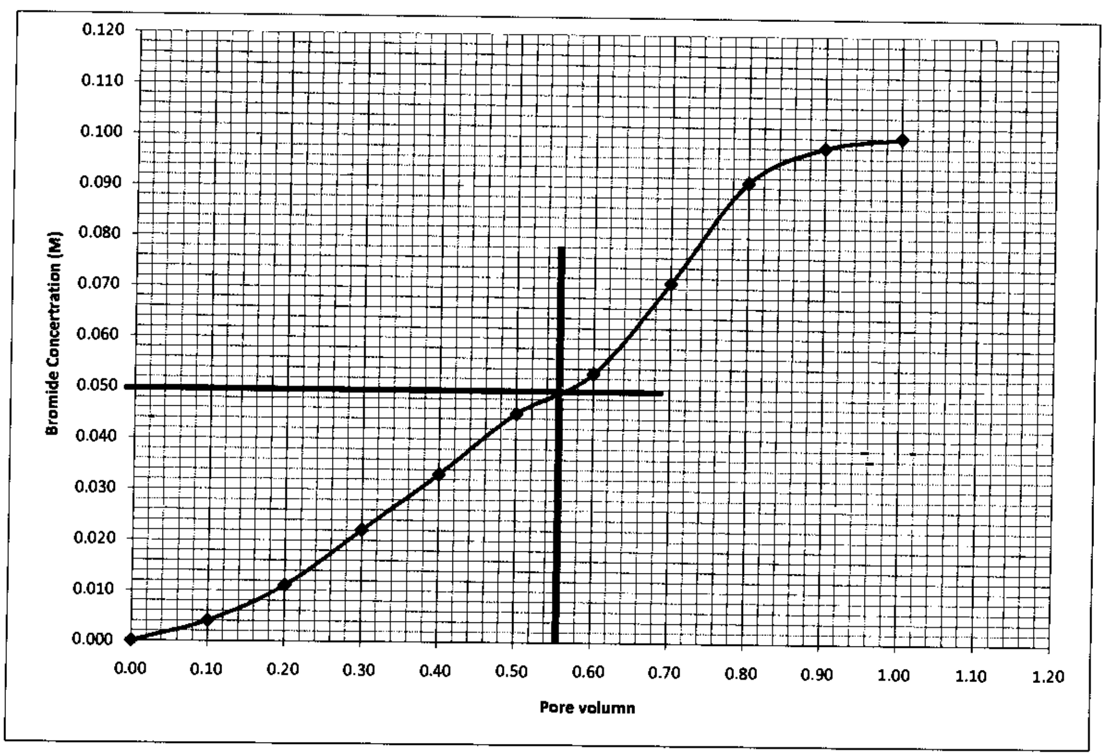
Total Porosity	0.44
Effective Porosity	0.23

KeanTan Laboratories

Effective Porosity

Project Number:	06-344-004	Tested By:	jk	Date	10/25/2010
Project Name:	BDVWA- Reche Recharge	Computed By:	jk	Date	10/25/2010
Boring Number:	MW-1	Checked By:		Date	10/25/2010
Sample Number:	6	Sample Type:	Drive		
Sample Depth:	242-245	Soil Description:			
Pore Volumn (1/10):	4.14				
Initial Bromide Concentration (M)	0.1				
Burette Area (Sq.in)	0.3685				

	Time	Pore Volumn	Burette Reading (CM)	Bromide Concrentration (M)	C/Co
		0.00		0.000	
1		0.10		0.004	
2		0.20		0.011	
3		0.30		0.022	
4		0.40		0.033	
5		0.50		0.045	
6		0.60		0.053	
7		0.70		0.071	
8		0.80		0.091	
9		0.90		0.098	
10		1.00		0.100	



Total Porosity	0.42
Effective Porosity	0.23

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October 27, 2010

Todd Engineer
2490 Mariner Square Loop, Suite 215
Alameda, California 94501-1080

Attn: Daniel Craig

Subject: **Report/Laboratory Test Results**
Project Name: BDVWA- Reche Recharge
Project Number: N/A
KTL Project No.: 06-344-004

To Daniel Craig

Enclosed are results of the laboratory testing program conducted on samples from the above referenced project. The testing performed for this program was conducted in general accordance with testing procedures as follows:

TYPE OF TEST	TEST PROCEDURE
Modified Proctor Compaction	ASTM D 1557

Attached herewith is Summary of Modified Proctor Compaction Test.

We appreciate the opportunity to provide testing services to Todd Engineer. If you have any questions regarding the test results, please contact us.

Very truly yours,
Keantan Laboratories

Jonathan Khaw
Laboratory Manager

Kean Tan
RCE # 50498

REGISTERED PROFESSIONAL ENGINEER
KEAN TAN
50498
Exp. 6/11
CIVIL
STATE OF CALIFORNIA

Encls.

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LABORATORIES
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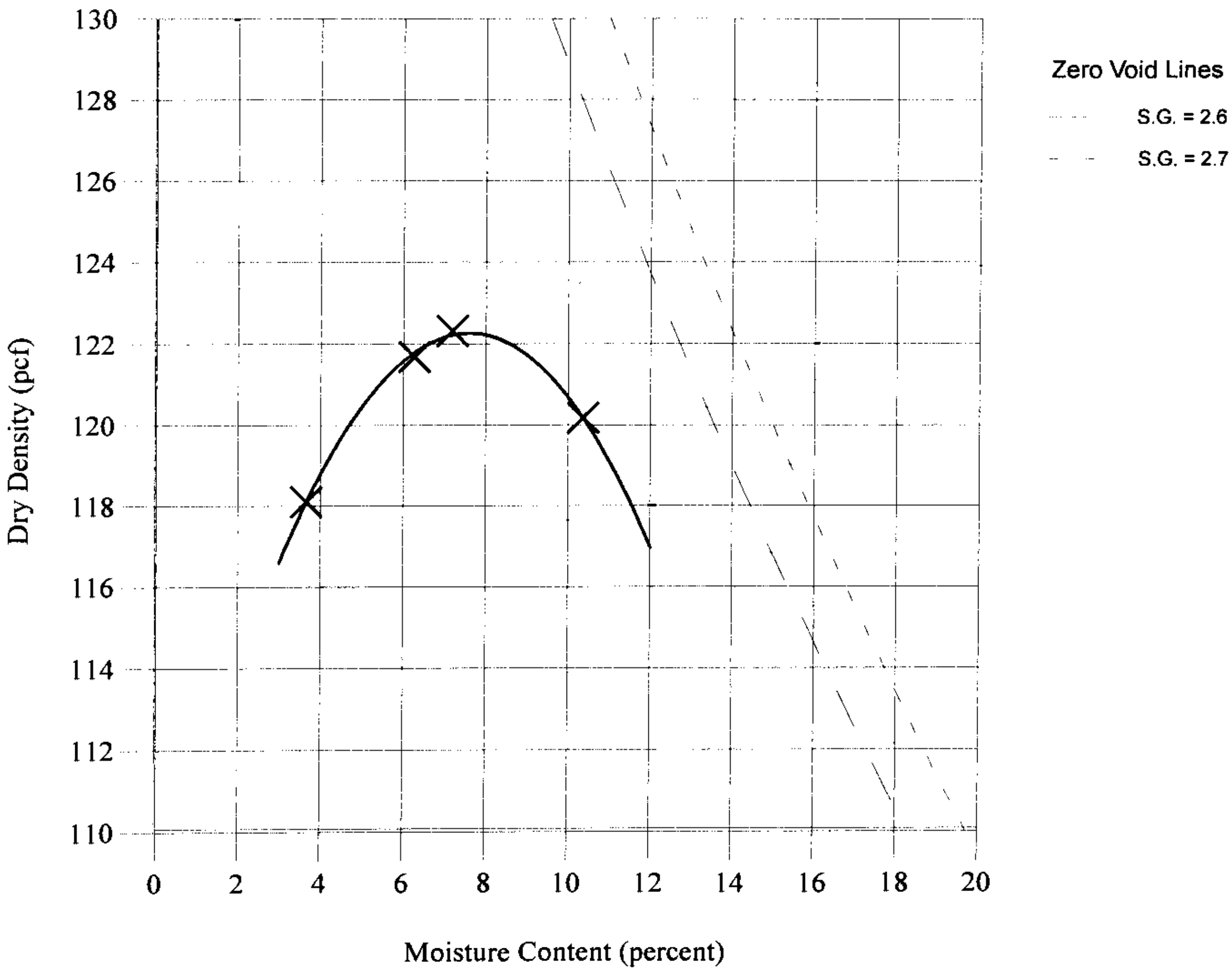
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge
PROJECT NO.: N/A
DATE: September 2010
BORING NO.: N/A
SAMPLE NO.: N/A

KTL NO.: 06-344-004
CLIENT: Todd Engineer
DEPTH (ft): 10 feet
USCS CLASS.: n/a

METHOD: A
DROP: 18 INCHES
NUMBER OF LAYERS: 5

RAM WEIGHT: 10 LBS
RAM TYPE: MANUAL
BLOWS/LAYER: 25



Optimum Moisture Content, %	Maximum Dry Density, pcf
7	122

PLATE CM-1

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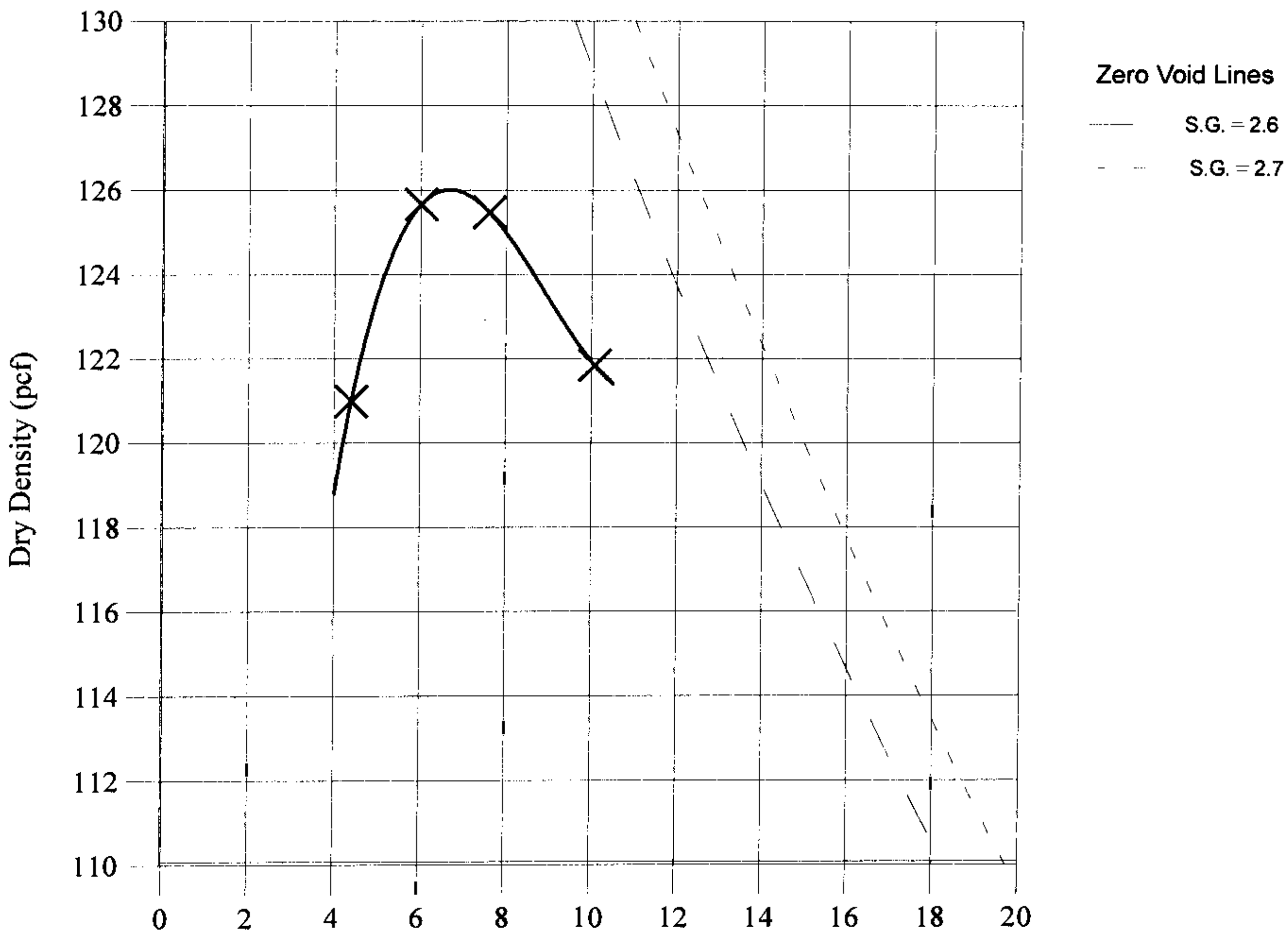
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge
PROJECT NO.: N/A
DATE: September 2010
BORING NO.: N/A
SAMPLE NO.: N/A

KTL NO.: 06-344-004
CLIENT: Todd Engineer
DEPTH (ft): 25 feet
USCS CLASS.: n/a

METHOD: A
DROP: 18 INCHES
NUMBER OF LAYERS: 5

RAM WEIGHT: 10 LBS
RAM TYPE: MANUAL
BLOWS/LAYER: 25



Optimum Moisture Content, %	Maximum Dry Density, pcf
7	126

PLATE CM-2

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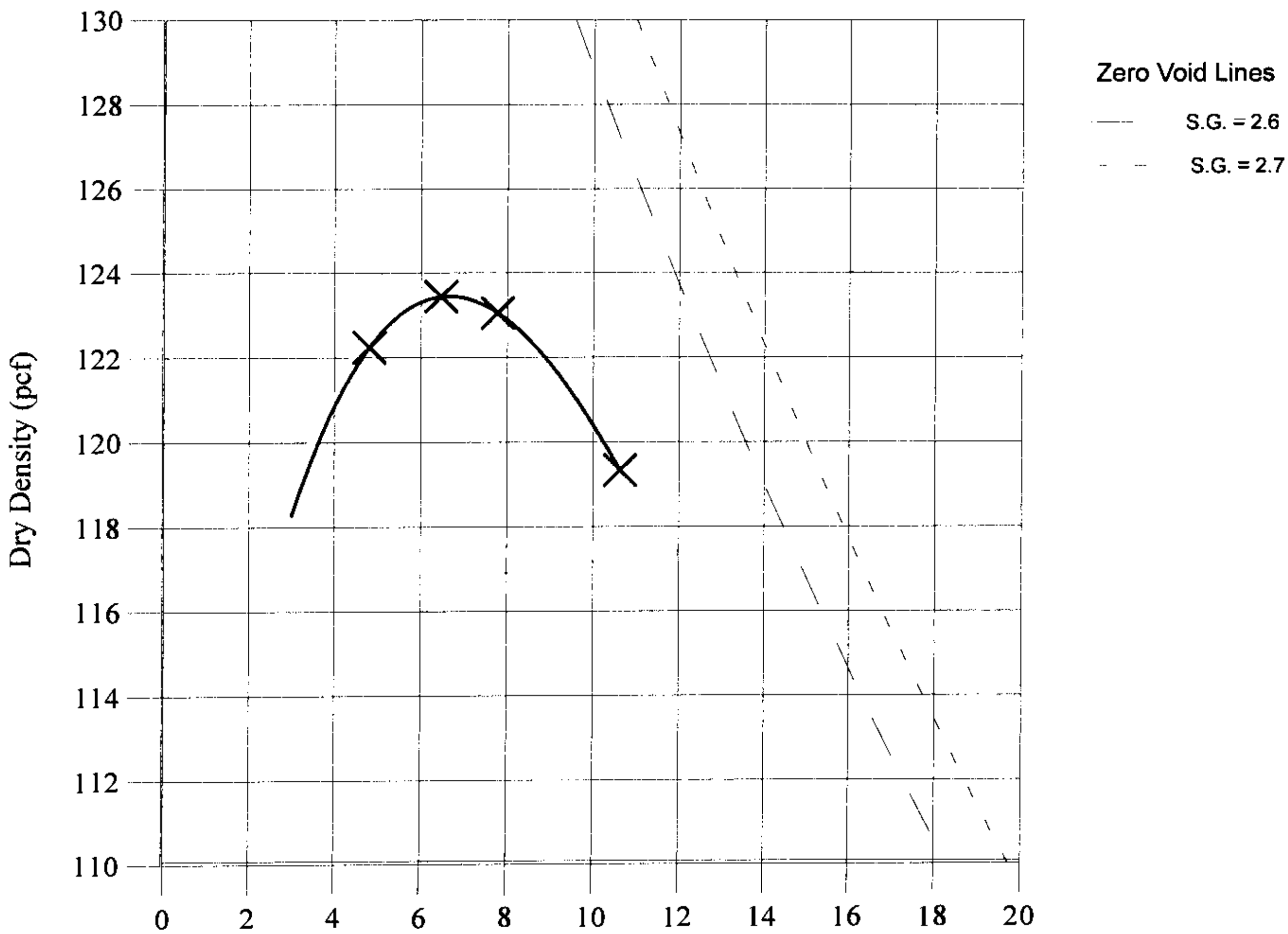
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge	KTL NO.: 06-344-004
PROJECT NO.: N/A	CLIENT: Todd Engineer
DATE: September 2010	DEPTH (ft): 50 feet
BORING NO.: N/A	USCS CLASS.: n/a
SAMPLE NO.: N/A	

METHOD: A	RAM WEIGHT: 10 LBS
DROP: 18 INCHES	RAM TYPE: MANUAL
NUMBER OF LAYERS: 5	BLOWS/LAYER: 25



Moisture Content (percent)

Optimum Moisture Content, %	Maximum Dry Density, pcf
7	123.5

PLATE CM-3

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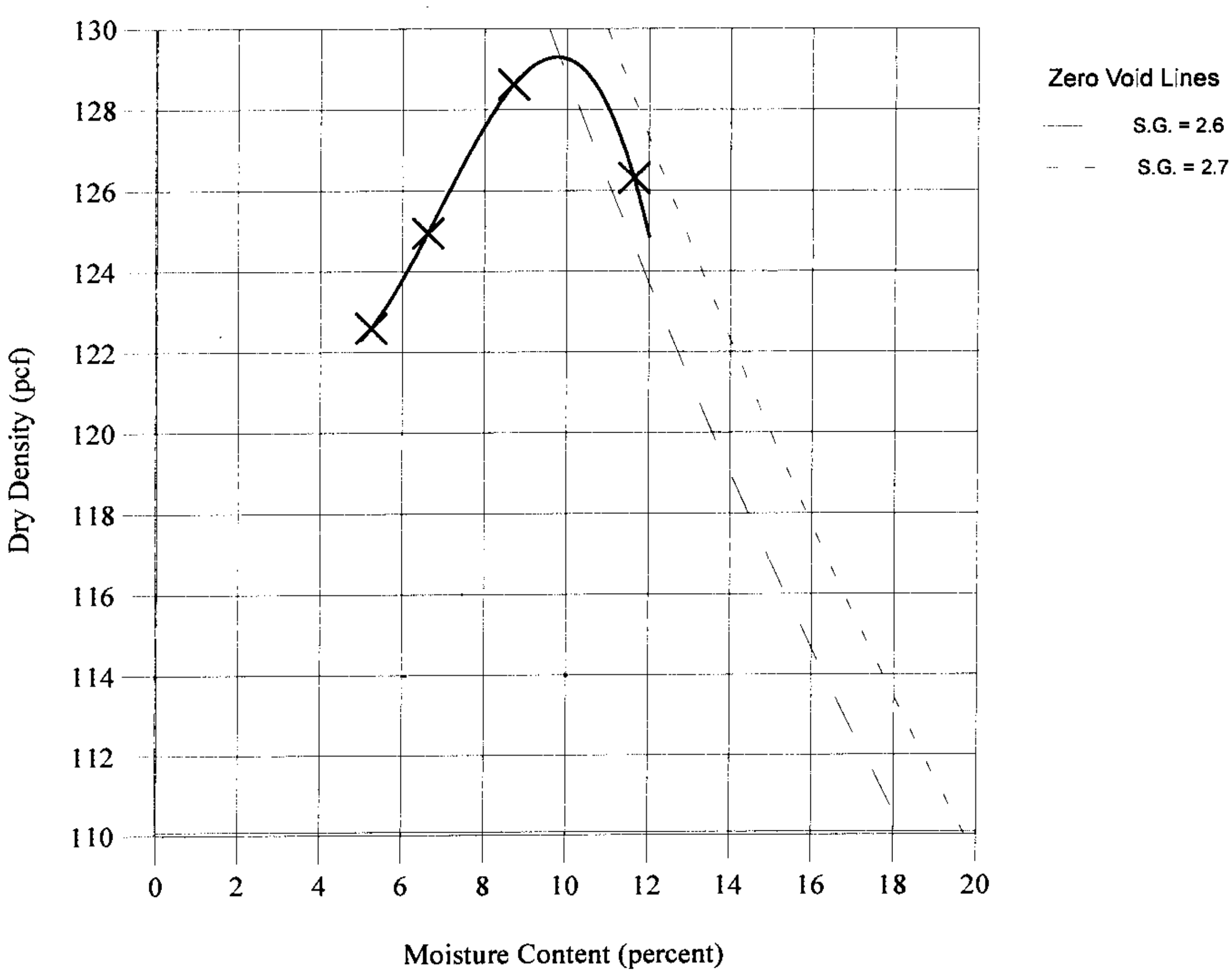
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge
PROJECT NO.: N/A
DATE: September 2010
BORING NO.: N/A
SAMPLE NO.: N/A

KTL NO.: 06-344-004
CLIENT: Todd Engineer
DEPTH (ft): 100 feet
USCS CLASS.: n/a

METHOD: A
DROP: 18 INCHES
NUMBER OF LAYERS: 5

RAM WEIGHT: 10 LBS
RAM TYPE: MANUAL
BLOWS/LAYER: 25



Optimum Moisture Content, %	Maximum Dry Density, pcf
9.5	129.0

PLATE CM-4

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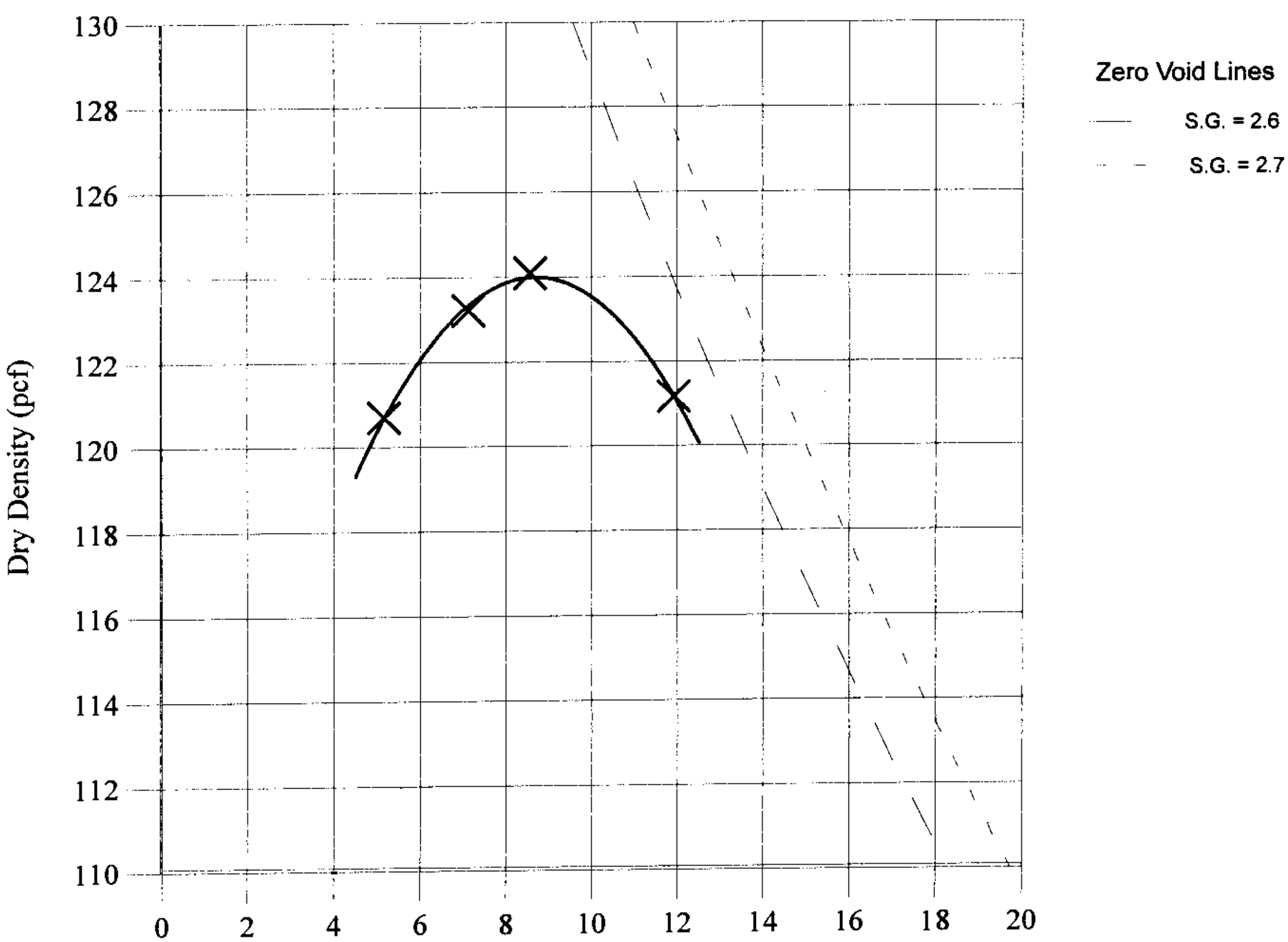
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge
PROJECT NO.: N/A
DATE: September 2010
BORING NO.: N/A
SAMPLE NO.: N/A

KTL NO.: 06-344-004
CLIENT: Todd Engineer
DEPTH (ft): 150 feet
USCS CLASS.: n/a

METHOD: A
DROP: 18 INCHES
NUMBER OF LAYERS: 5

RAM WEIGHT: 10 LBS
RAM TYPE: MANUAL
BLOWS/LAYER: 25



Moisture Content (percent)

Optimum Moisture Content, %	Maximum Dry Density, pcf
9.0	124.0

PLATE CM-5

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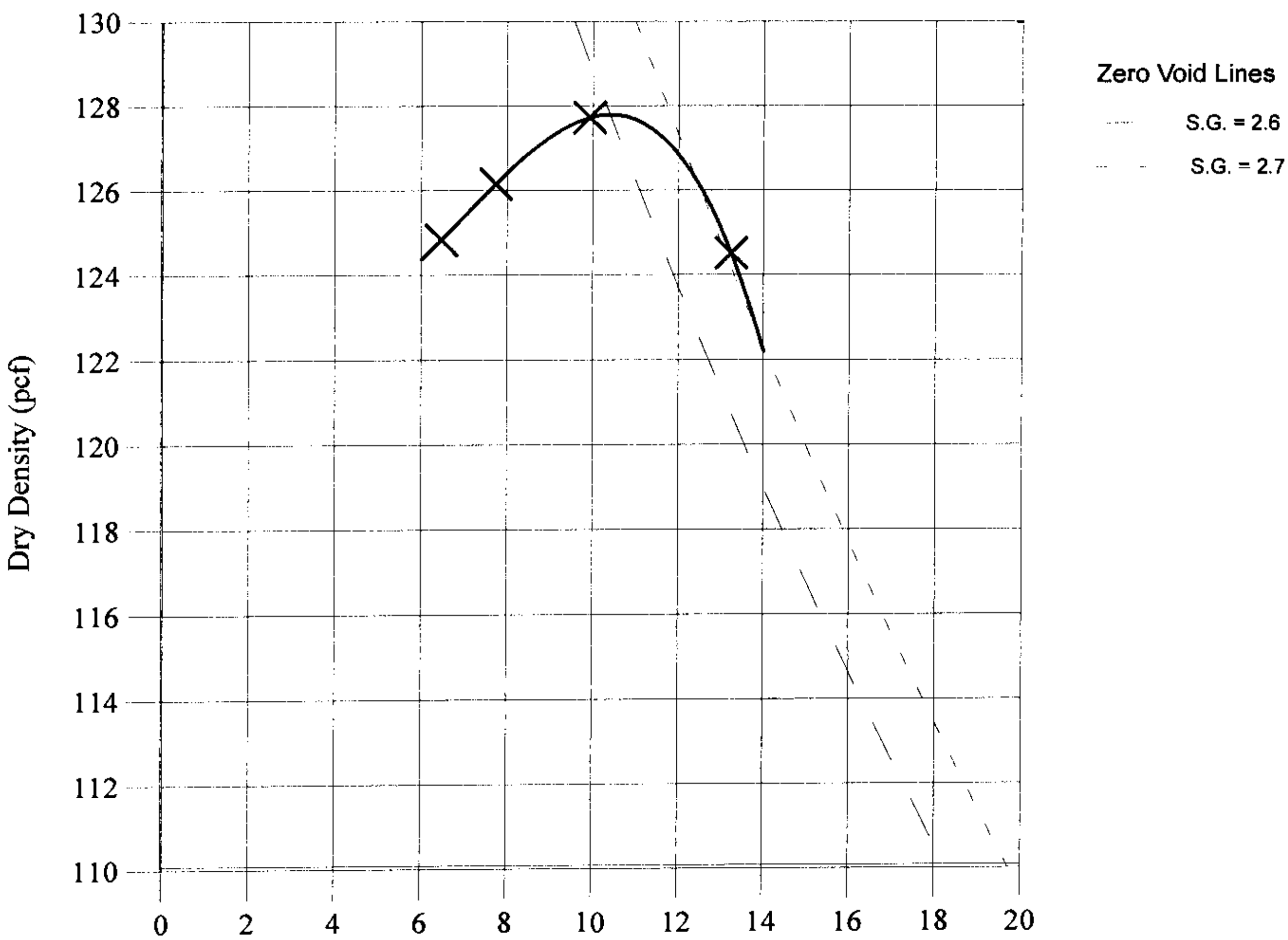
Modified Compaction Test Results
ASTM D 1557

PROJECT NAME:BDVWA- Reche Recharge
PROJECT NO.: N/A
DATE: September 2010
BORING NO.: N/A
SAMPLE NO.: N/A

KTL NO.: 06-344-004
CLIENT: Todd Engineer
DEPTH (ft): 245 feet
USCS CLASS.: n/a

METHOD: A
DROP: 18 INCHES
NUMBER OF LAYERS: 5

RAM WEIGHT: 10 LBS
RAM TYPE: MANUAL
BLOWS/LAYER: 25



Moisture Content (percent)

Optimum Moisture Content, %	Maximum Dry Density, pcf
9.5	127.5

PLATE CM-6

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Appendix C

Well Development Forms

Job Title Bighorn Desert View Water Agency Job No. 0989068.00
Date 9/23/10 Sheet 1 of 1

0530 DM leaves Irvine. Arrive in Yucca Valley Pick up ice for samples. Head to MW-2.
0755 DM @ MW-2
0815 BOART Arrives. Tortoise Awareness & Tailgate Mtg. Head over to MW-1. While Boart begin to set-up @ MW-1. DM goes to BDVWA office to get sample containers for MW-2 from Michelle. Per Michelle, dump water next to their office (~10 miles from MW-1). Boart set-up @ MW-1.
0950 Send 4in x ~~10~~ 8 ft bailer down - at ~40ft btoc it got stuck. Pull it out. Send down shorter bailer (4in x 5ft) - gets down. Bend in PVC? Begin to bail MW-1. Bailing & surging finished
1244 Begin to purge MW-1.
1404 MW-1 developed.
1410 Collect sample MW-1. Stop pumping. Begin to pull out pump. Demob @ MW-1. Move to MW-2.
1555 4in x ~~10~~ 8 ft bailer stopped @ 31 ft btoc. 2nd bailer (4in x 5ft) stopped @ 120 ft btoc @ MW-2. Reached bottom w/ 3in x 5ft bailer. MW-1 fence secured.
1600 Begin to bail MW-2. DM takes Dan to Dump drums by BDVWA office while operator Dan bail & surges MW-2.
1700 Stop surging - will resume tomorrow morning. Load up plywood & drums on-to Dan's truck to take back to shop. (used 5 drums).
1725 DM + Boart off-site. Fenced secured @ MW-2.

D. Marino
Inspector

Job Title Bighorn Desert View Water Agency Job No. 0989068.00

Date 9/24/10 Sheet 1 of

0700 DM + Boart on-site. Tailgate mtg.
0715 Begin to bail MW-2.
1010 Begin to purge MW-2.
1200 MW-2 developed
1205 Collect sample MW-2. Begin to pull pump.
1250 Attempted to get water level @ Well No. 24
but probe won't go past 5ft.
1345 Done - fences secured head to BDVWA office.
Give Michael GPS unit, keys, + Turtle awareness
signature sheet. Dump purge water.
1425 DM + Don off-site. DM heads to lab.

Inspector

GROUNDWAT MONITORING WELL
DEVELOPMENT DATA

Project Number: 0989068*00

Date: 9/23/10

General Information

Water-Level Meter: ~~Solinst Interface Probe~~ Geotech Env. Water Level meter.

Water Quality Meter: YSI 6820

Purging Equipment: Rig

Decontamination Process:

Personnel: D. Marino

Well Development Data for Monitoring Well:

Well Number: MW-1

Casing Diameter: 4in

Initial depth to water: 231.93 @ TOC

Pre-development total depth: 259.7 @ TOC

Water Column (feet): 27.77

Minimum Purge Volume: 93 <<— 3.35 X WC = 5 volumes (for a 4-inch diameter well)

Start Time	End Time	(Cumulative) Volume (gal)	pH*	Conductivity* (~~mS~~/cm)	Turbidity* (NTU)	O2 (mg/l)	Temperature* (C)	~~Salinity~~ ORP (%)	Activity: Surge	Activity: Bail	Activity: Pump
0950	1020	~15								X	TD @259.7
1020	1040								X		
1040	1058	~25								X	
1058	1117								X		
1117	1132	~32								X	
1244	1249	~40	7.06	705	2142.7	2.09	26.76	172.0		*DTW-231.93	X @ ~1ft from bottom
1249	1254	~53	7.64	620	1575.6	2.72	28.04	139.7		232.35	X
1254	1304	~78	7.74	588	138.9	4.19	28.44	107.0		232.42	X
1304	1314	~100	7.73	583	57.3	4.65	28.17	77.8		232.30	X
1314	1324	~120	7.75	580	32.2	4.90	28.16	72.6		232.35	X
1324	1334	~140	7.80	577	20.0	5.18	28.00	70.9		232.36	X

Post-development depth to water: See pg. 2

Post-development total depth: See pg. 2

Total Volume Removed See pg. 2

Notes/Comments: * DTW taken @ time in Start time column

GROUNDWAT MONITORING WELL
DEVELOPMENT DATA

Project Number: 098906~~8~~*00

Date: 9/23/10

General Information

Water-Level Meter: ~~Solinst Interface Probe~~ Geotech Env.

Water Quality Meter: YSI 6820

Purging Equipment: Rig

Decontamination Process:

Personnel: D. Marano

Well Development Data for Monitoring Well:

Well Number: MW-1

Casing Diameter: 4 in

Initial depth to water: 231.93 @ TOC

Pre-development total depth: 259.7 @ TOC

Water Column (feet): 27.77

Minimum Purge Volume: 93 <<--- 3.35 X WC = 5 volumes (for a 4-inch diameter well)

Start Time	End Time	Volume (gal)	pH	Conductivity (mS/cm)	Turbidity (NTU)	O2 (mg/l)	Temperature (C)	~~Salinity~~ ORP	Activity: Surge	Activity: Bail	Activity: Pump
1334	1344	~160	7.77	572	14.6	5.27	27.76	77.0	*DTW	232.40	X
1344	1354	~180	7.81	568	12.9	5.41	27.63	66.5		232.40	X
1354	1359	~190	7.83	568	12.5	5.48	27.60	64.4		232.39	X
1359	1404	~200	7.83	568	11.8	5.50	27.70	56.9		232.39	X
										232.35	

Post-development depth to water: 231.84 @ 1455

Post-development total depth: 259.7 @ TOC

Total Volume Removed: ~200 before collecting sample MW-1

Notes/Comments: collect sample MW-1 @ 1410

GROUNDWAT... MONITORING WELL DEVELOPMENT DATA

Project Number: 0989068*00

Date: 9/23/10 ÷ 9/24/10

General Information

Water-Level Meter: ~~Solinst Interface Probe~~ Geotech Env.

Water Quality Meter: YSI 6820

Purging Equipment: Rig

Decontamination Process:

Personnel: D. Marino

Well Development Data for Monitoring Well:

Well Number: MW-2

Casing Diameter: 4in

Initial depth to water: 288.53@TOC

Pre-development total depth: 347.3@TOC

Water Column (feet): 58.77

Minimum Purge Volume: ~197 <<— 3.35 X WC = 5 volumes (for a 4-inch diameter well)

Date	Start Time	End Time	(cumulative) Volume (gal)	pH	Conductivity (mS/cm)	Turbidity (NTU)	O2 (mg/l)	Temperature (C)	~~Salinity~~ ORP (%)	Activity: Surge	Activity: Bail	Activity: Pump
9/23	1600	1630	~15								X	
	1630	1700								X		
9/24	0715	0745	~25								X	TD-348.1@TOC
	0745	0815								X		
	0820	0842	~35								X	TD-348.10
	1010	1015	~50	7.90	430	2094.7	5.42	24.15	120.2	*DTW	290.15	X pump @ 344ft
	1015	1025	~72	7.83	434	2125.4	6.97	25.97	87.2		290.36	X
	1025	1035	~100	7.90	437	162.1	5.52	25.13	97.6		289.25	X
	1035	1045	~128	7.98	436	30.3	5.73	25.10	48.4		289.30	X
	1045	1055	~156	7.98	435	24.6	5.83	25.00	39.7		289.16	X
	1055	1105	~184	7.92	434	171.7	5.90	25.03	53.8		289.15	X @ 329ft.

Post-development depth to water: See pg. 2

Post-development total depth: See pg. 2

Total Volume Removed: See pg 2

Notes/Comments:

9/23/10 1630-1700 Surged whole screen (298-348) for 5 min. Then bottom 25ft for 10 min
top " "
then entire screen again for 5 min

9/24/10 0745-0815 same surge method as 9/23/10

* DTW taken @ time is start time column.

GROUNDWATE. .ONITORING WELL
DEVELOPMENT DATA

Project Number: 0989068*00

Date: 9/24/10

General Information

Water-Level Meter: ~~Solinst Interface Probe~~ Geotech Env.

Water Quality Meter: YSI 6820

Purging Equipment: Rig

Decontamination Process:

Personnel: D. Marino

Well Development Data for Monitoring Well:

Well Number: MW-2

Casing Diameter: 4in

Initial depth to water: 288.53 @ TOC

Pre-development total depth: 347.3 @ TOC

Water Column (feet): 58.77

Minimum Purge Volume: ~197 <<— 3.35 X WC = 5 volumes (for a 4-inch diameter well)

Start Time	End Time	Volume (gal)	pH	Conductivity (mS/cm)	Turbidity (NTU)	O2 (mg/l)	Temperature (C)	~~Salinity~~ ORP (%)	Activity Surge	Activity Bail	Activity Pump
1105	1115	~212	7.93	425	59.7	7.03	24.94	75.5			X
1115	1125	~240	7.87	423	50.9	7.21	24.97	129.4			X
1125	1133	~268	7.81	423	25.2	7.26	24.98	134.9			X
1135	1145	~296	7.92	440	14.6	5.40	25.27	95.4			X
1145	1150	~310	7.95	441	11.4	5.44	25.13	59.1			X
1150	1155	~324	7.94	440	9.5	5.49	25.17	48.0			X
1155	1200	~338	7.98	439	8.3	5.55	25.09	37.5			X

Post-development depth to water: 288.65 @ 1315

Post-development total depth: 348.10

Total Volume Removed: ~338 before collecting sample MW-2

Notes/Comments:

collect sample MW-2 @ 1205

BOART LONGYEAR

WELL SERVICE REPORT

RIG 5907 JOB NO. 3420-0515
DAY 1 DATE 9-23-10

Client Todd	Field Rep. Dina
Project Name Big Horn Water	Client Project No.
Location Warren Vista Yucca Valley CA	Client P.O. #

TYPE OF WORK	WELL NUMBER	DIA.	DEPTH OF WELL	MEASURED WATER DEPTH	PUMP SETTING	MEASURED GPM	START TIME	FINISH TIME	TOTAL TIME
Development	#MW-1	4"	259-7"	231.93	258'	2			
Bail 15 gallons, surge 15 minutes, Bail 13 gallons, surge 15 minutes									
Bail 10 gallons									
Pump						2	12:45	2:20	
Development	#MW-2	4"	318-1	288.53					
Bail 15 gallons, surge 30 minutes									
Bring Bobcat from #1 to MW-2									
Tranfer water 10 miles to Empty									

Time	Hours	Schedule	Time	Personnel	Name	Hours
Shop / Pretrip	.5	On Duty	5:30 AM	Technician	Don Hansen	12.5
Mobilization	2	Arrive Site	8:00 AM	Helper	Don Evans	13
Operating	9.5	Depart Site	5:30 PM			
Standby		Off Duty	6:00 PM	Subsistence (No. Men)		
Down/Repair (non-billable		Comments:				
Demobilization						
Shop/Post Trip	.5					
>Total Hours	12.5					

Equipment / Tools / Service		Supplies
[X] Generator (KW)	[ ] Compressor (Size)	5 drums
[ ] Steam Cleaner	[3] Pump (Size)	
[X] Water Wagon		
[X] Other Pick-up with plywood		

Client Signature [signature]	Technician Signature [signature]

BOART LONGYEAR

WELL SERVICE REPORT

RIG 8067 JOB NO. 3420-0515
DAY 2 DATE 9-24-10

Client Todd	Field Rep. Dina
Project Name Big Horn Water	Client Project No.
Location Warren Vista Yucca Valley	Client P.O. #

TYPE OF WORK	WELL NUMBER	DIA.	DEPTH OF WELL	MEASURED WATER DEPTH	PUMP SETTING	MEASURED GPM	START TIME	FINISH TIME	TOTAL TIME
Development	MW-2	4"	348-1	288.53	344	205	10:00	12:00	
Bail 10 gallons, surge 30 minutes					Bail 10 gallons				
pump									
Transfer water									

Time	Hours	Schedule	Time	Personnel	Name	Hours
Shop / Pretrip		On Duty	6:30 AM PM	Technician	Don Hansen	10
Mobilization	.5	Arrive Site	7:00 AM PM	Helper		
Operating	7.5	Depart Site	2:30 AM PM			
Standby		Off Duty	4:30 AM PM	Subsistence (No. Men)		
Down/Repair (non-billable		Comments:				
Demobilization						
Shop/Post Trip	2					
>Total Hours	10					

Equipment / Tools / Service		Supplies
[✓] Generator (KW)	[ ] Compressor (Size)	
[ ] Steam Cleaner	[3"] Pump (Size)	
[✓] Water Wagon		
[ ] Other		

Client Signature [signature]	Technician Signature [signature]

Appendix D

Aquifer Testing Data

Report Date:	10/6/2010 16:27		
Report User Name:	David		
Report Computer Name:	DAVID-PC		
Log File Properties			
File Name	Dan_Append_2010-10-06_12-06-08-225.wsl		
Create Date	10/6/2010 12:06		
Device Properties			
Device	Level TROLL 700		
Site	HDWD24E		
Device Name			
Serial Number	122996		
Firmware Version	2.08		
Hardware Version	2		
Log Configuration			
Log Name	Dan		
Created By	David		
Computer Name	DAVID-PC		
Application	WinSitu.exe		
Application Version	5.6.16.0		
Create Date	10/4/2010 11:21		
Current Time Zone	Pacific Daylight Time(Use Local Time)		
Notes Size(bytes)	4096		
Overwrite when full	Disabled		
Scheduled Start Time	Manual Start		
Scheduled Stop Time	No Stop Time		
Type	Fast Linear		
Interval	Days: 0 hrs: 00 mins: 00 secs: 20		
Level Reference Settings At Log Creation			
	Level Measurement Mode	Level Depth To Water	
	Specific Gravity	0.999	
	Level Reference Mode:	Set new reference	
	Level Reference Value:	0 (ft)	
	Level Reference Head Pressure	23.7936 (PSI)	
Other Log Settings			
	Depth of Probe:	54.9278 (ft)	
	Head Pressure:	23.7889 (PSI)	
	Temperature:	22.5892 (C)	
Log Notes:			
Date and Time	Note		
10/4/2010 11:21	Used Battery: 20% Used Memory: 4% User Name: David		
10/4/2010 11:21	Manual Start Command		
10/5/2010 15:16	Log Download - Used Battery: 21% Used Memory: 6% User Name: David		
10/6/2010 12:04	Log Download - Used Battery: 21% Used Memory: 7% User Name: David		
Log Data:			
Record Count	8769		
Sensors	1		

Date/Time	Time (min	WL (ft)	DD (ft)
10/5/10 8:00	0.0	-0.068	
10/5/10 8:01	0.3	0.957	1.025
10/5/10 8:01	0.7	1.468	1.536
10/5/10 8:01	1.0	1.500	1.568
10/5/10 8:02	1.3	1.129	1.197
10/5/10 8:02	1.7	0.972	1.04
10/5/10 8:02	2.0	0.994	1.062
10/5/10 8:03	2.3	1.009	1.077
10/5/10 8:03	2.7	1.069	1.137
10/5/10 8:03	3.0	1.095	1.163
10/5/10 8:04	3.3	1.112	1.18
10/5/10 8:04	3.7	1.109	1.177
10/5/10 8:04	4.0	1.116	1.184
10/5/10 8:05	4.3	1.137	1.205
10/5/10 8:05	4.7	1.127	1.195
10/5/10 8:05	5.0	1.139	1.207
10/5/10 8:06	5.3	1.147	1.215
10/5/10 8:06	5.7	1.151	1.219
10/5/10 8:06	6.0	1.160	1.228
10/5/10 8:07	6.3	1.169	1.237
10/5/10 8:07	6.7	1.183	1.251
10/5/10 8:07	7.0	1.189	1.257
10/5/10 8:08	7.3	1.190	1.258
10/5/10 8:08	7.7	1.186	1.254
10/5/10 8:08	8.0	1.188	1.256
10/5/10 8:09	8.3	1.193	1.261
10/5/10 8:09	8.7	1.199	1.267
10/5/10 8:09	9.0	1.203	1.271
10/5/10 8:10	9.3	1.207	1.275
10/5/10 8:10	9.7	1.223	1.291
10/5/10 8:10	10.0	1.225	1.293
10/5/10 8:11	10.3	1.226	1.294
10/5/10 8:11	10.7	1.236	1.304
10/5/10 8:11	11.0	1.230	1.298
10/5/10 8:12	11.3	1.242	1.31
10/5/10 8:12	11.7	1.246	1.314
10/5/10 8:12	12.0	1.249	1.317
10/5/10 8:13	12.3	1.241	1.309
10/5/10 8:13	12.7	1.254	1.322
10/5/10 8:13	13.0	1.256	1.324
10/5/10 8:14	13.3	1.262	1.33
10/5/10 8:14	13.7	1.263	1.331
10/5/10 8:14	14.0	1.266	1.334
10/5/10 8:15	14.3	1.274	1.342
10/5/10 8:15	14.7	1.271	1.339
10/5/10 8:15	15.0	1.277	1.345
10/5/10 8:16	15.3	1.279	1.347
10/5/10 8:16	15.7	1.281	1.349
10/5/10 8:16	16.0	1.280	1.348
10/5/10 8:17	16.3	1.279	1.347
10/5/10 8:17	16.7	1.284	1.352
10/5/10 8:17	17.0	1.287	1.355
10/5/10 8:18	17.3	1.290	1.358
10/5/10 8:18	17.7	1.293	1.361
10/5/10 8:18	18.0	1.298	1.366
10/5/10 8:19	18.3	1.307	1.375
10/5/10 8:19	18.7	1.310	1.378
10/5/10 8:19	19.0	1.305	1.373
10/5/10 8:20	19.3	1.311	1.379
10/5/10 8:20	19.7	1.311	1.379
10/5/10 8:20	20.0	1.308	1.376
10/5/10 8:21	20.3	1.311	1.379
10/5/10 8:21	20.7	1.312	1.38
10/5/10 8:21	21.0	1.314	1.382
10/5/10 8:22	21.3	1.329	1.397
10/5/10 8:22	21.7	1.335	1.403
10/5/10 8:22	22.0	1.327	1.395
10/5/10 8:23	22.3	1.342	1.41
10/5/10 8:23	22.7	1.330	1.398
10/5/10 8:23	23.0	1.341	1.409
10/5/10 8:24	23.3	1.340	1.408
10/5/10 8:24	23.7	1.344	1.412
10/5/10 8:24	24.0	1.361	1.429
10/5/10 8:25	24.3	1.340	1.408
10/5/10 8:25	24.7	1.346	1.414
10/5/10 8:25	25.0	1.349	1.417
10/5/10 8:26	25.3	1.353	1.421
10/5/10 8:26	25.7	1.350	1.418
10/5/10 8:26	26.0	1.357	1.425
10/5/10 8:27	26.3	1.354	1.422
10/5/10 8:27	26.7	1.342	1.41
10/5/10 8:27	27.0	1.349	1.417
10/5/10 8:28	27.3	1.348	1.416
10/5/10 8:28	27.7	1.367	1.435
10/5/10 8:28	28.0	1.370	1.438
10/5/10 8:29	28.3	1.367	1.435
10/5/10 8:29	28.7	1.369	1.437
10/5/10 8:29	29.0	1.376	1.444
10/5/10 8:30	29.3	1.374	1.442
10/5/10 8:30	29.7	1.379	1.447
10/5/10 8:30	30.0	1.376	1.444
10/5/10 8:31	30.3	1.384	1.452
10/5/10 8:31	30.7	1.391	1.459
10/5/10 8:31	31.0	1.394	1.462
10/5/10 8:32	31.3	1.377	1.445
10/5/10 8:32	31.7	1.389	1.457
10/5/10 8:32	32.0	1.392	1.46
10/5/10 8:33	32.3	1.399	1.467
10/5/10 8:33	32.7	1.394	1.462
10/5/10 8:33	33.0	1.394	1.462
10/5/10 8:34	33.3	1.402	1.47
10/5/10 8:34	33.7	1.404	1.472
10/5/10 8:34	34.0	1.402	1.47
10/5/10 8:35	34.3	1.403	1.471
10/5/10 8:35	34.7	1.407	1.475
10/5/10 8:35	35.0	1.409	1.477
10/5/10 8:36	35.3	1.409	1.477
10/5/10 8:36	35.7	1.407	1.475
10/5/10 8:36	36.0	1.408	1.476
10/5/10 8:37	36.3	1.408	1.476
10/5/10 8:37	36.7	1.410	1.478
10/5/10 8:37	37.0	1.412	1.48
10/5/10 8:38	37.3	1.420	1.488
10/5/10 8:38	37.7	1.414	1.482
10/5/10 8:38	38.0	1.424	1.492
10/5/10 8:39	38.3	1.422	1.49
10/5/10 8:39	38.7	1.429	1.497
10/5/10 8:39	39.0	1.430	1.498
10/5/10 8:40	39.3	1.433	1.501
10/5/10 8:40	39.7	1.439	1.507
10/5/10 8:40	40.0	1.440	1.508
10/5/10 8:41	40.3	1.447	1.515
10/5/10 8:41	40.7	1.445	1.513
10/5/10 8:41	41.0	1.442	1.51
10/5/10 8:42	41.3	1.448	1.516
10/5/10 8:42	41.7	1.450	1.518
10/5/10 8:42	42.0	1.451	1.519
10/5/10 8:43	42.3	1.451	1.519
10/5/10 8:43	42.7	1.456	1.524
10/5/10 8:43	43.0	1.453	1.521
10/5/10 8:44	43.3	1.461	1.529
10/5/10 8:44	43.7	1.467	1.535
10/5/10 8:44	44.0	1.468	1.536
10/5/10 8:45	44.3	1.473	1.541
10/5/10 8:45	44.7	1.469	1.537
10/5/10 8:45	45.0	1.462	1.53
10/5/10 8:46	45.3	1.464	1.532
10/5/10 8:46	45.7	1.465	1.533
10/5/10 8:46	46.0	1.465	1.533
10/5/10 8:47	46.3	1.466	1.534
10/5/10 8:47	46.7	1.468	1.536
10/5/10 8:47	47.0	1.471	1.539
10/5/10 8:48	47.3	1.475	1.543
10/5/10 8:48	47.7	1.475	1.543
10/5/10 8:48	48.0	1.478	1.546
10/5/10 8:49	48.3	1.480	1.548
10/5/10 8:49	48.7	1.482	1.55
10/5/10 8:49	49.0	1.483	1.551
10/5/10 8:50	49.3	1.484	1.552
10/5/10 8:50	49.7	1.488	1.556
10/5/10 8:50	50.0	1.487	1.555
10/5/10 8:51	50.3	1.485	1.553
10/5/10 8:51	50.7	1.491	1.559
10/5/10 8:51	51.0	1.490	1.558
10/5/10 8:52	51.3	1.491	1.559
10/5/10 8:52	51.7	1.496	1.564
10/5/10 8:52	52.0	1.493	1.561
10/5/10 8:53	52.3	1.491	1.559
10/5/10 8:53	52.7	1.497	1.565
10/5/10 8:53	53.0	1.496	1.564
10/5/10 8:54	53.3	1.498	1.566
10/5/10 8:54	53.7	1.504	1.572
10/5/10 8:54	54.0	1.510	1.578
10/5/10 8:55	54.3	1.508	1.576
10/5/10 8:55	54.7	1.504	1.572
10/5/10 8:55	55.0	1.507	1.575
10/5/10 8:56	55.3	1.506	1.574
10/5/10 8:56	55.7	1.508	1.576
10/5/10 8:56	56.0	1.518	1.586
10/5/10 8:57	56.3	1.518	1.586
10/5/10 8:57	56.7	1.515	1.583
10/5/10 8:57	57.0	1.516	1.584
10/5/10 8:58	57.3	1.517	1.585
10/5/10 8:58	57.7	1.519	1.587
10/5/10 8:58	58.0	1.522	1.59
10/5/10 8:59	58.3	1.523	1.591
10/5/10 8:59	58.7	1.527	1.595
10/5/10 8:59	59.0	1.521	1.589
10/5/10 9:00	59.3	1.517	1.585
10/5/10 9:00	59.7	1.524	1.592
10/5/10 9:00	60.0	1.522	1.59
10/5/10 9:01	60.3	1.521	1.589
10/5/10 9:01	60.7	1.523	1.591
10/5/10 9:01	61.0	1.525	1.593
10/5/10 9:02	61.3	1.529	1.597
10/5/10 9:02	61.7	1.532	1.6
10/5/10 9:02	62.0	1.532	1.6
10/5/10 9:03	62.3	1.542	1.61
10/5/10 9:03	62.7	1.540	1.608
10/5/10 9:03	63.0	1.539	1.607
10/5/10 9:04	63.3	1.542	1.61

10/5/10 9:04	63.7	1.538	1.606
10/5/10 9:04	64.0	1.542	1.61
10/5/10 9:05	64.3	1.550	1.618
10/5/10 9:05	64.7	1.549	1.617
10/5/10 9:05	65.0	1.544	1.612
10/5/10 9:06	65.3	1.544	1.612
10/5/10 9:06	65.7	1.542	1.61
10/5/10 9:06	66.0	1.539	1.607
10/5/10 9:07	66.3	1.541	1.609
10/5/10 9:07	66.7	1.543	1.611
10/5/10 9:07	67.0	1.542	1.61
10/5/10 9:08	67.3	1.542	1.61
10/5/10 9:08	67.7	1.541	1.609
10/5/10 9:08	68.0	1.542	1.61
10/5/10 9:09	68.3	1.544	1.612
10/5/10 9:09	68.7	1.547	1.615
10/5/10 9:09	69.0	1.548	1.616
10/5/10 9:10	69.3	1.546	1.614
10/5/10 9:10	69.7	1.547	1.615
10/5/10 9:10	70.0	1.547	1.615
10/5/10 9:11	70.3	1.547	1.615
10/5/10 9:11	70.7	1.547	1.615
10/5/10 9:11	71.0	1.549	1.617
10/5/10 9:12	71.3	1.552	1.62
10/5/10 9:12	71.7	1.553	1.621
10/5/10 9:12	72.0	1.556	1.624
10/5/10 9:13	72.3	1.560	1.628
10/5/10 9:13	72.7	1.558	1.626
10/5/10 9:13	73.0	1.555	1.623
10/5/10 9:14	73.3	1.560	1.628
10/5/10 9:14	73.7	1.562	1.63
10/5/10 9:14	74.0	1.564	1.632
10/5/10 9:15	74.3	1.562	1.63
10/5/10 9:15	74.7	1.566	1.634
10/5/10 9:15	75.0	1.565	1.633
10/5/10 9:16	75.3	1.573	1.641
10/5/10 9:16	75.7	1.573	1.641
10/5/10 9:16	76.0	1.577	1.645
10/5/10 9:17	76.3	1.576	1.644
10/5/10 9:17	76.7	1.574	1.642
10/5/10 9:17	77.0	1.575	1.643
10/5/10 9:18	77.3	1.574	1.642
10/5/10 9:18	77.7	1.574	1.642
10/5/10 9:18	78.0	1.578	1.646
10/5/10 9:19	78.3	1.576	1.644
10/5/10 9:19	78.7	1.575	1.643
10/5/10 9:19	79.0	1.572	1.64
10/5/10 9:20	79.3	1.575	1.643
10/5/10 9:20	79.7	1.575	1.643
10/5/10 9:20	80.0	1.575	1.643
10/5/10 9:21	80.3	1.579	1.647
10/5/10 9:21	80.7	1.584	1.652
10/5/10 9:21	81.0	1.582	1.65
10/5/10 9:22	81.3	1.583	1.651
10/5/10 9:22	81.7	1.583	1.651
10/5/10 9:22	82.0	1.583	1.651
10/5/10 9:23	82.3	1.592	1.66
10/5/10 9:23	82.7	1.592	1.66
10/5/10 9:23	83.0	1.594	1.662
10/5/10 9:24	83.3	1.589	1.657
10/5/10 9:24	83.7	1.593	1.661
10/5/10 9:24	84.0	1.595	1.663
10/5/10 9:25	84.3	1.594	1.662
10/5/10 9:25	84.7	1.598	1.666
10/5/10 9:25	85.0	1.595	1.663
10/5/10 9:26	85.3	1.597	1.665
10/5/10 9:26	85.7	1.593	1.661
10/5/10 9:26	86.0	1.594	1.662
10/5/10 9:27	86.3	1.597	1.665
10/5/10 9:27	86.7	1.600	1.668
10/5/10 9:27	87.0	1.601	1.669
10/5/10 9:28	87.3	1.601	1.669
10/5/10 9:28	87.7	1.606	1.674
10/5/10 9:28	88.0	1.604	1.672
10/5/10 9:29	88.3	1.602	1.67
10/5/10 9:29	88.7	1.605	1.673
10/5/10 9:29	89.0	1.602	1.67
10/5/10 9:30	89.3	1.602	1.67
10/5/10 9:30	89.7	1.602	1.67
10/5/10 9:30	90.0	1.608	1.676
10/5/10 9:31	90.3	1.607	1.675
10/5/10 9:31	90.7	1.610	1.678
10/5/10 9:31	91.0	1.608	1.676
10/5/10 9:32	91.3	1.610	1.678
10/5/10 9:32	91.7	1.610	1.678
10/5/10 9:32	92.0	1.615	1.683
10/5/10 9:33	92.3	1.618	1.686
10/5/10 9:33	92.7	1.619	1.687
10/5/10 9:33	93.0	1.619	1.687
10/5/10 9:34	93.3	1.626	1.694
10/5/10 9:34	93.7	1.625	1.693
10/5/10 9:34	94.0	1.625	1.693
10/5/10 9:35	94.3	1.621	1.689
10/5/10 9:35	94.7	1.621	1.689
10/5/10 9:35	95.0	1.630	1.698
10/5/10 9:36	95.3	1.630	1.698
10/5/10 9:36	95.7	1.603	1.671
10/5/10 9:36	96.0	1.614	1.682
10/5/10 9:37	96.3	1.623	1.691
10/5/10 9:37	96.7	1.612	1.68
10/5/10 9:37	97.0	1.620	1.688
10/5/10 9:38	97.3	1.622	1.69
10/5/10 9:38	97.7	1.621	1.689
10/5/10 9:38	98.0	1.622	1.69
10/5/10 9:39	98.3	1.613	1.681
10/5/10 9:39	98.7	1.619	1.687
10/5/10 9:39	99.0	1.620	1.688
10/5/10 9:40	99.3	1.623	1.691
10/5/10 9:40	100	1.626	1.694
10/5/10 9:40	100	1.628	1.696
10/5/10 9:41	100	1.631	1.699
10/5/10 9:41	101	1.631	1.699
10/5/10 9:41	101	1.633	1.701
10/5/10 9:42	101	1.632	1.7
10/5/10 9:42	102	1.631	1.699
10/5/10 9:42	102	1.621	1.689
10/5/10 9:43	102	1.616	1.684
10/5/10 9:43	103	1.623	1.691
10/5/10 9:43	103	1.625	1.693
10/5/10 9:44	103	1.627	1.695
10/5/10 9:44	104	1.629	1.697
10/5/10 9:44	104	1.630	1.698
10/5/10 9:45	104	1.631	1.699
10/5/10 9:45	105	1.629	1.697
10/5/10 9:45	105	1.634	1.702
10/5/10 9:46	105	1.639	1.707
10/5/10 9:46	106	1.636	1.704
10/5/10 9:46	106	1.635	1.703
10/5/10 9:47	106	1.642	1.71
10/5/10 9:47	107	1.639	1.707
10/5/10 9:47	107	1.641	1.709
10/5/10 9:48	107	1.644	1.712
10/5/10 9:48	108	1.647	1.715
10/5/10 9:48	108	1.650	1.718
10/5/10 9:49	108	1.660	1.728
10/5/10 9:49	109	1.665	1.733
10/5/10 9:49	109	1.658	1.726
10/5/10 9:50	109	1.660	1.728
10/5/10 9:50	110	1.659	1.727
10/5/10 9:50	110	1.662	1.73
10/5/10 9:51	110	1.662	1.73
10/5/10 9:51	111	1.663	1.731
10/5/10 9:51	111	1.663	1.731
10/5/10 9:52	111	1.659	1.727
10/5/10 9:52	112	1.666	1.734
10/5/10 9:52	112	1.669	1.737
10/5/10 9:53	112	1.663	1.731
10/5/10 9:53	113	1.664	1.732
10/5/10 9:53	113	1.663	1.731
10/5/10 9:54	113	1.666	1.734
10/5/10 9:54	114	1.668	1.736
10/5/10 9:54	114	1.666	1.734
10/5/10 9:55	114	1.663	1.731
10/5/10 9:55	115	1.669	1.737
10/5/10 9:55	115	1.669	1.737
10/5/10 9:56	115	1.668	1.736
10/5/10 9:56	116	1.666	1.734
10/5/10 9:56	116	1.668	1.736
10/5/10 9:57	116	1.671	1.739
10/5/10 9:57	117	1.671	1.739
10/5/10 9:57	117	1.676	1.744
10/5/10 9:58	117	1.674	1.742
10/5/10 9:58	118	1.672	1.74
10/5/10 9:58	118	1.676	1.744
10/5/10 9:59	118	1.681	1.749
10/5/10 9:59	119	1.681	1.749
10/5/10 9:59	119	1.677	1.745
10/5/10 10:00	119	1.677	1.745
10/5/10 10:00	120	1.679	1.747
10/5/10 10:00	120	1.677	1.745
10/5/10 10:01	120	1.682	1.75
10/5/10 10:01	121	1.681	1.749
10/5/10 10:01	121	1.689	1.757
10/5/10 10:02	121	1.683	1.751
10/5/10 10:02	122	1.685	1.753
10/5/10 10:02	122	1.688	1.756
10/5/10 10:03	122	1.686	1.754
10/5/10 10:03	123	1.690	1.758
10/5/10 10:03	123	1.692	1.76
10/5/10 10:04	123	1.690	1.758
10/5/10 10:04	124	1.692	1.76
10/5/10 10:04	124	1.696	1.764
10/5/10 10:05	124	1.694	1.762
10/5/10 10:05	125	1.694	1.762
10/5/10 10:05	125	1.694	1.762
10/5/10 10:06	125	1.679	1.747
10/5/10 10:06	126	1.681	1.749
10/5/10 10:06	126	1.684	1.752
10/5/10 10:07	126	1.686	1.754
10/5/10 10:07	127	1.684	1.752
10/5/10 10:07	127	1.686	1.754
10/5/10 10:08	127	1.685	1.753

10/5/10 10:08	128	1.691	1.759
10/5/10 10:08	128	1.692	1.76
10/5/10 10:09	128	1.692	1.76
10/5/10 10:09	129	1.693	1.761
10/5/10 10:09	129	1.688	1.756
10/5/10 10:10	129	1.692	1.76
10/5/10 10:10	130	1.689	1.757
10/5/10 10:10	130	1.692	1.76
10/5/10 10:11	130	1.704	1.772
10/5/10 10:11	131	1.703	1.771
10/5/10 10:11	131	1.699	1.767
10/5/10 10:12	131	1.700	1.768
10/5/10 10:12	132	1.706	1.774
10/5/10 10:12	132	1.703	1.771
10/5/10 10:13	132	1.706	1.774
10/5/10 10:13	133	1.702	1.77
10/5/10 10:13	133	1.701	1.769
10/5/10 10:14	133	1.704	1.772
10/5/10 10:14	134	1.706	1.774
10/5/10 10:14	134	1.709	1.777
10/5/10 10:15	134	1.705	1.773
10/5/10 10:15	135	1.708	1.776
10/5/10 10:15	135	1.710	1.778
10/5/10 10:16	135	1.708	1.776
10/5/10 10:16	136	1.704	1.772
10/5/10 10:16	136	1.706	1.774
10/5/10 10:17	136	1.707	1.775
10/5/10 10:17	137	1.709	1.777
10/5/10 10:17	137	1.707	1.775
10/5/10 10:18	137	1.711	1.779
10/5/10 10:18	138	1.709	1.777
10/5/10 10:18	138	1.712	1.78
10/5/10 10:19	138	1.710	1.778
10/5/10 10:19	139	1.715	1.783
10/5/10 10:19	139	1.718	1.786
10/5/10 10:20	139	1.722	1.79
10/5/10 10:20	140	1.718	1.786
10/5/10 10:20	140	1.719	1.787
10/5/10 10:21	140	1.720	1.788
10/5/10 10:21	141	1.724	1.792
10/5/10 10:21	141	1.721	1.789
10/5/10 10:22	141	1.723	1.791
10/5/10 10:22	142	1.725	1.793
10/5/10 10:22	142	1.722	1.79
10/5/10 10:23	142	1.720	1.788
10/5/10 10:23	143	1.720	1.788
10/5/10 10:23	143	1.723	1.791
10/5/10 10:24	143	1.720	1.788
10/5/10 10:24	144	1.723	1.791
10/5/10 10:24	144	1.721	1.789
10/5/10 10:25	144	1.724	1.792
10/5/10 10:25	145	1.721	1.789
10/5/10 10:25	145	1.736	1.804
10/5/10 10:26	145	1.724	1.792
10/5/10 10:26	146	1.728	1.796
10/5/10 10:26	146	1.729	1.797
10/5/10 10:27	146	1.736	1.804
10/5/10 10:27	147	1.724	1.792
10/5/10 10:27	147	1.714	1.782
10/5/10 10:28	147	1.718	1.786
10/5/10 10:28	148	1.727	1.795
10/5/10 10:28	148	1.724	1.792
10/5/10 10:29	148	1.723	1.791
10/5/10 10:29	149	1.727	1.795

10/5/10 10:29	149	1.725	1.793
10/5/10 10:30	149	1.727	1.795
10/5/10 10:30	150	1.742	1.81
10/5/10 10:30	150	1.759	1.827
10/5/10 10:31	150	1.774	1.842
10/5/10 10:31	151	1.746	1.814
10/5/10 10:31	151	1.749	1.817
10/5/10 10:32	151	1.748	1.816
10/5/10 10:32	152	1.753	1.821
10/5/10 10:32	152	1.753	1.821
10/5/10 10:33	152	1.756	1.824
10/5/10 10:33	153	1.758	1.826
10/5/10 10:33	153	1.757	1.825
10/5/10 10:34	153	1.757	1.825
10/5/10 10:34	154	1.758	1.826
10/5/10 10:34	154	1.763	1.831
10/5/10 10:35	154	1.766	1.834
10/5/10 10:35	155	1.767	1.835
10/5/10 10:35	155	1.763	1.831
10/5/10 10:36	155	1.763	1.831
10/5/10 10:36	156	1.769	1.837
10/5/10 10:36	156	1.764	1.832
10/5/10 10:37	156	1.767	1.835
10/5/10 10:37	157	1.770	1.838
10/5/10 10:37	157	1.770	1.838
10/5/10 10:38	157	1.769	1.837
10/5/10 10:38	158	1.772	1.84
10/5/10 10:38	158	1.771	1.839
10/5/10 10:39	158	1.768	1.836
10/5/10 10:39	159	1.776	1.844
10/5/10 10:39	159	1.777	1.845
10/5/10 10:40	159	1.775	1.843
10/5/10 10:40	160	1.774	1.842
10/5/10 10:40	160	1.777	1.845
10/5/10 10:41	160	1.773	1.841
10/5/10 10:41	161	1.775	1.843
10/5/10 10:41	161	1.777	1.845
10/5/10 10:42	161	1.778	1.846
10/5/10 10:42	162	1.779	1.847
10/5/10 10:42	162	1.778	1.846
10/5/10 10:43	162	1.780	1.848
10/5/10 10:43	163	1.781	1.849
10/5/10 10:43	163	1.782	1.85
10/5/10 10:44	163	1.784	1.852
10/5/10 10:44	164	1.785	1.853
10/5/10 10:44	164	1.785	1.853
10/5/10 10:45	164	1.787	1.855
10/5/10 10:45	165	1.792	1.86
10/5/10 10:45	165	1.789	1.857
10/5/10 10:46	165	1.793	1.861
10/5/10 10:46	166	1.785	1.853
10/5/10 10:46	166	1.788	1.856
10/5/10 10:47	166	1.789	1.857
10/5/10 10:47	167	1.789	1.857
10/5/10 10:47	167	1.793	1.861
10/5/10 10:48	167	1.792	1.86
10/5/10 10:48	168	1.789	1.857
10/5/10 10:48	168	1.791	1.859
10/5/10 10:49	168	1.793	1.861
10/5/10 10:49	169	1.796	1.864
10/5/10 10:49	169	1.808	1.876
10/5/10 10:50	169	1.794	1.862
10/5/10 10:50	170	1.798	1.866
10/5/10 10:50	170	1.800	1.868

10/5/10 10:51	170	1.811	1.879
10/5/10 10:51	171	1.798	1.866
10/5/10 10:51	171	1.797	1.865
10/5/10 10:52	171	1.813	1.881
10/5/10 10:52	172	1.802	1.87
10/5/10 10:52	172	1.800	1.868
10/5/10 10:53	172	1.802	1.87
10/5/10 10:53	173	1.802	1.87
10/5/10 10:53	173	1.805	1.873
10/5/10 10:54	173	1.807	1.875
10/5/10 10:54	174	1.807	1.875
10/5/10 10:54	174	1.805	1.873
10/5/10 10:55	174	1.803	1.871
10/5/10 10:55	175	1.808	1.876
10/5/10 10:55	175	1.813	1.881
10/5/10 10:56	175	1.811	1.879
10/5/10 10:56	176	1.813	1.881
10/5/10 10:56	176	1.809	1.877
10/5/10 10:57	176	1.812	1.88
10/5/10 10:57	177	1.823	1.891
10/5/10 10:57	177	1.812	1.88
10/5/10 10:58	177	1.814	1.882
10/5/10 10:58	178	1.816	1.884
10/5/10 10:58	178	1.816	1.884
10/5/10 10:59	178	1.831	1.899
10/5/10 10:59	179	1.826	1.894
10/5/10 10:59	179	1.816	1.884
10/5/10 11:00	179	1.821	1.889
10/5/10 11:00	180	1.815	1.883
10/5/10 11:00	180	1.816	1.884
10/5/10 11:01	180	1.814	1.882
10/5/10 11:01	181	1.819	1.887
10/5/10 11:01	181	1.820	1.888
10/5/10 11:02	181	1.810	1.878
10/5/10 11:02	182	1.830	1.898
10/5/10 11:02	182	1.819	1.887
10/5/10 11:03	182	1.829	1.897
10/5/10 11:03	183	1.823	1.891
10/5/10 11:03	183	1.822	1.89
10/5/10 11:04	183	1.816	1.884
10/5/10 11:04	184	1.819	1.887
10/5/10 11:04	184	1.823	1.891
10/5/10 11:05	184	1.822	1.89
10/5/10 11:05	185	1.823	1.891
10/5/10 11:05	185	1.822	1.89
10/5/10 11:06	185	1.819	1.887
10/5/10 11:06	186	1.816	1.884
10/5/10 11:06	186	1.814	1.882
10/5/10 11:07	186	1.815	1.883
10/5/10 11:07	187	1.812	1.88
10/5/10 11:07	187	1.818	1.886
10/5/10 11:08	187	1.812	1.88
10/5/10 11:08	188	1.814	1.882
10/5/10 11:08	188	1.817	1.885
10/5/10 11:09	188	1.813	1.881
10/5/10 11:09	189	1.815	1.883
10/5/10 11:09	189	1.819	1.887
10/5/10 11:10	189	1.820	1.888
10/5/10 11:10	190	1.816	1.884
10/5/10 11:10	190	1.817	1.885
10/5/10 11:11	190	1.816	1.884
10/5/10 11:11	191	1.822	1.89
10/5/10 11:11	191	1.827	1.895
10/5/10 11:12	191	1.824	1.892

10/5/10 11:12	192	1.824	1.892
10/5/10 11:12	192	1.822	1.89
10/5/10 11:13	192	1.826	1.894
10/5/10 11:13	193	1.827	1.895
10/5/10 11:13	193	1.832	1.9
10/5/10 11:14	193	1.832	1.9
10/5/10 11:14	194	1.825	1.893
10/5/10 11:14	194	1.828	1.896
10/5/10 11:15	194	1.831	1.899
10/5/10 11:15	195	1.798	1.866
10/5/10 11:15	195	1.810	1.878
10/5/10 11:16	195	1.820	1.888
10/5/10 11:16	196	1.814	1.882
10/5/10 11:16	196	1.805	1.873
10/5/10 11:17	196	1.806	1.874
10/5/10 11:17	197	1.806	1.874
10/5/10 11:17	197	1.807	1.875
10/5/10 11:18	197	1.817	1.885
10/5/10 11:18	198	1.803	1.871
10/5/10 11:18	198	1.806	1.874
10/5/10 11:19	198	1.803	1.871
10/5/10 11:19	199	1.805	1.873
10/5/10 11:19	199	1.807	1.875
10/5/10 11:20	199	1.808	1.876
10/5/10 11:20	200	1.811	1.879
10/5/10 11:20	200	1.815	1.883
10/5/10 11:21	200	1.810	1.878
10/5/10 11:21	201	1.810	1.878
10/5/10 11:21	201	1.805	1.873
10/5/10 11:22	201	1.797	1.865
10/5/10 11:22	202	1.810	1.878
10/5/10 11:22	202	1.799	1.867
10/5/10 11:23	202	1.801	1.869
10/5/10 11:23	203	1.799	1.867
10/5/10 11:23	203	1.802	1.87
10/5/10 11:24	203	1.804	1.872
10/5/10 11:24	204	1.806	1.874
10/5/10 11:24	204	1.804	1.872
10/5/10 11:25	204	1.808	1.876
10/5/10 11:25	205	1.804	1.872
10/5/10 11:25	205	1.805	1.873
10/5/10 11:26	205	1.807	1.875
10/5/10 11:26	206	1.807	1.875
10/5/10 11:26	206	1.806	1.874
10/5/10 11:27	206	1.808	1.876
10/5/10 11:27	207	1.810	1.878
10/5/10 11:27	207	1.816	1.884
10/5/10 11:28	207	1.819	1.887
10/5/10 11:28	208	1.815	1.883
10/5/10 11:28	208	1.813	1.881
10/5/10 11:29	208	1.812	1.88
10/5/10 11:29	209	1.811	1.879
10/5/10 11:29	209	1.817	1.885
10/5/10 11:30	209	1.826	1.894
10/5/10 11:30	210	1.815	1.883
10/5/10 11:30	210	1.818	1.886
10/5/10 11:31	210	1.819	1.887
10/5/10 11:31	211	1.826	1.894
10/5/10 11:31	211	1.814	1.882
10/5/10 11:32	211	1.812	1.88
10/5/10 11:32	212	1.815	1.883
10/5/10 11:32	212	1.817	1.885
10/5/10 11:33	212	1.832	1.9
10/5/10 11:33	213	1.821	1.889
10/5/10 11:33	213	1.820	1.888
10/5/10 11:34	213	1.825	1.893
10/5/10 11:34	214	1.824	1.892
10/5/10 11:34	214	1.820	1.888
10/5/10 11:35	214	1.826	1.894
10/5/10 11:35	215	1.823	1.891
10/5/10 11:35	215	1.820	1.888
10/5/10 11:36	215	1.822	1.89
10/5/10 11:36	216	1.823	1.891
10/5/10 11:36	216	1.835	1.903
10/5/10 11:37	216	1.823	1.891
10/5/10 11:37	217	1.824	1.892
10/5/10 11:37	217	1.824	1.892
10/5/10 11:38	217	1.825	1.893
10/5/10 11:38	218	1.826	1.894
10/5/10 11:38	218	1.828	1.896
10/5/10 11:39	218	1.830	1.898
10/5/10 11:39	219	1.830	1.898
10/5/10 11:39	219	1.829	1.897
10/5/10 11:40	219	1.830	1.898
10/5/10 11:40	220	1.841	1.909
10/5/10 11:40	220	1.829	1.897
10/5/10 11:41	220	1.829	1.897
10/5/10 11:41	221	1.828	1.896
10/5/10 11:41	221	1.834	1.902
10/5/10 11:42	221	1.833	1.901
10/5/10 11:42	222	1.833	1.901
10/5/10 11:42	222	1.833	1.901
10/5/10 11:43	222	1.835	1.903
10/5/10 11:43	223	1.833	1.901
10/5/10 11:43	223	1.824	1.892
10/5/10 11:44	223	1.816	1.884
10/5/10 11:44	224	1.822	1.89
10/5/10 11:44	224	1.824	1.892
10/5/10 11:45	224	1.820	1.888
10/5/10 11:45	225	1.822	1.89
10/5/10 11:45	225	1.832	1.9
10/5/10 11:46	225	1.824	1.892
10/5/10 11:46	226	1.822	1.89
10/5/10 11:46	226	1.820	1.888
10/5/10 11:47	226	1.818	1.886
10/5/10 11:47	227	1.818	1.886
10/5/10 11:47	227	1.817	1.885
10/5/10 11:48	227	1.820	1.888
10/5/10 11:48	228	1.837	1.905
10/5/10 11:48	228	1.861	1.929
10/5/10 11:49	228	1.877	1.945
10/5/10 11:49	229	1.856	1.924
10/5/10 11:49	229	1.852	1.92
10/5/10 11:50	229	1.851	1.919
10/5/10 11:50	230	1.859	1.927
10/5/10 11:50	230	1.861	1.929
10/5/10 11:51	230	1.857	1.925
10/5/10 11:51	231	1.855	1.923
10/5/10 11:51	231	1.858	1.926
10/5/10 11:52	231	1.860	1.928
10/5/10 11:52	232	1.862	1.93
10/5/10 11:52	232	1.861	1.929
10/5/10 11:53	232	1.860	1.928
10/5/10 11:53	233	1.862	1.93
10/5/10 11:53	233	1.866	1.934
10/5/10 11:54	233	1.861	1.929
10/5/10 11:54	234	1.867	1.935
10/5/10 11:54	234	1.867	1.935
10/5/10 11:55	234	1.863	1.931
10/5/10 11:55	235	1.864	1.932
10/5/10 11:55	235	1.864	1.932
10/5/10 11:56	235	1.866	1.934
10/5/10 11:56	236	1.866	1.934
10/5/10 11:56	236	1.865	1.933
10/5/10 11:57	236	1.871	1.939
10/5/10 11:57	237	1.870	1.938
10/5/10 11:57	237	1.872	1.94
10/5/10 11:58	237	1.873	1.941
10/5/10 11:58	238	1.872	1.94
10/5/10 11:58	238	1.875	1.943
10/5/10 11:59	238	1.876	1.944
10/5/10 11:59	239	1.877	1.945
10/5/10 11:59	239	1.872	1.94
10/5/10 12:00	239	1.874	1.942
10/5/10 12:00	240	1.872	1.94
10/5/10 12:00	240	1.869	1.937
10/5/10 12:01	240	1.874	1.942
10/5/10 12:01	241	1.873	1.941
10/5/10 12:01	241	1.870	1.938
10/5/10 12:02	241	1.870	1.938
10/5/10 12:02	242	1.872	1.94
10/5/10 12:02	242	1.869	1.937
10/5/10 12:03	242	1.870	1.938
10/5/10 12:03	243	1.875	1.943
10/5/10 12:03	243	1.873	1.941
10/5/10 12:04	243	1.869	1.937
10/5/10 12:04	244	1.872	1.94
10/5/10 12:04	244	1.872	1.94
10/5/10 12:05	244	1.872	1.94
10/5/10 12:05	245	1.872	1.94
10/5/10 12:05	245	1.876	1.944
10/5/10 12:06	245	1.875	1.943
10/5/10 12:06	246	1.877	1.945
10/5/10 12:06	246	1.881	1.949
10/5/10 12:07	246	1.878	1.946
10/5/10 12:07	247	1.877	1.945
10/5/10 12:07	247	1.879	1.947
10/5/10 12:08	247	1.883	1.951
10/5/10 12:08	248	1.888	1.956
10/5/10 12:08	248	1.892	1.96
10/5/10 12:09	248	1.889	1.957
10/5/10 12:09	249	1.886	1.954
10/5/10 12:09	249	1.884	1.952
10/5/10 12:10	249	1.884	1.952
10/5/10 12:10	250	1.887	1.955
10/5/10 12:10	250	1.881	1.949
10/5/10 12:11	250	1.880	1.948
10/5/10 12:11	251	1.879	1.947
10/5/10 12:11	251	1.877	1.945
10/5/10 12:12	251	1.882	1.95
10/5/10 12:12	252	1.887	1.955
10/5/10 12:12	252	1.886	1.954
10/5/10 12:13	252	1.888	1.956
10/5/10 12:13	253	1.886	1.954
10/5/10 12:13	253	1.889	1.957
10/5/10 12:14	253	1.889	1.957
10/5/10 12:14	254	1.888	1.956
10/5/10 12:14	254	1.886	1.954
10/5/10 12:15	254	1.887	1.955
10/5/10 12:15	255	1.892	1.96
10/5/10 12:15	255	1.892	1.96
10/5/10 12:16	255	1.894	1.962

10/5/10 12:16	256	1.889	1.957
10/5/10 12:16	256	1.890	1.958
10/5/10 12:17	256	1.888	1.956
10/5/10 12:17	257	1.890	1.958
10/5/10 12:17	257	1.895	1.963
10/5/10 12:18	257	1.895	1.963
10/5/10 12:18	258	1.896	1.964
10/5/10 12:18	258	1.896	1.964
10/5/10 12:19	258	1.892	1.96
10/5/10 12:19	259	1.892	1.96
10/5/10 12:19	259	1.890	1.958
10/5/10 12:20	259	1.895	1.963
10/5/10 12:20	260	1.902	1.97
10/5/10 12:20	260	1.894	1.962
10/5/10 12:21	260	1.897	1.965
10/5/10 12:21	261	1.898	1.966
10/5/10 12:21	261	1.893	1.961
10/5/10 12:22	261	1.888	1.956
10/5/10 12:22	262	1.890	1.958
10/5/10 12:22	262	1.893	1.961
10/5/10 12:23	262	1.895	1.963
10/5/10 12:23	263	1.894	1.962
10/5/10 12:23	263	1.897	1.965
10/5/10 12:24	263	1.895	1.963
10/5/10 12:24	264	1.894	1.962
10/5/10 12:24	264	1.903	1.971
10/5/10 12:25	264	1.895	1.963
10/5/10 12:25	265	1.896	1.964
10/5/10 12:25	265	1.899	1.967
10/5/10 12:26	265	1.905	1.973
10/5/10 12:26	266	1.903	1.971
10/5/10 12:26	266	1.904	1.972
10/5/10 12:27	266	1.897	1.965
10/5/10 12:27	267	1.897	1.965
10/5/10 12:27	267	1.901	1.969
10/5/10 12:28	267	1.904	1.972
10/5/10 12:28	268	1.903	1.971
10/5/10 12:28	268	1.906	1.974
10/5/10 12:29	268	1.907	1.975
10/5/10 12:29	269	1.916	1.984
10/5/10 12:29	269	1.909	1.977
10/5/10 12:30	269	1.901	1.969
10/5/10 12:30	270	1.905	1.973
10/5/10 12:30	270	1.904	1.972
10/5/10 12:31	270	1.909	1.977
10/5/10 12:31	271	1.908	1.976
10/5/10 12:31	271	1.907	1.975
10/5/10 12:32	271	1.909	1.977
10/5/10 12:32	272	1.911	1.979
10/5/10 12:32	272	1.909	1.977
10/5/10 12:33	272	1.910	1.978
10/5/10 12:33	273	1.912	1.98
10/5/10 12:33	273	1.911	1.979
10/5/10 12:34	273	1.910	1.978
10/5/10 12:34	274	1.913	1.981
10/5/10 12:34	274	1.910	1.978
10/5/10 12:35	274	1.911	1.979
10/5/10 12:35	275	1.912	1.98
10/5/10 12:35	275	1.913	1.981
10/5/10 12:36	275	1.909	1.977
10/5/10 12:36	276	1.916	1.984
10/5/10 12:36	276	1.914	1.982
10/5/10 12:37	276	1.915	1.983
10/5/10 12:37	277	1.914	1.982
10/5/10 12:37	277	1.913	1.981
10/5/10 12:38	277	1.918	1.986
10/5/10 12:38	278	1.915	1.983
10/5/10 12:38	278	1.913	1.981
10/5/10 12:39	278	1.909	1.977
10/5/10 12:39	279	1.914	1.982
10/5/10 12:39	279	1.917	1.985
10/5/10 12:40	279	1.918	1.986
10/5/10 12:40	280	1.916	1.984
10/5/10 12:40	280	1.921	1.989
10/5/10 12:41	280	1.916	1.984
10/5/10 12:41	281	1.917	1.985
10/5/10 12:41	281	1.916	1.984
10/5/10 12:42	281	1.917	1.985
10/5/10 12:42	282	1.918	1.986
10/5/10 12:42	282	1.919	1.987
10/5/10 12:43	282	1.917	1.985
10/5/10 12:43	283	1.918	1.986
10/5/10 12:43	283	1.929	1.997
10/5/10 12:44	283	1.923	1.991
10/5/10 12:44	284	1.921	1.989
10/5/10 12:44	284	1.923	1.991
10/5/10 12:45	284	1.917	1.985
10/5/10 12:45	285	1.918	1.986
10/5/10 12:45	285	1.919	1.987
10/5/10 12:46	285	1.919	1.987
10/5/10 12:46	286	1.920	1.988
10/5/10 12:46	286	1.918	1.986
10/5/10 12:47	286	1.916	1.984
10/5/10 12:47	287	1.922	1.99
10/5/10 12:47	287	1.922	1.99
10/5/10 12:48	287	1.924	1.992
10/5/10 12:48	288	1.922	1.99
10/5/10 12:48	288	1.925	1.993
10/5/10 12:49	288	1.920	1.988
10/5/10 12:49	289	1.922	1.99
10/5/10 12:49	289	1.923	1.991
10/5/10 12:50	289	1.925	1.993
10/5/10 12:50	290	1.924	1.992
10/5/10 12:50	290	1.923	1.991
10/5/10 12:51	290	1.924	1.992
10/5/10 12:51	291	1.926	1.994
10/5/10 12:51	291	1.929	1.997
10/5/10 12:52	291	1.929	1.997
10/5/10 12:52	292	1.928	1.996
10/5/10 12:52	292	1.936	2.004
10/5/10 12:53	292	1.931	1.999
10/5/10 12:53	293	1.932	2
10/5/10 12:53	293	1.931	1.999
10/5/10 12:54	293	1.943	2.011
10/5/10 12:54	294	1.928	1.996
10/5/10 12:54	294	1.929	1.997
10/5/10 12:55	294	1.935	2.003
10/5/10 12:55	295	1.932	2
10/5/10 12:55	295	1.936	2.004
10/5/10 12:56	295	1.933	2.001
10/5/10 12:56	296	1.931	1.999
10/5/10 12:56	296	1.935	2.003
10/5/10 12:57	296	1.933	2.001
10/5/10 12:57	297	1.934	2.002
10/5/10 12:57	297	1.932	2
10/5/10 12:58	297	1.943	2.011
10/5/10 12:58	298	1.934	2.002
10/5/10 12:58	298	1.934	2.002
10/5/10 12:59	298	1.933	2.001
10/5/10 12:59	299	1.933	2.001
10/5/10 12:59	299	1.936	2.004
10/5/10 13:00	299	1.936	2.004
10/5/10 13:00	300	1.933	2.001
10/5/10 13:00	300	1.935	2.003
10/5/10 13:01	300	1.936	2.004
10/5/10 13:01	301	1.937	2.005
10/5/10 13:01	301	1.936	2.004
10/5/10 13:02	301	1.936	2.004
10/5/10 13:02	302	1.938	2.006
10/5/10 13:02	302	1.939	2.007
10/5/10 13:03	302	1.937	2.005
10/5/10 13:03	303	1.936	2.004
10/5/10 13:03	303	1.936	2.004
10/5/10 13:04	303	1.939	2.007
10/5/10 13:04	304	1.941	2.009
10/5/10 13:04	304	1.937	2.005
10/5/10 13:05	304	1.937	2.005
10/5/10 13:05	305	1.941	2.009
10/5/10 13:05	305	1.939	2.007
10/5/10 13:06	305	1.938	2.006
10/5/10 13:06	306	1.937	2.005
10/5/10 13:06	306	1.935	2.003
10/5/10 13:07	306	1.933	2.001
10/5/10 13:07	307	1.942	2.01
10/5/10 13:07	307	1.945	2.013
10/5/10 13:08	307	1.942	2.01
10/5/10 13:08	308	1.940	2.008
10/5/10 13:08	308	1.942	2.01
10/5/10 13:09	308	1.952	2.02
10/5/10 13:09	309	1.942	2.01
10/5/10 13:09	309	1.945	2.013
10/5/10 13:10	309	1.947	2.015
10/5/10 13:10	310	1.942	2.01
10/5/10 13:10	310	1.936	2.004
10/5/10 13:11	310	1.944	2.012
10/5/10 13:11	311	1.940	2.008
10/5/10 13:11	311	1.946	2.014
10/5/10 13:12	311	1.944	2.012
10/5/10 13:12	312	1.941	2.009
10/5/10 13:12	312	1.941	2.009
10/5/10 13:13	312	1.938	2.006
10/5/10 13:13	313	1.938	2.006
10/5/10 13:13	313	1.941	2.009
10/5/10 13:14	313	1.947	2.015
10/5/10 13:14	314	1.945	2.013
10/5/10 13:14	314	1.942	2.01
10/5/10 13:15	314	1.947	2.015
10/5/10 13:15	315	1.950	2.018
10/5/10 13:15	315	1.944	2.012
10/5/10 13:16	315	1.940	2.008
10/5/10 13:16	316	1.945	2.013
10/5/10 13:16	316	1.953	2.021
10/5/10 13:17	316	1.961	2.029
10/5/10 13:17	317	1.948	2.016
10/5/10 13:17	317	1.947	2.015
10/5/10 13:18	317	1.944	2.012
10/5/10 13:18	318	1.948	2.016
10/5/10 13:18	318	1.953	2.021
10/5/10 13:19	318	1.953	2.021
10/5/10 13:19	319	1.951	2.019
10/5/10 13:19	319	1.950	2.018
10/5/10 13:20	319	1.950	2.018

10/5/10 13:20	320	1.961	2.029
10/5/10 13:20	320	1.948	2.016
10/5/10 13:21	320	1.951	2.019
10/5/10 13:21	321	1.952	2.02
10/5/10 13:21	321	1.949	2.017
10/5/10 13:22	321	1.953	2.021
10/5/10 13:22	322	1.955	2.023
10/5/10 13:22	322	1.960	2.028
10/5/10 13:23	322	1.961	2.029
10/5/10 13:23	323	1.960	2.028
10/5/10 13:23	323	1.965	2.033
10/5/10 13:24	323	1.966	2.034
10/5/10 13:24	324	1.962	2.03
10/5/10 13:24	324	1.962	2.03
10/5/10 13:25	324	1.964	2.032
10/5/10 13:25	325	1.964	2.032
10/5/10 13:25	325	1.962	2.03
10/5/10 13:26	325	1.961	2.029
10/5/10 13:26	326	1.969	2.037
10/5/10 13:26	326	1.960	2.028
10/5/10 13:27	326	1.965	2.033
10/5/10 13:27	327	1.963	2.031
10/5/10 13:27	327	1.963	2.031
10/5/10 13:28	327	1.965	2.033
10/5/10 13:28	328	1.959	2.027
10/5/10 13:28	328	1.963	2.031
10/5/10 13:29	328	1.961	2.029
10/5/10 13:29	329	1.972	2.04
10/5/10 13:29	329	1.958	2.026
10/5/10 13:30	329	1.963	2.031
10/5/10 13:30	330	1.962	2.03
10/5/10 13:30	330	1.965	2.033
10/5/10 13:31	330	1.971	2.039
10/5/10 13:31	331	1.967	2.035
10/5/10 13:31	331	1.962	2.03
10/5/10 13:32	331	1.963	2.031
10/5/10 13:32	332	1.967	2.035
10/5/10 13:32	332	1.969	2.037
10/5/10 13:33	332	1.964	2.032
10/5/10 13:33	333	1.978	2.046
10/5/10 13:33	333	1.966	2.034
10/5/10 13:34	333	1.964	2.032
10/5/10 13:34	334	1.967	2.035
10/5/10 13:34	334	1.963	2.031
10/5/10 13:35	334	1.964	2.032
10/5/10 13:35	335	1.967	2.035
10/5/10 13:35	335	1.967	2.035
10/5/10 13:36	335	1.967	2.035
10/5/10 13:36	336	1.974	2.042
10/5/10 13:36	336	1.966	2.034
10/5/10 13:37	336	1.972	2.04
10/5/10 13:37	337	1.969	2.037
10/5/10 13:37	337	1.971	2.039
10/5/10 13:38	337	1.975	2.043
10/5/10 13:38	338	1.974	2.042
10/5/10 13:38	338	1.974	2.042
10/5/10 13:39	338	1.970	2.038
10/5/10 13:39	339	1.950	2.018
10/5/10 13:39	339	1.961	2.029
10/5/10 13:40	339	1.966	2.034
10/5/10 13:40	340	1.949	2.017
10/5/10 13:40	340	1.955	2.023
10/5/10 13:41	340	1.955	2.023
10/5/10 13:41	341	1.960	2.028
10/5/10 13:41	341	1.958	2.026
10/5/10 13:42	341	1.955	2.023
10/5/10 13:42	342	1.956	2.024
10/5/10 13:42	342	1.965	2.033
10/5/10 13:43	342	1.956	2.024
10/5/10 13:43	343	1.970	2.038
10/5/10 13:43	343	1.959	2.027
10/5/10 13:44	343	1.958	2.026
10/5/10 13:44	344	1.962	2.03
10/5/10 13:44	344	1.957	2.025
10/5/10 13:45	344	1.958	2.026
10/5/10 13:45	345	1.959	2.027
10/5/10 13:45	345	1.953	2.021
10/5/10 13:46	345	1.947	2.015
10/5/10 13:46	346	1.945	2.013
10/5/10 13:46	346	1.949	2.017
10/5/10 13:47	346	1.952	2.02
10/5/10 13:47	347	1.948	2.016
10/5/10 13:47	347	1.947	2.015
10/5/10 13:48	347	1.952	2.02
10/5/10 13:48	348	1.949	2.017
10/5/10 13:48	348	1.948	2.016
10/5/10 13:49	348	1.952	2.02
10/5/10 13:49	349	1.959	2.027
10/5/10 13:49	349	1.953	2.021
10/5/10 13:50	349	1.953	2.021
10/5/10 13:50	350	1.946	2.014
10/5/10 13:50	350	1.959	2.027
10/5/10 13:51	350	1.951	2.019
10/5/10 13:51	351	1.951	2.019
10/5/10 13:51	351	1.953	2.021
10/5/10 13:52	351	1.955	2.023
10/5/10 13:52	352	1.955	2.023
10/5/10 13:52	352	1.959	2.027
10/5/10 13:53	352	1.958	2.026
10/5/10 13:53	353	1.958	2.026
10/5/10 13:53	353	1.958	2.026
10/5/10 13:54	353	1.957	2.025
10/5/10 13:54	354	1.961	2.029
10/5/10 13:54	354	1.957	2.025
10/5/10 13:55	354	1.959	2.027
10/5/10 13:55	355	1.960	2.028
10/5/10 13:55	355	1.959	2.027
10/5/10 13:56	355	1.960	2.028
10/5/10 13:56	356	1.964	2.032
10/5/10 13:56	356	1.960	2.028
10/5/10 13:57	356	1.962	2.03
10/5/10 13:57	357	1.961	2.029
10/5/10 13:57	357	1.967	2.035
10/5/10 13:58	357	1.962	2.03
10/5/10 13:58	358	1.967	2.035
10/5/10 13:58	358	1.966	2.034
10/5/10 13:59	358	1.966	2.034
10/5/10 13:59	359	1.964	2.032
10/5/10 13:59	359	1.958	2.026
10/5/10 14:00	359	1.961	2.029
10/5/10 14:00	360	1.966	2.034
10/5/10 14:00	360	1.971	2.039
10/5/10 14:01	360	1.983	2.051
10/5/10 14:01	361	1.980	2.048
10/5/10 14:01	361	1.976	2.044
10/5/10 14:02	361	1.975	2.043
10/5/10 14:02	362	1.973	2.041
10/5/10 14:02	362	1.977	2.045
10/5/10 14:03	362	1.977	2.045
10/5/10 14:03	363	1.979	2.047
10/5/10 14:03	363	1.981	2.049
10/5/10 14:04	363	1.975	2.043
10/5/10 14:04	364	1.982	2.05
10/5/10 14:04	364	1.976	2.044
10/5/10 14:05	364	1.979	2.047
10/5/10 14:05	365	1.988	2.056
10/5/10 14:05	365	1.986	2.054
10/5/10 14:06	365	1.982	2.05
10/5/10 14:06	366	1.976	2.044
10/5/10 14:06	366	1.979	2.047
10/5/10 14:07	366	1.977	2.045
10/5/10 14:07	367	1.979	2.047
10/5/10 14:07	367	1.980	2.048
10/5/10 14:08	367	1.988	2.056
10/5/10 14:08	368	1.984	2.052
10/5/10 14:08	368	1.983	2.051
10/5/10 14:09	368	1.981	2.049
10/5/10 14:09	369	1.982	2.05
10/5/10 14:09	369	1.979	2.047
10/5/10 14:10	369	1.981	2.049
10/5/10 14:10	370	1.984	2.052
10/5/10 14:10	370	1.982	2.05
10/5/10 14:11	370	1.980	2.048
10/5/10 14:11	371	1.980	2.048
10/5/10 14:11	371	1.993	2.061
10/5/10 14:12	371	1.981	2.049
10/5/10 14:12	372	1.985	2.053
10/5/10 14:12	372	1.981	2.049
10/5/10 14:13	372	1.981	2.049
10/5/10 14:13	373	1.991	2.059
10/5/10 14:13	373	1.988	2.056
10/5/10 14:14	373	1.996	2.064
10/5/10 14:14	374	1.982	2.05
10/5/10 14:14	374	1.982	2.05
10/5/10 14:15	374	1.982	2.05
10/5/10 14:15	375	1.984	2.052
10/5/10 14:15	375	1.990	2.058
10/5/10 14:16	375	1.989	2.057
10/5/10 14:16	376	1.988	2.056
10/5/10 14:16	376	1.989	2.057
10/5/10 14:17	376	2.004	2.072
10/5/10 14:17	377	2.000	2.068
10/5/10 14:17	377	1.995	2.063
10/5/10 14:18	377	1.986	2.054
10/5/10 14:18	378	1.989	2.057
10/5/10 14:18	378	2.004	2.072
10/5/10 14:19	378	1.997	2.065
10/5/10 14:19	379	1.993	2.061
10/5/10 14:19	379	1.998	2.066
10/5/10 14:20	379	1.995	2.063
10/5/10 14:20	380	1.996	2.064
10/5/10 14:20	380	1.992	2.06
10/5/10 14:21	380	1.993	2.061
10/5/10 14:21	381	1.996	2.064
10/5/10 14:21	381	1.995	2.063
10/5/10 14:22	381	1.995	2.063
10/5/10 14:22	382	2.001	2.069
10/5/10 14:22	382	1.999	2.067
10/5/10 14:23	382	1.997	2.065
10/5/10 14:23	383	1.998	2.066
10/5/10 14:23	383	1.997	2.065
10/5/10 14:24	383	2.001	2.069

10/5/10 14:24	384	2.013	2.081
10/5/10 14:24	384	2.026	2.094
10/5/10 14:25	384	2.019	2.087
10/5/10 14:25	385	2.009	2.077
10/5/10 14:25	385	2.012	2.08
10/5/10 14:26	385	2.010	2.078
10/5/10 14:26	386	2.016	2.084
10/5/10 14:26	386	2.014	2.082
10/5/10 14:27	386	2.015	2.083
10/5/10 14:27	387	2.017	2.085
10/5/10 14:27	387	2.019	2.087
10/5/10 14:28	387	2.023	2.091
10/5/10 14:28	388	2.018	2.086
10/5/10 14:28	388	2.022	2.09
10/5/10 14:29	388	2.020	2.088
10/5/10 14:29	389	2.022	2.09
10/5/10 14:29	389	2.020	2.088
10/5/10 14:30	389	2.021	2.089
10/5/10 14:30	390	2.033	2.101
10/5/10 14:30	390	2.021	2.089
10/5/10 14:31	390	2.023	2.091
10/5/10 14:31	391	2.021	2.089
10/5/10 14:31	391	2.024	2.092
10/5/10 14:32	391	2.036	2.104
10/5/10 14:32	392	2.027	2.095
10/5/10 14:32	392	2.026	2.094
10/5/10 14:33	392	2.025	2.093
10/5/10 14:33	393	2.026	2.094
10/5/10 14:33	393	2.027	2.095
10/5/10 14:34	393	2.025	2.093
10/5/10 14:34	394	2.030	2.098
10/5/10 14:34	394	2.033	2.101
10/5/10 14:35	394	2.027	2.095
10/5/10 14:35	395	2.027	2.095
10/5/10 14:35	395	2.026	2.094
10/5/10 14:36	395	2.027	2.095
10/5/10 14:36	396	2.029	2.097
10/5/10 14:36	396	2.028	2.096
10/5/10 14:37	396	2.040	2.108
10/5/10 14:37	397	2.030	2.098
10/5/10 14:37	397	2.027	2.095
10/5/10 14:38	397	2.027	2.095
10/5/10 14:38	398	2.028	2.096
10/5/10 14:38	398	2.029	2.097
10/5/10 14:39	398	2.028	2.096
10/5/10 14:39	399	2.029	2.097
10/5/10 14:39	399	2.032	2.1
10/5/10 14:40	399	2.033	2.101
10/5/10 14:40	400	2.035	2.103
10/5/10 14:40	400	2.034	2.102
10/5/10 14:41	400	2.051	2.119
10/5/10 14:41	401	2.040	2.108
10/5/10 14:41	401	2.035	2.103
10/5/10 14:42	401	2.034	2.102
10/5/10 14:42	402	2.035	2.103
10/5/10 14:42	402	2.035	2.103
10/5/10 14:43	402	2.037	2.105
10/5/10 14:43	403	2.036	2.104
10/5/10 14:43	403	2.046	2.114
10/5/10 14:44	403	2.039	2.107
10/5/10 14:44	404	2.038	2.106
10/5/10 14:44	404	2.050	2.118
10/5/10 14:45	404	2.037	2.105
10/5/10 14:45	405	2.037	2.105
10/5/10 14:45	405	2.039	2.107
10/5/10 14:46	405	2.038	2.106
10/5/10 14:46	406	2.042	2.11
10/5/10 14:46	406	2.044	2.112
10/5/10 14:47	406	2.042	2.11
10/5/10 14:47	407	2.041	2.109
10/5/10 14:47	407	2.042	2.11
10/5/10 14:48	407	2.043	2.111
10/5/10 14:48	408	2.046	2.114
10/5/10 14:48	408	2.058	2.126
10/5/10 14:49	408	2.049	2.117
10/5/10 14:49	409	2.049	2.117
10/5/10 14:49	409	2.059	2.127
10/5/10 14:50	409	2.047	2.115
10/5/10 14:50	410	2.044	2.112
10/5/10 14:50	410	2.046	2.114
10/5/10 14:51	410	2.048	2.116
10/5/10 14:51	411	2.050	2.118
10/5/10 14:51	411	2.051	2.119
10/5/10 14:52	411	2.054	2.122
10/5/10 14:52	412	2.053	2.121
10/5/10 14:52	412	2.053	2.121
10/5/10 14:53	412	2.054	2.122
10/5/10 14:53	413	2.056	2.124
10/5/10 14:53	413	2.057	2.125
10/5/10 14:54	413	2.054	2.122
10/5/10 14:54	414	2.064	2.132
10/5/10 14:54	414	2.054	2.122
10/5/10 14:55	414	2.054	2.122
10/5/10 14:55	415	2.054	2.122
10/5/10 14:55	415	2.055	2.123
10/5/10 14:56	415	2.068	2.136
10/5/10 14:56	416	2.060	2.128
10/5/10 14:56	416	2.059	2.127
10/5/10 14:57	416	2.055	2.123
10/5/10 14:57	417	2.055	2.123
10/5/10 14:57	417	2.061	2.129
10/5/10 14:58	417	2.059	2.127
10/5/10 14:58	418	2.054	2.122
10/5/10 14:58	418	2.055	2.123
10/5/10 14:59	418	2.056	2.124
10/5/10 14:59	419	2.061	2.129
10/5/10 14:59	419	2.059	2.127
10/5/10 15:00	419	2.060	2.128
10/5/10 15:00	420	2.061	2.129
10/5/10 15:00	420	2.057	2.125
10/5/10 15:01	420	2.056	2.124
10/5/10 15:01	421	2.057	2.125
10/5/10 15:01	421	2.059	2.127
10/5/10 15:02	421	2.060	2.128
10/5/10 15:02	422	2.074	2.142
10/5/10 15:02	422	2.062	2.13
10/5/10 15:03	422	2.059	2.127
10/5/10 15:03	423	2.064	2.132
10/5/10 15:03	423	2.060	2.128
10/5/10 15:04	423	2.064	2.132
10/5/10 15:04	424	2.062	2.13
10/5/10 15:04	424	2.063	2.131
10/5/10 15:05	424	2.063	2.131
10/5/10 15:05	425	2.065	2.133
10/5/10 15:05	425	2.062	2.13
10/5/10 15:06	425	2.068	2.136
10/5/10 15:06	426	2.071	2.139
10/5/10 15:06	426	2.078	2.146
10/5/10 15:07	426	2.074	2.142
10/5/10 15:07	427	2.071	2.139
10/5/10 15:07	427	2.073	2.141
10/5/10 15:08	427	2.072	2.14
10/5/10 15:08	428	2.082	2.15
10/5/10 15:08	428	2.069	2.137
10/5/10 15:09	428	2.069	2.137
10/5/10 15:09	429	2.045	2.113
10/5/10 15:09	429	2.053	2.121
10/5/10 15:10	429	2.061	2.129
10/5/10 15:10	430	2.050	2.118
10/5/10 15:10	430	2.054	2.122
10/5/10 15:11	430	2.067	2.135
10/5/10 15:11	431	2.060	2.128
10/5/10 15:11	431	2.043	2.111
10/5/10 15:12	431	2.044	2.112
10/5/10 15:12	432	2.048	2.116
10/5/10 15:12	432	2.050	2.118
10/5/10 15:13	432	2.049	2.117
10/5/10 15:13	433	2.049	2.117
10/5/10 15:13	433	2.055	2.123
10/5/10 15:14	433	2.052	2.12
10/5/10 15:14	434	2.051	2.119
10/5/10 15:14	434	2.049	2.117
10/5/10 15:15	434	2.046	2.114
10/5/10 15:15	435	2.048	2.116
10/5/10 15:15	435	2.043	2.111
10/5/10 15:16	435	2.040	2.108
10/5/10 15:16	436	2.045	2.113
10/5/10 15:16	436	2.030	2.098
10/5/10 15:17	436	2.005	2.073
10/5/10 15:17	437	2.020	2.088
10/5/10 15:17	437	2.043	2.111
10/5/10 15:18	437	2.056	2.124
10/5/10 15:18	438	2.042	2.11
10/5/10 15:18	438	2.043	2.111
10/5/10 15:19	438	2.041	2.109
10/5/10 15:19	439	2.045	2.113
10/5/10 15:19	439	2.044	2.112
10/5/10 15:20	439	2.043	2.111
10/5/10 15:20	440	2.044	2.112
10/5/10 15:20	440	2.043	2.111
10/5/10 15:21	440	2.041	2.109
10/5/10 15:21	441	2.042	2.11
10/5/10 15:21	441	2.041	2.109
10/5/10 15:22	441	2.042	2.11
10/5/10 15:22	442	2.044	2.112
10/5/10 15:22	442	2.042	2.11
10/5/10 15:23	442	2.050	2.118
10/5/10 15:23	443	2.048	2.116
10/5/10 15:23	443	2.045	2.113
10/5/10 15:24	443	2.045	2.113
10/5/10 15:24	444	2.049	2.117
10/5/10 15:24	444	2.048	2.116
10/5/10 15:25	444	2.052	2.12
10/5/10 15:25	445	2.051	2.119
10/5/10 15:25	445	2.049	2.117
10/5/10 15:26	445	2.046	2.114
10/5/10 15:26	446	2.041	2.109
10/5/10 15:26	446	2.045	2.113
10/5/10 15:27	446	2.045	2.113
10/5/10 15:27	447	2.053	2.121
10/5/10 15:27	447	2.049	2.117
10/5/10 15:28	447	2.047	2.115

10/5/10 15:28	448	2.048	2.116
10/5/10 15:28	448	2.046	2.114
10/5/10 15:29	448	2.047	2.115
10/5/10 15:29	449	2.046	2.114
10/5/10 15:29	449	2.047	2.115
10/5/10 15:30	449	2.046	2.114
10/5/10 15:30	450	2.050	2.118
10/5/10 15:30	450	2.048	2.116
10/5/10 15:31	450	2.059	2.127
10/5/10 15:31	451	2.049	2.117
10/5/10 15:31	451	2.047	2.115
10/5/10 15:32	451	2.044	2.112
10/5/10 15:32	452	2.047	2.115
10/5/10 15:32	452	2.050	2.118
10/5/10 15:33	452	2.049	2.117
10/5/10 15:33	453	2.053	2.121
10/5/10 15:33	453	2.059	2.127
10/5/10 15:34	453	2.065	2.133
10/5/10 15:34	454	2.077	2.145
10/5/10 15:34	454	2.065	2.133
10/5/10 15:35	454	2.065	2.133
10/5/10 15:35	455	2.062	2.13
10/5/10 15:35	455	2.062	2.13
10/5/10 15:36	455	2.066	2.134
10/5/10 15:36	456	2.085	2.153
10/5/10 15:36	456	2.111	2.179
10/5/10 15:37	456	2.113	2.181
10/5/10 15:37	457	2.092	2.16
10/5/10 15:37	457	2.091	2.159
10/5/10 15:38	457	2.098	2.166
10/5/10 15:38	458	2.097	2.165
10/5/10 15:38	458	2.101	2.169
10/5/10 15:39	458	2.097	2.165
10/5/10 15:39	459	2.097	2.165
10/5/10 15:39	459	2.099	2.167
10/5/10 15:40	459	2.100	2.168
10/5/10 15:40	460	2.096	2.164
10/5/10 15:40	460	2.104	2.172
10/5/10 15:41	460	2.101	2.169
10/5/10 15:41	461	2.100	2.168
10/5/10 15:41	461	2.106	2.174
10/5/10 15:42	461	2.100	2.168
10/5/10 15:42	462	2.104	2.172
10/5/10 15:42	462	2.102	2.17
10/5/10 15:43	462	2.102	2.17
10/5/10 15:43	463	2.106	2.174
10/5/10 15:43	463	2.107	2.175
10/5/10 15:44	463	2.104	2.172
10/5/10 15:44	464	2.102	2.17
10/5/10 15:44	464	2.103	2.171
10/5/10 15:45	464	2.104	2.172
10/5/10 15:45	465	2.104	2.172
10/5/10 15:45	465	2.104	2.172
10/5/10 15:46	465	2.103	2.171
10/5/10 15:46	466	2.104	2.172
10/5/10 15:46	466	2.110	2.178
10/5/10 15:47	466	2.108	2.176
10/5/10 15:47	467	2.104	2.172
10/5/10 15:47	467	2.112	2.18
10/5/10 15:48	467	2.110	2.178
10/5/10 15:48	468	2.110	2.178
10/5/10 15:48	468	2.108	2.176
10/5/10 15:49	468	2.107	2.175
10/5/10 15:49	469	2.107	2.175
10/5/10 15:49	469	2.107	2.175
10/5/10 15:50	469	2.110	2.178
10/5/10 15:50	470	2.108	2.176
10/5/10 15:50	470	2.112	2.18
10/5/10 15:51	470	2.109	2.177
10/5/10 15:51	471	2.109	2.177
10/5/10 15:51	471	2.108	2.176
10/5/10 15:52	471	2.110	2.178
10/5/10 15:52	472	2.113	2.181
10/5/10 15:52	472	2.112	2.18
10/5/10 15:53	472	2.114	2.182
10/5/10 15:53	473	2.111	2.179
10/5/10 15:53	473	2.111	2.179
10/5/10 15:54	473	2.112	2.18
10/5/10 15:54	474	2.109	2.177
10/5/10 15:54	474	2.109	2.177
10/5/10 15:55	474	2.111	2.179
10/5/10 15:55	475	2.111	2.179
10/5/10 15:55	475	2.111	2.179
10/5/10 15:56	475	2.114	2.182
10/5/10 15:56	476	2.114	2.182
10/5/10 15:56	476	2.115	2.183
10/5/10 15:57	476	2.111	2.179
10/5/10 15:57	477	2.117	2.185
10/5/10 15:57	477	2.128	2.196
10/5/10 15:58	477	2.117	2.185
10/5/10 15:58	478	2.119	2.187
10/5/10 15:58	478	2.104	2.172
10/5/10 15:59	478	2.109	2.177
10/5/10 15:59	479	2.120	2.188
10/5/10 15:59	479	2.114	2.182
10/5/10 16:00	479	2.114	2.182
10/5/10 16:00	480	2.116	2.184
10/5/10 16:00	480	2.121	2.189
10/5/10 16:01	480	2.118	2.186
10/5/10 16:01	481	2.120	2.188
10/5/10 16:01	481	2.126	2.194
10/5/10 16:02	481	2.136	2.204
10/5/10 16:02	482	2.124	2.192
10/5/10 16:02	482	2.121	2.189
10/5/10 16:03	482	2.125	2.193
10/5/10 16:03	483	2.120	2.188
10/5/10 16:03	483	2.117	2.185
10/5/10 16:04	483	2.114	2.182
10/5/10 16:04	484	2.121	2.189
10/5/10 16:04	484	2.123	2.191
10/5/10 16:05	484	2.120	2.188
10/5/10 16:05	485	2.123	2.191
10/5/10 16:05	485	2.123	2.191
10/5/10 16:06	485	2.123	2.191
10/5/10 16:06	486	2.137	2.205
10/5/10 16:06	486	2.122	2.19
10/5/10 16:07	486	2.127	2.195
10/5/10 16:07	487	2.121	2.189
10/5/10 16:07	487	2.127	2.195
10/5/10 16:08	487	2.128	2.196
10/5/10 16:08	488	2.125	2.193
10/5/10 16:08	488	2.126	2.194
10/5/10 16:09	488	2.121	2.189
10/5/10 16:09	489	2.130	2.198
10/5/10 16:09	489	2.130	2.198
10/5/10 16:10	489	2.132	2.2
10/5/10 16:10	490	2.134	2.202
10/5/10 16:10	490	2.130	2.198
10/5/10 16:11	490	2.131	2.199
10/5/10 16:11	491	2.134	2.202
10/5/10 16:11	491	2.136	2.204
10/5/10 16:12	491	2.136	2.204
10/5/10 16:12	492	2.134	2.202
10/5/10 16:12	492	2.130	2.198
10/5/10 16:13	492	2.131	2.199
10/5/10 16:13	493	2.133	2.201
10/5/10 16:13	493	2.135	2.203
10/5/10 16:14	493	2.137	2.205
10/5/10 16:14	494	2.148	2.216
10/5/10 16:14	494	2.136	2.204
10/5/10 16:15	494	2.133	2.201
10/5/10 16:15	495	2.133	2.201
10/5/10 16:15	495	2.134	2.202
10/5/10 16:16	495	2.138	2.206
10/5/10 16:16	496	2.139	2.207
10/5/10 16:16	496	2.151	2.219
10/5/10 16:17	496	2.139	2.207
10/5/10 16:17	497	2.139	2.207
10/5/10 16:17	497	2.140	2.208
10/5/10 16:18	497	2.138	2.206
10/5/10 16:18	498	2.137	2.205
10/5/10 16:18	498	2.139	2.207
10/5/10 16:19	498	2.144	2.212
10/5/10 16:19	499	2.144	2.212
10/5/10 16:19	499	2.141	2.209
10/5/10 16:20	499	2.148	2.216
10/5/10 16:20	500	2.145	2.213
10/5/10 16:20	500	2.141	2.209
10/5/10 16:21	500	2.146	2.214
10/5/10 16:21	501	2.144	2.212
10/5/10 16:21	501	2.142	2.21
10/5/10 16:22	501	2.139	2.207
10/5/10 16:22	502	2.145	2.213
10/5/10 16:22	502	2.142	2.21
10/5/10 16:23	502	2.144	2.212
10/5/10 16:23	503	2.144	2.212
10/5/10 16:23	503	2.149	2.217
10/5/10 16:24	503	2.149	2.217
10/5/10 16:24	504	2.149	2.217
10/5/10 16:24	504	2.149	2.217
10/5/10 16:25	504	2.151	2.219
10/5/10 16:25	505	2.148	2.216
10/5/10 16:25	505	2.155	2.223
10/5/10 16:26	505	2.149	2.217
10/5/10 16:26	506	2.146	2.214
10/5/10 16:26	506	2.146	2.214
10/5/10 16:27	506	2.149	2.217
10/5/10 16:27	507	2.147	2.215
10/5/10 16:27	507	2.151	2.219
10/5/10 16:28	507	2.144	2.212
10/5/10 16:28	508	2.146	2.214
10/5/10 16:28	508	2.148	2.216
10/5/10 16:29	508	2.147	2.215
10/5/10 16:29	509	2.151	2.219
10/5/10 16:29	509	2.148	2.216
10/5/10 16:30	509	2.147	2.215
10/5/10 16:30	510	2.151	2.219
10/5/10 16:30	510	2.151	2.219
10/5/10 16:31	510	2.152	2.22
10/5/10 16:31	511	2.155	2.223
10/5/10 16:31	511	2.154	2.222
10/5/10 16:32	511	2.154	2.222

10/5/10 16:32	512	2.156	2.224
10/5/10 16:32	512	2.156	2.224
10/5/10 16:33	512	2.156	2.224
10/5/10 16:33	513	2.155	2.223
10/5/10 16:33	513	2.163	2.231
10/5/10 16:34	513	2.167	2.235
10/5/10 16:34	514	2.161	2.229
10/5/10 16:34	514	2.162	2.23
10/5/10 16:35	514	2.162	2.23
10/5/10 16:35	515	2.161	2.229
10/5/10 16:35	515	2.160	2.228
10/5/10 16:36	515	2.161	2.229
10/5/10 16:36	516	2.168	2.236
10/5/10 16:36	516	2.163	2.231
10/5/10 16:37	516	2.159	2.227
10/5/10 16:37	517	2.158	2.226
10/5/10 16:37	517	2.165	2.233
10/5/10 16:38	517	2.166	2.234
10/5/10 16:38	518	2.158	2.226
10/5/10 16:38	518	2.162	2.23
10/5/10 16:39	518	2.159	2.227
10/5/10 16:39	519	2.163	2.231
10/5/10 16:39	519	2.168	2.236
10/5/10 16:40	519	2.163	2.231
10/5/10 16:40	520	2.159	2.227
10/5/10 16:40	520	2.164	2.232
10/5/10 16:41	520	2.161	2.229
10/5/10 16:41	521	2.161	2.229
10/5/10 16:41	521	2.159	2.227
10/5/10 16:42	521	2.157	2.225
10/5/10 16:42	522	2.159	2.227
10/5/10 16:42	522	2.165	2.233
10/5/10 16:43	522	2.163	2.231
10/5/10 16:43	523	2.163	2.231
10/5/10 16:43	523	2.165	2.233
10/5/10 16:44	523	2.159	2.227
10/5/10 16:44	524	2.165	2.233
10/5/10 16:44	524	2.164	2.232
10/5/10 16:45	524	2.163	2.231
10/5/10 16:45	525	2.165	2.233
10/5/10 16:45	525	2.165	2.233
10/5/10 16:46	525	2.164	2.232
10/5/10 16:46	526	2.166	2.234
10/5/10 16:46	526	2.165	2.233
10/5/10 16:47	526	2.166	2.234
10/5/10 16:47	527	2.166	2.234
10/5/10 16:47	527	2.163	2.231
10/5/10 16:48	527	2.165	2.233
10/5/10 16:48	528	2.167	2.235
10/5/10 16:48	528	2.165	2.233
10/5/10 16:49	528	2.167	2.235
10/5/10 16:49	529	2.166	2.234
10/5/10 16:49	529	2.167	2.235
10/5/10 16:50	529	2.181	2.249
10/5/10 16:50	530	2.169	2.237
10/5/10 16:50	530	2.171	2.239
10/5/10 16:51	530	2.170	2.238
10/5/10 16:51	531	2.169	2.237
10/5/10 16:51	531	2.176	2.244
10/5/10 16:52	531	2.176	2.244
10/5/10 16:52	532	2.176	2.244
10/5/10 16:52	532	2.179	2.247
10/5/10 16:53	532	2.177	2.245
10/5/10 16:53	533	2.187	2.255
10/5/10 16:53	533	2.176	2.244
10/5/10 16:54	533	2.178	2.246
10/5/10 16:54	534	2.177	2.245
10/5/10 16:54	534	2.179	2.247
10/5/10 16:55	534	2.181	2.249
10/5/10 16:55	535	2.177	2.245
10/5/10 16:55	535	2.178	2.246
10/5/10 16:56	535	2.192	2.26
10/5/10 16:56	536	2.180	2.248
10/5/10 16:56	536	2.183	2.251
10/5/10 16:57	536	2.183	2.251
10/5/10 16:57	537	2.184	2.252
10/5/10 16:57	537	2.185	2.253
10/5/10 16:58	537	2.186	2.254
10/5/10 16:58	538	2.186	2.254
10/5/10 16:58	538	2.183	2.251
10/5/10 16:59	538	2.183	2.251
10/5/10 16:59	539	2.180	2.248
10/5/10 16:59	539	2.184	2.252
10/5/10 17:00	539	2.187	2.255
10/5/10 17:00	540	2.186	2.254
10/5/10 17:00	540	2.185	2.253
10/5/10 17:01	540	2.182	2.25
10/5/10 17:01	541	2.189	2.257
10/5/10 17:01	541	2.190	2.258
10/5/10 17:02	541	2.187	2.255
10/5/10 17:02	542	2.185	2.253
10/5/10 17:02	542	2.187	2.255
10/5/10 17:03	542	2.199	2.267
10/5/10 17:03	543	2.197	2.265
10/5/10 17:03	543	2.186	2.254
10/5/10 17:04	543	2.183	2.251
10/5/10 17:04	544	2.184	2.252
10/5/10 17:04	544	2.183	2.251
10/5/10 17:05	544	2.187	2.255
10/5/10 17:05	545	2.187	2.255
10/5/10 17:05	545	2.188	2.256
10/5/10 17:06	545	2.202	2.27
10/5/10 17:06	546	2.188	2.256
10/5/10 17:06	546	2.187	2.255
10/5/10 17:07	546	2.188	2.256
10/5/10 17:07	547	2.193	2.261
10/5/10 17:07	547	2.199	2.267
10/5/10 17:08	547	2.189	2.257
10/5/10 17:08	548	2.192	2.26
10/5/10 17:08	548	2.190	2.258
10/5/10 17:09	548	2.191	2.259
10/5/10 17:09	549	2.193	2.261
10/5/10 17:09	549	2.189	2.257
10/5/10 17:10	549	2.190	2.258
10/5/10 17:10	550	2.192	2.26
10/5/10 17:10	550	2.191	2.259
10/5/10 17:11	550	2.191	2.259
10/5/10 17:11	551	2.190	2.258
10/5/10 17:11	551	2.203	2.271
10/5/10 17:12	551	2.195	2.263
10/5/10 17:12	552	2.197	2.265
10/5/10 17:12	552	2.199	2.267
10/5/10 17:13	552	2.201	2.269
10/5/10 17:13	553	2.200	2.268
10/5/10 17:13	553	2.198	2.266
10/5/10 17:14	553	2.203	2.271
10/5/10 17:14	554	2.204	2.272
10/5/10 17:14	554	2.203	2.271
10/5/10 17:15	554	2.205	2.273
10/5/10 17:15	555	2.216	2.284
10/5/10 17:15	555	2.214	2.282
10/5/10 17:16	555	2.206	2.274
10/5/10 17:16	556	2.207	2.275
10/5/10 17:16	556	2.207	2.275
10/5/10 17:17	556	2.209	2.277
10/5/10 17:17	557	2.211	2.279
10/5/10 17:17	557	2.213	2.281
10/5/10 17:18	557	2.212	2.28
10/5/10 17:18	558	2.211	2.279
10/5/10 17:18	558	2.208	2.276
10/5/10 17:19	558	2.220	2.288
10/5/10 17:19	559	2.216	2.284
10/5/10 17:19	559	2.213	2.281
10/5/10 17:20	559	2.218	2.286
10/5/10 17:20	560	2.214	2.282
10/5/10 17:20	560	2.206	2.274
10/5/10 17:21	560	2.207	2.275
10/5/10 17:21	561	2.212	2.28
10/5/10 17:21	561	2.216	2.284
10/5/10 17:22	561	2.218	2.286
10/5/10 17:22	562	2.215	2.283
10/5/10 17:22	562	2.215	2.283
10/5/10 17:23	562	2.218	2.286
10/5/10 17:23	563	2.232	2.3
10/5/10 17:23	563	2.212	2.28
10/5/10 17:24	563	2.213	2.281
10/5/10 17:24	564	2.217	2.285
10/5/10 17:24	564	2.226	2.294
10/5/10 17:25	564	2.215	2.283
10/5/10 17:25	565	2.220	2.288
10/5/10 17:25	565	2.219	2.287
10/5/10 17:26	565	2.222	2.29
10/5/10 17:26	566	2.219	2.287
10/5/10 17:26	566	2.219	2.287
10/5/10 17:27	566	2.222	2.29
10/5/10 17:27	567	2.221	2.289
10/5/10 17:27	567	2.220	2.288
10/5/10 17:28	567	2.221	2.289
10/5/10 17:28	568	2.221	2.289
10/5/10 17:28	568	2.222	2.29
10/5/10 17:29	568	2.221	2.289
10/5/10 17:29	569	2.222	2.29
10/5/10 17:29	569	2.214	2.282
10/5/10 17:30	569	2.221	2.289
10/5/10 17:30	570	2.220	2.288
10/5/10 17:30	570	2.219	2.287
10/5/10 17:31	570	2.215	2.283
10/5/10 17:31	571	2.213	2.281
10/5/10 17:31	571	2.216	2.284
10/5/10 17:32	571	2.219	2.287
10/5/10 17:32	572	2.215	2.283
10/5/10 17:32	572	2.217	2.285
10/5/10 17:33	572	2.218	2.286
10/5/10 17:33	573	2.225	2.293
10/5/10 17:33	573	2.221	2.289
10/5/10 17:34	573	2.220	2.288
10/5/10 17:34	574	2.221	2.289
10/5/10 17:34	574	2.221	2.289
10/5/10 17:35	574	2.224	2.292
10/5/10 17:35	575	2.223	2.291
10/5/10 17:35	575	2.235	2.303
10/5/10 17:36	575	2.225	2.293

10/5/10 17:36	576	2.228	2.296
10/5/10 17:36	576	2.230	2.298
10/5/10 17:37	576	2.229	2.297
10/5/10 17:37	577	2.225	2.293
10/5/10 17:37	577	2.226	2.294
10/5/10 17:38	577	2.223	2.291
10/5/10 17:38	578	2.228	2.296
10/5/10 17:38	578	2.227	2.295
10/5/10 17:39	578	2.228	2.296
10/5/10 17:39	579	2.233	2.301
10/5/10 17:39	579	2.237	2.305
10/5/10 17:40	579	2.231	2.299
10/5/10 17:40	580	2.231	2.299
10/5/10 17:40	580	2.231	2.299
10/5/10 17:41	580	2.240	2.308
10/5/10 17:41	581	2.232	2.3
10/5/10 17:41	581	2.233	2.301
10/5/10 17:42	581	2.236	2.304
10/5/10 17:42	582	2.233	2.301
10/5/10 17:42	582	2.237	2.305
10/5/10 17:43	582	2.237	2.305
10/5/10 17:43	583	2.249	2.317
10/5/10 17:43	583	2.247	2.315
10/5/10 17:44	583	2.238	2.306
10/5/10 17:44	584	2.240	2.308
10/5/10 17:44	584	2.240	2.308
10/5/10 17:45	584	2.237	2.305
10/5/10 17:45	585	2.242	2.31
10/5/10 17:45	585	2.246	2.314
10/5/10 17:46	585	2.243	2.311
10/5/10 17:46	586	2.239	2.307
10/5/10 17:46	586	2.240	2.308
10/5/10 17:47	586	2.239	2.307
10/5/10 17:47	587	2.236	2.304
10/5/10 17:47	587	2.234	2.302
10/5/10 17:48	587	2.249	2.317
10/5/10 17:48	588	2.251	2.319
10/5/10 17:48	588	2.243	2.311
10/5/10 17:49	588	2.242	2.31
10/5/10 17:49	589	2.243	2.311
10/5/10 17:49	589	2.244	2.312
10/5/10 17:50	589	2.245	2.313
10/5/10 17:50	590	2.237	2.305
10/5/10 17:50	590	2.240	2.308
10/5/10 17:51	590	2.237	2.305
10/5/10 17:51	591	2.244	2.312
10/5/10 17:51	591	2.241	2.309
10/5/10 17:52	591	2.240	2.308
10/5/10 17:52	592	2.246	2.314
10/5/10 17:52	592	2.246	2.314
10/5/10 17:53	592	2.249	2.317
10/5/10 17:53	593	2.245	2.313
10/5/10 17:53	593	2.245	2.313
10/5/10 17:54	593	2.245	2.313
10/5/10 17:54	594	2.249	2.317
10/5/10 17:54	594	2.244	2.312
10/5/10 17:55	594	2.246	2.314
10/5/10 17:55	595	2.249	2.317
10/5/10 17:55	595	2.258	2.326
10/5/10 17:56	595	2.245	2.313
10/5/10 17:56	596	2.246	2.314
10/5/10 17:56	596	2.246	2.314
10/5/10 17:57	596	2.251	2.319
10/5/10 17:57	597	2.248	2.316
10/5/10 17:57	597	2.259	2.327
10/5/10 17:58	597	2.246	2.314
10/5/10 17:58	598	2.249	2.317
10/5/10 17:58	598	2.246	2.314
10/5/10 17:59	598	2.246	2.314
10/5/10 17:59	599	2.245	2.313
10/5/10 17:59	599	2.248	2.316
10/5/10 18:00	599	2.251	2.319
10/5/10 18:00	600	2.254	2.322
10/5/10 18:00	600	2.256	2.324
10/5/10 18:01	600	2.251	2.319
10/5/10 18:01	601	2.252	2.32
10/5/10 18:01	601	2.253	2.321
10/5/10 18:02	601	2.257	2.325
10/5/10 18:02	602	2.253	2.321
10/5/10 18:02	602	2.254	2.322
10/5/10 18:03	602	2.260	2.328
10/5/10 18:03	603	2.272	2.34
10/5/10 18:03	603	2.270	2.338
10/5/10 18:04	603	2.262	2.33
10/5/10 18:04	604	2.259	2.327
10/5/10 18:04	604	2.271	2.339
10/5/10 18:05	604	2.262	2.33
10/5/10 18:05	605	2.259	2.327
10/5/10 18:05	605	2.258	2.326
10/5/10 18:06	605	2.255	2.323
10/5/10 18:06	606	2.259	2.327
10/5/10 18:06	606	2.268	2.336
10/5/10 18:07	606	2.260	2.328
10/5/10 18:07	607	2.263	2.331
10/5/10 18:07	607	2.278	2.346
10/5/10 18:08	607	2.265	2.333
10/5/10 18:08	608	2.272	2.34
10/5/10 18:08	608	2.262	2.33
10/5/10 18:09	608	2.272	2.34
10/5/10 18:09	609	2.264	2.332
10/5/10 18:09	609	2.264	2.332
10/5/10 18:10	609	2.261	2.329
10/5/10 18:10	610	2.258	2.326
10/5/10 18:10	610	2.263	2.331
10/5/10 18:11	610	2.272	2.34
10/5/10 18:11	611	2.267	2.335
10/5/10 18:11	611	2.268	2.336
10/5/10 18:12	611	2.265	2.333
10/5/10 18:12	612	2.265	2.333
10/5/10 18:12	612	2.269	2.337
10/5/10 18:13	612	2.268	2.336
10/5/10 18:13	613	2.272	2.34
10/5/10 18:13	613	2.273	2.341
10/5/10 18:14	613	2.275	2.343
10/5/10 18:14	614	2.285	2.353
10/5/10 18:14	614	2.268	2.336
10/5/10 18:15	614	2.273	2.341
10/5/10 18:15	615	2.275	2.343
10/5/10 18:15	615	2.273	2.341
10/5/10 18:16	615	2.275	2.343
10/5/10 18:16	616	2.276	2.344
10/5/10 18:16	616	2.275	2.343
10/5/10 18:17	616	2.276	2.344
10/5/10 18:17	617	2.271	2.339
10/5/10 18:17	617	2.269	2.337
10/5/10 18:18	617	2.269	2.337
10/5/10 18:18	618	2.248	2.316
10/5/10 18:18	618	2.269	2.337
10/5/10 18:19	618	2.265	2.333
10/5/10 18:19	619	2.262	2.33
10/5/10 18:19	619	2.249	2.317
10/5/10 18:20	619	2.251	2.319
10/5/10 18:20	620	2.262	2.33
10/5/10 18:20	620	2.261	2.329
10/5/10 18:21	620	2.258	2.326
10/5/10 18:21	621	2.259	2.327
10/5/10 18:21	621	2.256	2.324
10/5/10 18:22	621	2.258	2.326
10/5/10 18:22	622	2.257	2.325
10/5/10 18:22	622	2.264	2.332
10/5/10 18:23	622	2.258	2.326
10/5/10 18:23	623	2.262	2.33
10/5/10 18:23	623	2.264	2.332
10/5/10 18:24	623	2.264	2.332
10/5/10 18:24	624	2.258	2.326
10/5/10 18:24	624	2.258	2.326
10/5/10 18:25	624	2.258	2.326
10/5/10 18:25	625	2.261	2.329
10/5/10 18:25	625	2.261	2.329
10/5/10 18:26	625	2.259	2.327
10/5/10 18:26	626	2.266	2.334
10/5/10 18:26	626	2.266	2.334
10/5/10 18:27	626	2.268	2.336
10/5/10 18:27	627	2.270	2.338
10/5/10 18:27	627	2.264	2.332
10/5/10 18:28	627	2.267	2.335
10/5/10 18:28	628	2.266	2.334
10/5/10 18:28	628	2.273	2.341
10/5/10 18:29	628	2.261	2.329
10/5/10 18:29	629	2.272	2.34
10/5/10 18:29	629	2.267	2.335
10/5/10 18:30	629	2.267	2.335
10/5/10 18:30	630	2.266	2.334
10/5/10 18:30	630	2.268	2.336
10/5/10 18:31	630	2.267	2.335
10/5/10 18:31	631	2.267	2.335
10/5/10 18:31	631	2.269	2.337
10/5/10 18:32	631	2.265	2.333
10/5/10 18:32	632	2.264	2.332
10/5/10 18:32	632	2.267	2.335
10/5/10 18:33	632	2.272	2.34
10/5/10 18:33	633	2.273	2.341
10/5/10 18:33	633	2.270	2.338
10/5/10 18:34	633	2.273	2.341
10/5/10 18:34	634	2.270	2.338
10/5/10 18:34	634	2.277	2.345
10/5/10 18:35	634	2.287	2.355
10/5/10 18:35	635	2.270	2.338
10/5/10 18:35	635	2.276	2.344
10/5/10 18:36	635	2.273	2.341
10/5/10 18:36	636	2.272	2.34
10/5/10 18:36	636	2.289	2.357
10/5/10 18:37	636	2.276	2.344
10/5/10 18:37	637	2.278	2.346
10/5/10 18:37	637	2.273	2.341
10/5/10 18:38	637	2.276	2.344
10/5/10 18:38	638	2.275	2.343
10/5/10 18:38	638	2.275	2.343
10/5/10 18:39	638	2.289	2.357
10/5/10 18:39	639	2.298	2.366
10/5/10 18:39	639	2.296	2.364
10/5/10 18:40	639	2.275	2.343

10/5/10 18:40	640	2.282	2.35
10/5/10 18:40	640	2.282	2.35
10/5/10 18:41	640	2.282	2.35
10/5/10 18:41	641	2.286	2.354
10/5/10 18:41	641	2.285	2.353
10/5/10 18:42	641	2.281	2.349
10/5/10 18:42	642	2.276	2.344
10/5/10 18:42	642	2.282	2.35
10/5/10 18:43	642	2.281	2.349
10/5/10 18:43	643	2.284	2.352
10/5/10 18:43	643	2.281	2.349
10/5/10 18:44	643	2.277	2.345
10/5/10 18:44	644	2.281	2.349
10/5/10 18:44	644	2.293	2.361
10/5/10 18:45	644	2.282	2.35
10/5/10 18:45	645	2.283	2.351
10/5/10 18:45	645	2.281	2.349
10/5/10 18:46	645	2.280	2.348
10/5/10 18:46	646	2.280	2.348
10/5/10 18:46	646	2.281	2.349
10/5/10 18:47	646	2.284	2.352
10/5/10 18:47	647	2.285	2.353
10/5/10 18:47	647	2.282	2.35
10/5/10 18:48	647	2.297	2.365
10/5/10 18:48	648	2.284	2.352
10/5/10 18:48	648	2.283	2.351
10/5/10 18:49	648	2.290	2.358
10/5/10 18:49	649	2.303	2.371
10/5/10 18:49	649	2.298	2.366
10/5/10 18:50	649	2.291	2.359
10/5/10 18:50	650	2.290	2.358
10/5/10 18:50	650	2.288	2.356
10/5/10 18:51	650	2.297	2.365
10/5/10 18:51	651	2.289	2.357
10/5/10 18:51	651	2.297	2.365
10/5/10 18:52	651	2.294	2.362
10/5/10 18:52	652	2.297	2.365
10/5/10 18:52	652	2.298	2.366
10/5/10 18:53	652	2.298	2.366
10/5/10 18:53	653	2.302	2.37
10/5/10 18:53	653	2.308	2.376
10/5/10 18:54	653	2.310	2.378
10/5/10 18:54	654	2.303	2.371
10/5/10 18:54	654	2.301	2.369
10/5/10 18:55	654	2.293	2.361
10/5/10 18:55	655	2.298	2.366
10/5/10 18:55	655	2.300	2.368
10/5/10 18:56	655	2.291	2.359
10/5/10 18:56	656	2.290	2.358
10/5/10 18:56	656	2.296	2.364
10/5/10 18:57	656	2.296	2.364
10/5/10 18:57	657	2.293	2.361
10/5/10 18:57	657	2.292	2.36
10/5/10 18:58	657	2.293	2.361
10/5/10 18:58	658	2.298	2.366
10/5/10 18:58	658	2.299	2.367
10/5/10 18:59	658	2.299	2.367
10/5/10 18:59	659	2.298	2.366
10/5/10 18:59	659	2.300	2.368
10/5/10 19:00	659	2.299	2.367
10/5/10 19:00	660	2.301	2.369
10/5/10 19:00	660	2.300	2.368
10/5/10 19:01	660	2.297	2.365
10/5/10 19:01	661	2.302	2.37
10/5/10 19:01	661	2.302	2.37
10/5/10 19:02	661	2.303	2.371
10/5/10 19:02	662	2.306	2.374
10/5/10 19:02	662	2.307	2.375
10/5/10 19:03	662	2.306	2.374
10/5/10 19:03	663	2.305	2.373
10/5/10 19:03	663	2.305	2.373
10/5/10 19:04	663	2.307	2.375
10/5/10 19:04	664	2.304	2.372
10/5/10 19:04	664	2.306	2.374
10/5/10 19:05	664	2.307	2.375
10/5/10 19:05	665	2.308	2.376
10/5/10 19:05	665	2.310	2.378
10/5/10 19:06	665	2.309	2.377
10/5/10 19:06	666	2.312	2.38
10/5/10 19:06	666	2.314	2.382
10/5/10 19:07	666	2.310	2.378
10/5/10 19:07	667	2.312	2.38
10/5/10 19:07	667	2.312	2.38
10/5/10 19:08	667	2.308	2.376
10/5/10 19:08	668	2.312	2.38
10/5/10 19:08	668	2.315	2.383
10/5/10 19:09	668	2.312	2.38
10/5/10 19:09	669	2.311	2.379
10/5/10 19:09	669	2.309	2.377
10/5/10 19:10	669	2.313	2.381
10/5/10 19:10	670	2.311	2.379
10/5/10 19:10	670	2.312	2.38
10/5/10 19:11	670	2.316	2.384
10/5/10 19:11	671	2.315	2.383
10/5/10 19:11	671	2.317	2.385
10/5/10 19:12	671	2.316	2.384
10/5/10 19:12	672	2.314	2.382
10/5/10 19:12	672	2.312	2.38
10/5/10 19:13	672	2.317	2.385
10/5/10 19:13	673	2.317	2.385
10/5/10 19:13	673	2.326	2.394
10/5/10 19:14	673	2.325	2.393
10/5/10 19:14	674	2.318	2.386
10/5/10 19:14	674	2.315	2.383
10/5/10 19:15	674	2.317	2.385
10/5/10 19:15	675	2.317	2.385
10/5/10 19:15	675	2.317	2.385
10/5/10 19:16	675	2.315	2.383
10/5/10 19:16	676	2.318	2.386
10/5/10 19:16	676	2.314	2.382
10/5/10 19:17	676	2.318	2.386
10/5/10 19:17	677	2.316	2.384
10/5/10 19:17	677	2.313	2.381
10/5/10 19:18	677	2.318	2.386
10/5/10 19:18	678	2.318	2.386
10/5/10 19:18	678	2.319	2.387
10/5/10 19:19	678	2.320	2.388
10/5/10 19:19	679	2.323	2.391
10/5/10 19:19	679	2.324	2.392
10/5/10 19:20	679	2.321	2.389
10/5/10 19:20	680	2.319	2.387
10/5/10 19:20	680	2.322	2.39
10/5/10 19:21	680	2.326	2.394
10/5/10 19:21	681	2.321	2.389
10/5/10 19:21	681	2.322	2.39
10/5/10 19:22	681	2.322	2.39
10/5/10 19:22	682	2.324	2.392
10/5/10 19:22	682	2.328	2.396
10/5/10 19:23	682	2.319	2.387
10/5/10 19:23	683	2.319	2.387
10/5/10 19:23	683	2.321	2.389
10/5/10 19:24	683	2.321	2.389
10/5/10 19:24	684	2.323	2.391
10/5/10 19:24	684	2.322	2.39
10/5/10 19:25	684	2.324	2.392
10/5/10 19:25	685	2.328	2.396
10/5/10 19:25	685	2.328	2.396
10/5/10 19:26	685	2.324	2.392
10/5/10 19:26	686	2.325	2.393
10/5/10 19:26	686	2.328	2.396
10/5/10 19:27	686	2.325	2.393
10/5/10 19:27	687	2.329	2.397
10/5/10 19:27	687	2.326	2.394
10/5/10 19:28	687	2.327	2.395
10/5/10 19:28	688	2.327	2.395
10/5/10 19:28	688	2.326	2.394
10/5/10 19:29	688	2.329	2.397
10/5/10 19:29	689	2.331	2.399
10/5/10 19:29	689	2.335	2.403
10/5/10 19:30	689	2.333	2.401
10/5/10 19:30	690	2.330	2.398
10/5/10 19:30	690	2.336	2.404
10/5/10 19:31	690	2.338	2.406
10/5/10 19:31	691	2.336	2.404
10/5/10 19:31	691	2.334	2.402
10/5/10 19:32	691	2.331	2.399
10/5/10 19:32	692	2.334	2.402
10/5/10 19:32	692	2.338	2.406
10/5/10 19:33	692	2.343	2.411
10/5/10 19:33	693	2.335	2.403
10/5/10 19:33	693	2.344	2.412
10/5/10 19:34	693	2.349	2.417
10/5/10 19:34	694	2.345	2.413
10/5/10 19:34	694	2.342	2.41
10/5/10 19:35	694	2.356	2.424
10/5/10 19:35	695	2.344	2.412
10/5/10 19:35	695	2.343	2.411
10/5/10 19:36	695	2.343	2.411
10/5/10 19:36	696	2.344	2.412
10/5/10 19:36	696	2.342	2.41
10/5/10 19:37	696	2.345	2.413
10/5/10 19:37	697	2.341	2.409
10/5/10 19:37	697	2.335	2.403
10/5/10 19:38	697	2.339	2.407
10/5/10 19:38	698	2.341	2.409
10/5/10 19:38	698	2.348	2.416
10/5/10 19:39	698	2.344	2.412
10/5/10 19:39	699	2.344	2.412
10/5/10 19:39	699	2.339	2.407
10/5/10 19:40	699	2.339	2.407
10/5/10 19:40	700	2.342	2.41
10/5/10 19:40	700	2.345	2.413
10/5/10 19:41	700	2.341	2.409
10/5/10 19:41	701	2.339	2.407
10/5/10 19:41	701	2.343	2.411
10/5/10 19:42	701	2.341	2.409
10/5/10 19:42	702	2.341	2.409
10/5/10 19:42	702	2.342	2.41
10/5/10 19:43	702	2.340	2.408
10/5/10 19:43	703	2.345	2.413
10/5/10 19:43	703	2.348	2.416
10/5/10 19:44	703	2.350	2.418

10/5/10 19:44	704	2.348	2.416	10/5/10 20:05	725	2.353	2.421	10/5/10 20:27	746	2.377	2.445
10/5/10 19:44	704	2.346	2.414	10/5/10 20:06	725	2.351	2.419	10/5/10 20:27	747	2.374	2.442
10/5/10 19:45	704	2.346	2.414	10/5/10 20:06	726	2.354	2.422	10/5/10 20:27	747	2.377	2.445
10/5/10 19:45	705	2.343	2.411	10/5/10 20:06	726	2.355	2.423	10/5/10 20:28	747	2.376	2.444
10/5/10 19:45	705	2.344	2.412	10/5/10 20:07	726	2.352	2.42	10/5/10 20:28	748	2.379	2.447
10/5/10 19:46	705	2.342	2.41	10/5/10 20:07	727	2.352	2.42	10/5/10 20:28	748	2.379	2.447
10/5/10 19:46	706	2.343	2.411	10/5/10 20:07	727	2.358	2.426	10/5/10 20:29	748	2.382	2.45
10/5/10 19:46	706	2.343	2.411	10/5/10 20:08	727	2.356	2.424	10/5/10 20:29	749	2.379	2.447
10/5/10 19:47	706	2.341	2.409	10/5/10 20:08	728	2.357	2.425	10/5/10 20:29	749	2.379	2.447
10/5/10 19:47	707	2.342	2.41	10/5/10 20:08	728	2.360	2.428	10/5/10 20:30	749	2.379	2.447
10/5/10 19:47	707	2.346	2.414	10/5/10 20:09	728	2.362	2.43	10/5/10 20:30	750	2.379	2.447
10/5/10 19:48	707	2.345	2.413	10/5/10 20:09	729	2.355	2.423	10/5/10 20:30	750	2.383	2.451
10/5/10 19:48	708	2.346	2.414	10/5/10 20:09	729	2.358	2.426	10/5/10 20:31	750	2.385	2.453
10/5/10 19:48	708	2.341	2.409	10/5/10 20:10	729	2.356	2.424	10/5/10 20:31	751	2.384	2.452
10/5/10 19:49	708	2.344	2.412	10/5/10 20:10	730	2.355	2.423	10/5/10 20:31	751	2.383	2.451
10/5/10 19:49	709	2.348	2.416	10/5/10 20:10	730	2.356	2.424	10/5/10 20:32	751	2.382	2.45
10/5/10 19:49	709	2.342	2.41	10/5/10 20:11	730	2.358	2.426	10/5/10 20:32	752	2.383	2.451
10/5/10 19:50	709	2.350	2.418	10/5/10 20:11	731	2.361	2.429	10/5/10 20:32	752	2.385	2.453
10/5/10 19:50	710	2.349	2.417	10/5/10 20:11	731	2.360	2.428	10/5/10 20:33	752	2.387	2.455
10/5/10 19:50	710	2.348	2.416	10/5/10 20:12	731	2.362	2.43	10/5/10 20:33	753	2.385	2.453
10/5/10 19:51	710	2.345	2.413	10/5/10 20:12	732	2.364	2.432	10/5/10 20:33	753	2.395	2.463
10/5/10 19:51	711	2.338	2.406	10/5/10 20:12	732	2.364	2.432	10/5/10 20:34	753	2.384	2.452
10/5/10 19:51	711	2.345	2.413	10/5/10 20:13	732	2.363	2.431	10/5/10 20:34	754	2.382	2.45
10/5/10 19:52	711	2.345	2.413	10/5/10 20:13	733	2.364	2.432	10/5/10 20:34	754	2.378	2.446
10/5/10 19:52	712	2.349	2.417	10/5/10 20:13	733	2.367	2.435	10/5/10 20:35	754	2.386	2.454
10/5/10 19:52	712	2.353	2.421	10/5/10 20:14	733	2.364	2.432	10/5/10 20:35	755	2.383	2.451
10/5/10 19:53	712	2.347	2.415	10/5/10 20:14	734	2.361	2.429	10/5/10 20:35	755	2.390	2.458
10/5/10 19:53	713	2.347	2.415	10/5/10 20:14	734	2.367	2.435	10/5/10 20:36	755	2.389	2.457
10/5/10 19:53	713	2.359	2.427	10/5/10 20:15	734	2.372	2.44	10/5/10 20:36	756	2.389	2.457
10/5/10 19:54	713	2.348	2.416	10/5/10 20:15	735	2.372	2.44	10/5/10 20:36	756	2.388	2.456
10/5/10 19:54	714	2.346	2.414	10/5/10 20:15	735	2.368	2.436	10/5/10 20:37	756	2.385	2.453
10/5/10 19:54	714	2.345	2.413	10/5/10 20:16	735	2.373	2.441	10/5/10 20:37	757	2.386	2.454
10/5/10 19:55	714	2.348	2.416	10/5/10 20:16	736	2.368	2.436	10/5/10 20:37	757	2.387	2.455
10/5/10 19:55	715	2.350	2.418	10/5/10 20:16	736	2.370	2.438	10/5/10 20:38	757	2.385	2.453
10/5/10 19:55	715	2.353	2.421	10/5/10 20:17	736	2.372	2.44	10/5/10 20:38	758	2.387	2.455
10/5/10 19:56	715	2.351	2.419	10/5/10 20:17	737	2.374	2.442	10/5/10 20:38	758	2.387	2.455
10/5/10 19:56	716	2.350	2.418	10/5/10 20:17	737	2.376	2.444	10/5/10 20:39	758	2.386	2.454
10/5/10 19:56	716	2.349	2.417	10/5/10 20:18	737	2.377	2.445	10/5/10 20:39	759	2.387	2.455
10/5/10 19:57	716	2.349	2.417	10/5/10 20:18	738	2.379	2.447	10/5/10 20:39	759	2.387	2.455
10/5/10 19:57	717	2.350	2.418	10/5/10 20:18	738	2.388	2.456	10/5/10 20:40	759	2.387	2.455
10/5/10 19:57	717	2.351	2.419	10/5/10 20:19	738	2.379	2.447	10/5/10 20:40	760	2.389	2.457
10/5/10 19:58	717	2.349	2.417	10/5/10 20:19	739	2.378	2.446	10/5/10 20:40	760	2.389	2.457
10/5/10 19:58	718	2.349	2.417	10/5/10 20:19	739	2.375	2.443	10/5/10 20:41	760	2.384	2.452
10/5/10 19:58	718	2.348	2.416	10/5/10 20:20	739	2.377	2.445	10/5/10 20:41	761	2.388	2.456
10/5/10 19:59	718	2.351	2.419	10/5/10 20:20	740	2.378	2.446	10/5/10 20:41	761	2.391	2.459
10/5/10 19:59	719	2.347	2.415	10/5/10 20:20	740	2.376	2.444	10/5/10 20:42	761	2.391	2.459
10/5/10 19:59	719	2.346	2.414	10/5/10 20:21	740	2.376	2.444	10/5/10 20:42	762	2.394	2.462
10/5/10 20:00	719	2.343	2.411	10/5/10 20:21	741	2.376	2.444	10/5/10 20:42	762	2.390	2.458
10/5/10 20:00	720	2.340	2.408	10/5/10 20:21	741	2.376	2.444	10/5/10 20:43	762	2.387	2.455
10/5/10 20:00	720	2.344	2.412	10/5/10 20:22	741	2.378	2.446	10/5/10 20:43	763	2.389	2.457
10/5/10 20:01	720	2.346	2.414	10/5/10 20:22	742	2.380	2.448	10/5/10 20:43	763	2.388	2.456
10/5/10 20:01	721	2.344	2.412	10/5/10 20:22	742	2.379	2.447	10/5/10 20:44	763	2.392	2.46
10/5/10 20:01	721	2.355	2.423	10/5/10 20:23	742	2.378	2.446	10/5/10 20:44	764	2.392	2.46
10/5/10 20:02	721	2.355	2.423	10/5/10 20:23	743	2.378	2.446	10/5/10 20:44	764	2.391	2.459
10/5/10 20:02	722	2.346	2.414	10/5/10 20:23	743	2.378	2.446	10/5/10 20:45	764	2.390	2.458
10/5/10 20:02	722	2.345	2.413	10/5/10 20:24	743	2.374	2.442	10/5/10 20:45	765	2.389	2.457
10/5/10 20:03	722	2.346	2.414	10/5/10 20:24	744	2.379	2.447	10/5/10 20:45	765	2.387	2.455
10/5/10 20:03	723	2.347	2.415	10/5/10 20:24	744	2.379	2.447	10/5/10 20:46	765	2.388	2.456
10/5/10 20:03	723	2.361	2.429	10/5/10 20:25	744	2.379	2.447	10/5/10 20:46	766	2.391	2.459
10/5/10 20:04	723	2.363	2.431	10/5/10 20:25	745	2.373	2.441	10/5/10 20:46	766	2.389	2.457
10/5/10 20:04	724	2.352	2.42	10/5/10 20:25	745	2.376	2.444	10/5/10 20:47	766	2.391	2.459
10/5/10 20:04	724	2.354	2.422	10/5/10 20:26	745	2.375	2.443	10/5/10 20:47	767	2.388	2.456
10/5/10 20:05	724	2.351	2.419	10/5/10 20:26	746	2.373	2.441	10/5/10 20:47	767	2.389	2.457
10/5/10 20:05	725	2.356	2.424	10/5/10 20:26	746	2.376	2.444	10/5/10 20:48	767	2.389	2.457

10/5/10 20:48	768	2.392	2.46
10/5/10 20:48	768	2.387	2.455
10/5/10 20:49	768	2.387	2.455
10/5/10 20:49	769	2.388	2.456
10/5/10 20:49	769	2.387	2.455
10/5/10 20:50	769	2.387	2.455
10/5/10 20:50	770	2.391	2.459
10/5/10 20:50	770	2.388	2.456
10/5/10 20:51	770	2.392	2.46
10/5/10 20:51	771	2.388	2.456
10/5/10 20:51	771	2.388	2.456
10/5/10 20:52	771	2.388	2.456
10/5/10 20:52	772	2.388	2.456
10/5/10 20:52	772	2.401	2.469
10/5/10 20:53	772	2.389	2.457
10/5/10 20:53	773	2.391	2.459
10/5/10 20:53	773	2.388	2.456
10/5/10 20:54	773	2.391	2.459
10/5/10 20:54	774	2.394	2.462
10/5/10 20:54	774	2.388	2.456
10/5/10 20:55	774	2.386	2.454
10/5/10 20:55	775	2.390	2.458
10/5/10 20:55	775	2.388	2.456
10/5/10 20:56	775	2.389	2.457
10/5/10 20:56	776	2.400	2.468
10/5/10 20:56	776	2.393	2.461
10/5/10 20:57	776	2.390	2.458
10/5/10 20:57	777	2.390	2.458
10/5/10 20:57	777	2.391	2.459
10/5/10 20:58	777	2.389	2.457
10/5/10 20:58	778	2.394	2.462
10/5/10 20:58	778	2.395	2.463
10/5/10 20:59	778	2.394	2.462
10/5/10 20:59	779	2.392	2.46
10/5/10 20:59	779	2.392	2.46
10/5/10 21:00	779	2.392	2.46
10/5/10 21:00	780	2.393	2.461
10/5/10 21:00	780	2.394	2.462
10/5/10 21:01	780	2.389	2.457
10/5/10 21:01	781	2.389	2.457
10/5/10 21:01	781	2.392	2.46
10/5/10 21:02	781	2.392	2.46
10/5/10 21:02	782	2.392	2.46
10/5/10 21:02	782	2.394	2.462
10/5/10 21:03	782	2.395	2.463
10/5/10 21:03	783	2.392	2.46
10/5/10 21:03	783	2.397	2.465
10/5/10 21:04	783	2.391	2.459
10/5/10 21:04	784	2.390	2.458
10/5/10 21:04	784	2.394	2.462
10/5/10 21:05	784	2.393	2.461
10/5/10 21:05	785	2.395	2.463
10/5/10 21:05	785	2.394	2.462
10/5/10 21:06	785	2.395	2.463
10/5/10 21:06	786	2.394	2.462
10/5/10 21:06	786	2.394	2.462
10/5/10 21:07	786	2.400	2.468
10/5/10 21:07	787	2.405	2.473
10/5/10 21:07	787	2.395	2.463
10/5/10 21:08	787	2.392	2.46
10/5/10 21:08	788	2.401	2.469
10/5/10 21:08	788	2.396	2.464
10/5/10 21:09	788	2.394	2.462
10/5/10 21:09	789	2.406	2.474
10/5/10 21:09	789	2.398	2.466
10/5/10 21:10	789	2.401	2.469
10/5/10 21:10	790	2.399	2.467
10/5/10 21:10	790	2.394	2.462
10/5/10 21:11	790	2.397	2.465
10/5/10 21:11	791	2.399	2.467
10/5/10 21:11	791	2.410	2.478
10/5/10 21:12	791	2.399	2.467
10/5/10 21:12	792	2.402	2.47
10/5/10 21:12	792	2.401	2.469
10/5/10 21:13	792	2.403	2.471
10/5/10 21:13	793	2.402	2.47
10/5/10 21:13	793	2.401	2.469
10/5/10 21:14	793	2.401	2.469
10/5/10 21:14	794	2.401	2.469
10/5/10 21:14	794	2.403	2.471
10/5/10 21:15	794	2.398	2.466
10/5/10 21:15	795	2.403	2.471
10/5/10 21:15	795	2.402	2.47
10/5/10 21:16	795	2.401	2.469
10/5/10 21:16	796	2.406	2.474
10/5/10 21:16	796	2.403	2.471
10/5/10 21:17	796	2.406	2.474
10/5/10 21:17	797	2.405	2.473
10/5/10 21:17	797	2.404	2.472
10/5/10 21:18	797	2.403	2.471
10/5/10 21:18	798	2.409	2.477
10/5/10 21:18	798	2.406	2.474
10/5/10 21:19	798	2.404	2.472
10/5/10 21:19	799	2.403	2.471
10/5/10 21:19	799	2.401	2.469
10/5/10 21:20	799	2.412	2.48
10/5/10 21:20	800	2.404	2.472
10/5/10 21:20	800	2.405	2.473
10/5/10 21:21	800	2.405	2.473
10/5/10 21:21	801	2.403	2.471
10/5/10 21:21	801	2.404	2.472
10/5/10 21:22	801	2.405	2.473
10/5/10 21:22	802	2.409	2.477
10/5/10 21:22	802	2.406	2.474
10/5/10 21:23	802	2.406	2.474
10/5/10 21:23	803	2.411	2.479
10/5/10 21:23	803	2.406	2.474
10/5/10 21:24	803	2.407	2.475
10/5/10 21:24	804	2.407	2.475
10/5/10 21:24	804	2.410	2.478
10/5/10 21:25	804	2.407	2.475
10/5/10 21:25	805	2.411	2.479
10/5/10 21:25	805	2.409	2.477
10/5/10 21:26	805	2.417	2.485
10/5/10 21:26	806	2.405	2.473
10/5/10 21:26	806	2.406	2.474
10/5/10 21:27	806	2.405	2.473
10/5/10 21:27	807	2.408	2.476
10/5/10 21:27	807	2.404	2.472
10/5/10 21:28	807	2.407	2.475
10/5/10 21:28	808	2.407	2.475
10/5/10 21:28	808	2.411	2.479
10/5/10 21:29	808	2.407	2.475
10/5/10 21:29	809	2.408	2.476
10/5/10 21:29	809	2.406	2.474
10/5/10 21:30	809	2.410	2.478
10/5/10 21:30	810	2.407	2.475
10/5/10 21:30	810	2.413	2.481
10/5/10 21:31	810	2.410	2.478
10/5/10 21:31	811	2.413	2.481
10/5/10 21:31	811	2.410	2.478
10/5/10 21:32	811	2.413	2.481
10/5/10 21:32	812	2.409	2.477
10/5/10 21:32	812	2.413	2.481
10/5/10 21:33	812	2.416	2.484
10/5/10 21:33	813	2.419	2.487
10/5/10 21:33	813	2.419	2.487
10/5/10 21:34	813	2.418	2.486
10/5/10 21:34	814	2.417	2.485
10/5/10 21:34	814	2.412	2.48
10/5/10 21:35	814	2.417	2.485
10/5/10 21:35	815	2.414	2.482
10/5/10 21:35	815	2.416	2.484
10/5/10 21:36	815	2.417	2.485
10/5/10 21:36	816	2.414	2.482
10/5/10 21:36	816	2.416	2.484
10/5/10 21:37	816	2.413	2.481
10/5/10 21:37	817	2.415	2.483
10/5/10 21:37	817	2.419	2.487
10/5/10 21:38	817	2.419	2.487
10/5/10 21:38	818	2.415	2.483
10/5/10 21:38	818	2.417	2.485
10/5/10 21:39	818	2.417	2.485
10/5/10 21:39	819	2.419	2.487
10/5/10 21:39	819	2.421	2.489
10/5/10 21:40	819	2.418	2.486
10/5/10 21:40	820	2.417	2.485
10/5/10 21:40	820	2.424	2.492
10/5/10 21:41	820	2.421	2.489
10/5/10 21:41	821	2.420	2.488
10/5/10 21:41	821	2.430	2.498
10/5/10 21:42	821	2.422	2.49
10/5/10 21:42	822	2.422	2.49
10/5/10 21:42	822	2.423	2.491
10/5/10 21:43	822	2.421	2.489
10/5/10 21:43	823	2.423	2.491
10/5/10 21:43	823	2.420	2.488
10/5/10 21:44	823	2.422	2.49
10/5/10 21:44	824	2.432	2.5
10/5/10 21:44	824	2.434	2.502
10/5/10 21:45	824	2.423	2.491
10/5/10 21:45	825	2.421	2.489
10/5/10 21:45	825	2.416	2.484
10/5/10 21:46	825	2.424	2.492
10/5/10 21:46	826	2.422	2.49
10/5/10 21:46	826	2.420	2.488
10/5/10 21:47	826	2.420	2.488
10/5/10 21:47	827	2.418	2.486
10/5/10 21:47	827	2.422	2.49
10/5/10 21:48	827	2.421	2.489
10/5/10 21:48	828	2.433	2.501
10/5/10 21:48	828	2.418	2.486
10/5/10 21:49	828	2.422	2.49
10/5/10 21:49	829	2.424	2.492
10/5/10 21:49	829	2.427	2.495
10/5/10 21:50	829	2.425	2.493
10/5/10 21:50	830	2.420	2.488
10/5/10 21:50	830	2.423	2.491
10/5/10 21:51	830	2.423	2.491
10/5/10 21:51	831	2.421	2.489
10/5/10 21:51	831	2.424	2.492
10/5/10 21:52	831	2.422	2.49

10/5/10 21:52	832	2.429	2.497
10/5/10 21:52	832	2.427	2.495
10/5/10 21:53	832	2.428	2.496
10/5/10 21:53	833	2.427	2.495
10/5/10 21:53	833	2.425	2.493
10/5/10 21:54	833	2.426	2.494
10/5/10 21:54	834	2.433	2.501
10/5/10 21:54	834	2.430	2.498
10/5/10 21:55	834	2.429	2.497
10/5/10 21:55	835	2.442	2.51
10/5/10 21:55	835	2.430	2.498
10/5/10 21:56	835	2.429	2.497
10/5/10 21:56	836	2.436	2.504
10/5/10 21:56	836	2.430	2.498
10/5/10 21:57	836	2.430	2.498
10/5/10 21:57	837	2.441	2.509
10/5/10 21:57	837	2.432	2.5
10/5/10 21:58	837	2.440	2.508
10/5/10 21:58	838	2.432	2.5
10/5/10 21:58	838	2.429	2.497
10/5/10 21:59	838	2.430	2.498
10/5/10 21:59	839	2.426	2.494
10/5/10 21:59	839	2.429	2.497
10/5/10 22:00	839	2.430	2.498
10/5/10 22:00	840	2.427	2.495
10/5/10 22:00	840	2.427	2.495
10/5/10 22:01	840	2.431	2.499
10/5/10 22:01	841	2.428	2.496
10/5/10 22:01	841	2.431	2.499
10/5/10 22:02	841	2.440	2.508
10/5/10 22:02	842	2.434	2.502
10/5/10 22:02	842	2.431	2.499
10/5/10 22:03	842	2.433	2.501
10/5/10 22:03	843	2.431	2.499
10/5/10 22:03	843	2.431	2.499
10/5/10 22:04	843	2.430	2.498
10/5/10 22:04	844	2.429	2.497
10/5/10 22:04	844	2.429	2.497
10/5/10 22:05	844	2.431	2.499
10/5/10 22:05	845	2.431	2.499
10/5/10 22:05	845	2.428	2.496
10/5/10 22:06	845	2.428	2.496
10/5/10 22:06	846	2.434	2.502
10/5/10 22:06	846	2.431	2.499
10/5/10 22:07	846	2.432	2.5
10/5/10 22:07	847	2.434	2.502
10/5/10 22:07	847	2.432	2.5
10/5/10 22:08	847	2.430	2.498
10/5/10 22:08	848	2.432	2.5
10/5/10 22:08	848	2.433	2.501
10/5/10 22:09	848	2.433	2.501
10/5/10 22:09	849	2.443	2.511
10/5/10 22:09	849	2.431	2.499
10/5/10 22:10	849	2.441	2.509
10/5/10 22:10	850	2.431	2.499
10/5/10 22:10	850	2.442	2.51
10/5/10 22:11	850	2.433	2.501
10/5/10 22:11	851	2.435	2.503
10/5/10 22:11	851	2.434	2.502
10/5/10 22:12	851	2.433	2.501
10/5/10 22:12	852	2.436	2.504
10/5/10 22:12	852	2.435	2.503
10/5/10 22:13	852	2.448	2.516
10/5/10 22:13	853	2.439	2.507
10/5/10 22:13	853	2.436	2.504
10/5/10 22:14	853	2.436	2.504
10/5/10 22:14	854	2.436	2.504
10/5/10 22:14	854	2.439	2.507
10/5/10 22:15	854	2.436	2.504
10/5/10 22:15	855	2.442	2.51
10/5/10 22:15	855	2.444	2.512
10/5/10 22:16	855	2.438	2.506
10/5/10 22:16	856	2.441	2.509
10/5/10 22:16	856	2.441	2.509
10/5/10 22:17	856	2.439	2.507
10/5/10 22:17	857	2.447	2.515
10/5/10 22:17	857	2.437	2.505
10/5/10 22:18	857	2.446	2.514
10/5/10 22:18	858	2.436	2.504
10/5/10 22:18	858	2.443	2.511
10/5/10 22:19	858	2.440	2.508
10/5/10 22:19	859	2.432	2.5
10/5/10 22:19	859	2.437	2.505
10/5/10 22:20	859	2.437	2.505
10/5/10 22:20	860	2.437	2.505
10/5/10 22:20	860	2.437	2.505
10/5/10 22:21	860	2.436	2.504
10/5/10 22:21	861	2.434	2.502
10/5/10 22:21	861	2.437	2.505
10/5/10 22:22	861	2.439	2.507
10/5/10 22:22	862	2.446	2.514
10/5/10 22:22	862	2.437	2.505
10/5/10 22:23	862	2.439	2.507
10/5/10 22:23	863	2.437	2.505
10/5/10 22:23	863	2.436	2.504
10/5/10 22:24	863	2.454	2.522
10/5/10 22:24	864	2.437	2.505
10/5/10 22:24	864	2.451	2.519
10/5/10 22:25	864	2.438	2.506
10/5/10 22:25	865	2.437	2.505
10/5/10 22:25	865	2.439	2.507
10/5/10 22:26	865	2.454	2.522
10/5/10 22:26	866	2.436	2.504
10/5/10 22:26	866	2.443	2.511
10/5/10 22:27	866	2.440	2.508
10/5/10 22:27	867	2.444	2.512
10/5/10 22:27	867	2.451	2.519
10/5/10 22:28	867	2.443	2.511
10/5/10 22:28	868	2.442	2.51
10/5/10 22:28	868	2.443	2.511
10/5/10 22:29	868	2.452	2.52
10/5/10 22:29	869	2.445	2.513
10/5/10 22:29	869	2.444	2.512
10/5/10 22:30	869	2.446	2.514
10/5/10 22:30	870	2.445	2.513
10/5/10 22:30	870	2.445	2.513
10/5/10 22:31	870	2.443	2.511
10/5/10 22:31	871	2.453	2.521
10/5/10 22:31	871	2.442	2.51
10/5/10 22:32	871	2.445	2.513
10/5/10 22:32	872	2.445	2.513
10/5/10 22:32	872	2.445	2.513
10/5/10 22:33	872	2.447	2.515
10/5/10 22:33	873	2.447	2.515
10/5/10 22:33	873	2.461	2.529
10/5/10 22:34	873	2.445	2.513
10/5/10 22:34	874	2.454	2.522
10/5/10 22:34	874	2.446	2.514
10/5/10 22:35	874	2.447	2.515
10/5/10 22:35	875	2.443	2.511
10/5/10 22:35	875	2.445	2.513
10/5/10 22:36	875	2.443	2.511
10/5/10 22:36	876	2.445	2.513
10/5/10 22:36	876	2.443	2.511
10/5/10 22:37	876	2.447	2.515
10/5/10 22:37	877	2.448	2.516
10/5/10 22:37	877	2.449	2.517
10/5/10 22:38	877	2.446	2.514
10/5/10 22:38	878	2.456	2.524
10/5/10 22:38	878	2.443	2.511
10/5/10 22:39	878	2.448	2.516
10/5/10 22:39	879	2.444	2.512
10/5/10 22:39	879	2.446	2.514
10/5/10 22:40	879	2.446	2.514
10/5/10 22:40	880	2.442	2.51
10/5/10 22:40	880	2.448	2.516
10/5/10 22:41	880	2.449	2.517
10/5/10 22:41	881	2.450	2.518
10/5/10 22:41	881	2.443	2.511
10/5/10 22:42	881	2.443	2.511
10/5/10 22:42	882	2.445	2.513
10/5/10 22:42	882	2.448	2.516
10/5/10 22:43	882	2.444	2.512
10/5/10 22:43	883	2.443	2.511
10/5/10 22:43	883	2.446	2.514
10/5/10 22:44	883	2.447	2.515
10/5/10 22:44	884	2.445	2.513
10/5/10 22:44	884	2.446	2.514
10/5/10 22:45	884	2.444	2.512
10/5/10 22:45	885	2.447	2.515
10/5/10 22:45	885	2.446	2.514
10/5/10 22:46	885	2.456	2.524
10/5/10 22:46	886	2.446	2.514
10/5/10 22:46	886	2.450	2.518
10/5/10 22:47	886	2.455	2.523
10/5/10 22:47	887	2.449	2.517
10/5/10 22:47	887	2.445	2.513
10/5/10 22:48	887	2.449	2.517
10/5/10 22:48	888	2.448	2.516
10/5/10 22:48	888	2.456	2.524
10/5/10 22:49	888	2.447	2.515
10/5/10 22:49	889	2.446	2.514
10/5/10 22:49	889	2.451	2.519
10/5/10 22:50	889	2.448	2.516
10/5/10 22:50	890	2.446	2.514
10/5/10 22:50	890	2.451	2.519
10/5/10 22:51	890	2.446	2.514
10/5/10 22:51	891	2.447	2.515
10/5/10 22:51	891	2.447	2.515
10/5/10 22:52	891	2.447	2.515
10/5/10 22:52	892	2.446	2.514
10/5/10 22:52	892	2.448	2.516
10/5/10 22:53	892	2.446	2.514
10/5/10 22:53	893	2.449	2.517
10/5/10 22:53	893	2.448	2.516
10/5/10 22:54	893	2.449	2.517
10/5/10 22:54	894	2.448	2.516
10/5/10 22:54	894	2.449	2.517
10/5/10 22:55	894	2.452	2.52
10/5/10 22:55	895	2.452	2.52
10/5/10 22:55	895	2.450	2.518
10/5/10 22:56	895	2.450	2.518

10/5/10 22:56	896	2.448	2.516
10/5/10 22:56	896	2.447	2.515
10/5/10 22:57	896	2.448	2.516
10/5/10 22:57	897	2.440	2.508
10/5/10 22:57	897	2.445	2.513
10/5/10 22:58	897	2.448	2.516
10/5/10 22:58	898	2.433	2.501
10/5/10 22:58	898	2.439	2.507
10/5/10 22:59	898	2.444	2.512
10/5/10 22:59	899	2.443	2.511
10/5/10 22:59	899	2.442	2.51
10/5/10 23:00	899	2.437	2.505
10/5/10 23:00	900	2.440	2.508
10/5/10 23:00	900	2.442	2.51
10/5/10 23:01	900	2.441	2.509
10/5/10 23:01	901	2.463	2.531
10/5/10 23:01	901	2.448	2.516
10/5/10 23:02	901	2.444	2.512
10/5/10 23:02	902	2.443	2.511
10/5/10 23:02	902	2.449	2.517
10/5/10 23:03	902	2.447	2.515
10/5/10 23:03	903	2.446	2.514
10/5/10 23:03	903	2.444	2.512
10/5/10 23:04	903	2.447	2.515
10/5/10 23:04	904	2.444	2.512
10/5/10 23:04	904	2.454	2.522
10/5/10 23:05	904	2.444	2.512
10/5/10 23:05	905	2.445	2.513
10/5/10 23:05	905	2.442	2.51
10/5/10 23:06	905	2.442	2.51
10/5/10 23:06	906	2.442	2.51
10/5/10 23:06	906	2.446	2.514
10/5/10 23:07	906	2.445	2.513
10/5/10 23:07	907	2.442	2.51
10/5/10 23:07	907	2.444	2.512
10/5/10 23:08	907	2.459	2.527
10/5/10 23:08	908	2.441	2.509
10/5/10 23:08	908	2.456	2.524
10/5/10 23:09	908	2.447	2.515
10/5/10 23:09	909	2.444	2.512
10/5/10 23:09	909	2.456	2.524
10/5/10 23:10	909	2.445	2.513
10/5/10 23:10	910	2.444	2.512
10/5/10 23:10	910	2.454	2.522
10/5/10 23:11	910	2.445	2.513
10/5/10 23:11	911	2.448	2.516
10/5/10 23:11	911	2.450	2.518
10/5/10 23:12	911	2.448	2.516
10/5/10 23:12	912	2.447	2.515
10/5/10 23:12	912	2.448	2.516
10/5/10 23:13	912	2.446	2.514
10/5/10 23:13	913	2.449	2.517
10/5/10 23:13	913	2.446	2.514
10/5/10 23:14	913	2.447	2.515
10/5/10 23:14	914	2.451	2.519
10/5/10 23:14	914	2.451	2.519
10/5/10 23:15	914	2.450	2.518
10/5/10 23:15	915	2.449	2.517
10/5/10 23:15	915	2.449	2.517
10/5/10 23:16	915	2.449	2.517
10/5/10 23:16	916	2.452	2.52
10/5/10 23:16	916	2.445	2.513
10/5/10 23:17	916	2.453	2.521
10/5/10 23:17	917	2.448	2.516
10/5/10 23:17	917	2.450	2.518
10/5/10 23:18	917	2.450	2.518
10/5/10 23:18	918	2.447	2.515
10/5/10 23:18	918	2.451	2.519
10/5/10 23:19	918	2.453	2.521
10/5/10 23:19	919	2.448	2.516
10/5/10 23:19	919	2.448	2.516
10/5/10 23:20	919	2.453	2.521
10/5/10 23:20	920	2.448	2.516
10/5/10 23:20	920	2.450	2.518
10/5/10 23:21	920	2.451	2.519
10/5/10 23:21	921	2.450	2.518
10/5/10 23:21	921	2.449	2.517
10/5/10 23:22	921	2.449	2.517
10/5/10 23:22	922	2.451	2.519
10/5/10 23:22	922	2.454	2.522
10/5/10 23:23	922	2.452	2.52
10/5/10 23:23	923	2.448	2.516
10/5/10 23:23	923	2.447	2.515
10/5/10 23:24	923	2.451	2.519
10/5/10 23:24	924	2.452	2.52
10/5/10 23:24	924	2.449	2.517
10/5/10 23:25	924	2.451	2.519
10/5/10 23:25	925	2.452	2.52
10/5/10 23:25	925	2.452	2.52
10/5/10 23:26	925	2.450	2.518
10/5/10 23:26	926	2.450	2.518
10/5/10 23:26	926	2.467	2.535
10/5/10 23:27	926	2.454	2.522
10/5/10 23:27	927	2.456	2.524
10/5/10 23:27	927	2.455	2.523
10/5/10 23:28	927	2.451	2.519
10/5/10 23:28	928	2.451	2.519
10/5/10 23:28	928	2.456	2.524
10/5/10 23:29	928	2.453	2.521
10/5/10 23:29	929	2.453	2.521
10/5/10 23:29	929	2.458	2.526
10/5/10 23:30	929	2.455	2.523
10/5/10 23:30	930	2.457	2.525
10/5/10 23:30	930	2.458	2.526
10/5/10 23:31	930	2.459	2.527
10/5/10 23:31	931	2.470	2.538
10/5/10 23:31	931	2.461	2.529
10/5/10 23:32	931	2.459	2.527
10/5/10 23:32	932	2.457	2.525
10/5/10 23:32	932	2.458	2.526
10/5/10 23:33	932	2.457	2.525
10/5/10 23:33	933	2.458	2.526
10/5/10 23:33	933	2.460	2.528
10/5/10 23:34	933	2.460	2.528
10/5/10 23:34	934	2.459	2.527
10/5/10 23:34	934	2.458	2.526
10/5/10 23:35	934	2.461	2.529
10/5/10 23:35	935	2.457	2.525
10/5/10 23:35	935	2.460	2.528
10/5/10 23:36	935	2.464	2.532
10/5/10 23:36	936	2.461	2.529
10/5/10 23:36	936	2.460	2.528
10/5/10 23:37	936	2.457	2.525
10/5/10 23:37	937	2.460	2.528
10/5/10 23:37	937	2.461	2.529
10/5/10 23:38	937	2.460	2.528
10/5/10 23:38	938	2.464	2.532
10/5/10 23:38	938	2.462	2.53
10/5/10 23:39	938	2.466	2.534
10/5/10 23:39	939	2.462	2.53
10/5/10 23:39	939	2.462	2.53
10/5/10 23:40	939	2.464	2.532
10/5/10 23:40	940	2.465	2.533
10/5/10 23:40	940	2.462	2.53
10/5/10 23:41	940	2.464	2.532
10/5/10 23:41	941	2.465	2.533
10/5/10 23:41	941	2.466	2.534
10/5/10 23:42	941	2.467	2.535
10/5/10 23:42	942	2.462	2.53
10/5/10 23:42	942	2.465	2.533
10/5/10 23:43	942	2.465	2.533
10/5/10 23:43	943	2.467	2.535
10/5/10 23:43	943	2.466	2.534
10/5/10 23:44	943	2.464	2.532
10/5/10 23:44	944	2.467	2.535
10/5/10 23:44	944	2.465	2.533
10/5/10 23:45	944	2.472	2.54
10/5/10 23:45	945	2.466	2.534
10/5/10 23:45	945	2.471	2.539
10/5/10 23:46	945	2.469	2.537
10/5/10 23:46	946	2.470	2.538
10/5/10 23:46	946	2.470	2.538
10/5/10 23:47	946	2.467	2.535
10/5/10 23:47	947	2.468	2.536
10/5/10 23:47	947	2.468	2.536
10/5/10 23:48	947	2.469	2.537
10/5/10 23:48	948	2.467	2.535
10/5/10 23:48	948	2.467	2.535
10/5/10 23:49	948	2.470	2.538
10/5/10 23:49	949	2.469	2.537
10/5/10 23:49	949	2.466	2.534
10/5/10 23:50	949	2.468	2.536
10/5/10 23:50	950	2.469	2.537
10/5/10 23:50	950	2.467	2.535
10/5/10 23:51	950	2.465	2.533
10/5/10 23:51	951	2.466	2.534
10/5/10 23:51	951	2.477	2.545
10/5/10 23:52	951	2.464	2.532
10/5/10 23:52	952	2.467	2.535
10/5/10 23:52	952	2.470	2.538
10/5/10 23:53	952	2.464	2.532
10/5/10 23:53	953	2.466	2.534
10/5/10 23:53	953	2.465	2.533
10/5/10 23:54	953	2.465	2.533
10/5/10 23:54	954	2.466	2.534
10/5/10 23:54	954	2.466	2.534
10/5/10 23:55	954	2.472	2.54
10/5/10 23:55	955	2.466	2.534
10/5/10 23:55	955	2.466	2.534
10/5/10 23:56	955	2.467	2.535
10/5/10 23:56	956	2.470	2.538
10/5/10 23:56	956	2.471	2.539
10/5/10 23:57	956	2.470	2.538
10/5/10 23:57	957	2.466	2.534
10/5/10 23:57	957	2.470	2.538
10/5/10 23:58	957	2.473	2.541
10/5/10 23:58	958	2.468	2.536
10/5/10 23:58	958	2.472	2.54
10/5/10 23:59	958	2.472	2.54
10/5/10 23:59	959	2.473	2.541
10/5/10 23:59	959	2.471	2.539
10/6/10 0:00	959	2.471	2.539

10/6/10 0:00	960	2.480	2.548
10/6/10 0:00	960	2.471	2.539
10/6/10 0:01	960	2.474	2.542
10/6/10 0:01	961	2.472	2.54
10/6/10 0:01	961	2.473	2.541
10/6/10 0:02	961	2.485	2.553
10/6/10 0:02	962	2.476	2.544
10/6/10 0:02	962	2.472	2.54
10/6/10 0:03	962	2.475	2.543
10/6/10 0:03	963	2.476	2.544
10/6/10 0:03	963	2.474	2.542
10/6/10 0:04	963	2.476	2.544
10/6/10 0:04	964	2.475	2.543
10/6/10 0:04	964	2.473	2.541
10/6/10 0:05	964	2.476	2.544
10/6/10 0:05	965	2.470	2.538
10/6/10 0:05	965	2.462	2.53
10/6/10 0:06	965	2.475	2.543
10/6/10 0:06	966	2.473	2.541
10/6/10 0:06	966	2.469	2.537
10/6/10 0:07	966	2.471	2.539
10/6/10 0:07	967	2.473	2.541
10/6/10 0:07	967	2.474	2.542
10/6/10 0:08	967	2.472	2.54
10/6/10 0:08	968	2.473	2.541
10/6/10 0:08	968	2.478	2.546
10/6/10 0:09	968	2.475	2.543
10/6/10 0:09	969	2.475	2.543
10/6/10 0:09	969	2.474	2.542
10/6/10 0:10	969	2.475	2.543
10/6/10 0:10	970	2.472	2.54
10/6/10 0:10	970	2.478	2.546
10/6/10 0:11	970	2.475	2.543
10/6/10 0:11	971	2.478	2.546
10/6/10 0:11	971	2.475	2.543
10/6/10 0:12	971	2.476	2.544
10/6/10 0:12	972	2.476	2.544
10/6/10 0:12	972	2.475	2.543
10/6/10 0:13	972	2.476	2.544
10/6/10 0:13	973	2.476	2.544
10/6/10 0:13	973	2.472	2.54
10/6/10 0:14	973	2.475	2.543
10/6/10 0:14	974	2.476	2.544
10/6/10 0:14	974	2.474	2.542
10/6/10 0:15	974	2.474	2.542
10/6/10 0:15	975	2.477	2.545
10/6/10 0:15	975	2.475	2.543
10/6/10 0:16	975	2.475	2.543
10/6/10 0:16	976	2.478	2.546
10/6/10 0:16	976	2.473	2.541
10/6/10 0:17	976	2.477	2.545
10/6/10 0:17	977	2.476	2.544
10/6/10 0:17	977	2.474	2.542
10/6/10 0:18	977	2.476	2.544
10/6/10 0:18	978	2.476	2.544
10/6/10 0:18	978	2.477	2.545
10/6/10 0:19	978	2.476	2.544
10/6/10 0:19	979	2.478	2.546
10/6/10 0:19	979	2.479	2.547
10/6/10 0:20	979	2.476	2.544
10/6/10 0:20	980	2.474	2.542
10/6/10 0:20	980	2.475	2.543
10/6/10 0:21	980	2.475	2.543
10/6/10 0:21	981	2.475	2.543
10/6/10 0:21	981	2.475	2.543
10/6/10 0:22	981	2.477	2.545
10/6/10 0:22	982	2.477	2.545
10/6/10 0:22	982	2.476	2.544
10/6/10 0:23	982	2.475	2.543
10/6/10 0:23	983	2.475	2.543
10/6/10 0:23	983	2.474	2.542
10/6/10 0:24	983	2.474	2.542
10/6/10 0:24	984	2.478	2.546
10/6/10 0:24	984	2.478	2.546
10/6/10 0:25	984	2.481	2.549
10/6/10 0:25	985	2.476	2.544
10/6/10 0:25	985	2.476	2.544
10/6/10 0:26	985	2.473	2.541
10/6/10 0:26	986	2.475	2.543
10/6/10 0:26	986	2.472	2.54
10/6/10 0:27	986	2.484	2.552
10/6/10 0:27	987	2.478	2.546
10/6/10 0:27	987	2.473	2.541
10/6/10 0:28	987	2.474	2.542
10/6/10 0:28	988	2.478	2.546
10/6/10 0:28	988	2.477	2.545
10/6/10 0:29	988	2.479	2.547
10/6/10 0:29	989	2.473	2.541
10/6/10 0:29	989	2.474	2.542
10/6/10 0:30	989	2.477	2.545
10/6/10 0:30	990	2.477	2.545
10/6/10 0:30	990	2.475	2.543
10/6/10 0:31	990	2.477	2.545
10/6/10 0:31	991	2.476	2.544
10/6/10 0:31	991	2.478	2.546
10/6/10 0:32	991	2.479	2.547
10/6/10 0:32	992	2.477	2.545
10/6/10 0:32	992	2.475	2.543
10/6/10 0:33	992	2.476	2.544
10/6/10 0:33	993	2.476	2.544
10/6/10 0:33	993	2.481	2.549
10/6/10 0:34	993	2.477	2.545
10/6/10 0:34	994	2.477	2.545
10/6/10 0:34	994	2.479	2.547
10/6/10 0:35	994	2.473	2.541
10/6/10 0:35	995	2.475	2.543
10/6/10 0:35	995	2.476	2.544
10/6/10 0:36	995	2.479	2.547
10/6/10 0:36	996	2.477	2.545
10/6/10 0:36	996	2.486	2.554
10/6/10 0:37	996	2.474	2.542
10/6/10 0:37	997	2.478	2.546
10/6/10 0:37	997	2.476	2.544
10/6/10 0:38	997	2.477	2.545
10/6/10 0:38	998	2.479	2.547
10/6/10 0:38	998	2.479	2.547
10/6/10 0:39	998	2.481	2.549
10/6/10 0:39	999	2.478	2.546
10/6/10 0:39	999	2.475	2.543
10/6/10 0:40	999	2.479	2.547
10/6/10 0:40	1000	2.481	2.549
10/6/10 0:40	1000	2.482	2.55
10/6/10 0:41	1000	2.485	2.553
10/6/10 0:41	1001	2.479	2.547
10/6/10 0:41	1001	2.482	2.55
10/6/10 0:42	1001	2.483	2.551
10/6/10 0:42	1002	2.480	2.548
10/6/10 0:42	1002	2.483	2.551
10/6/10 0:43	1002	2.480	2.548
10/6/10 0:43	1003	2.484	2.552
10/6/10 0:43	1003	2.486	2.554
10/6/10 0:44	1003	2.482	2.55
10/6/10 0:44	1004	2.482	2.55
10/6/10 0:44	1004	2.479	2.547
10/6/10 0:45	1004	2.482	2.55
10/6/10 0:45	1005	2.481	2.549
10/6/10 0:45	1005	2.484	2.552
10/6/10 0:46	1005	2.480	2.548
10/6/10 0:46	1006	2.484	2.552
10/6/10 0:46	1006	2.482	2.55
10/6/10 0:47	1006	2.482	2.55
10/6/10 0:47	1007	2.484	2.552
10/6/10 0:47	1007	2.481	2.549
10/6/10 0:48	1007	2.485	2.553
10/6/10 0:48	1008	2.486	2.554
10/6/10 0:48	1008	2.488	2.556
10/6/10 0:49	1008	2.485	2.553
10/6/10 0:49	1009	2.485	2.553
10/6/10 0:49	1009	2.484	2.552
10/6/10 0:50	1009	2.484	2.552
10/6/10 0:50	1010	2.485	2.553
10/6/10 0:50	1010	2.488	2.556
10/6/10 0:51	1010	2.487	2.555
10/6/10 0:51	1011	2.493	2.561
10/6/10 0:51	1011	2.488	2.556
10/6/10 0:52	1011	2.486	2.554
10/6/10 0:52	1012	2.486	2.554
10/6/10 0:52	1012	2.488	2.556
10/6/10 0:53	1012	2.489	2.557
10/6/10 0:53	1013	2.486	2.554
10/6/10 0:53	1013	2.489	2.557
10/6/10 0:54	1013	2.488	2.556
10/6/10 0:54	1014	2.488	2.556
10/6/10 0:54	1014	2.488	2.556
10/6/10 0:55	1014	2.488	2.556
10/6/10 0:55	1015	2.486	2.554
10/6/10 0:55	1015	2.486	2.554
10/6/10 0:56	1015	2.487	2.555
10/6/10 0:56	1016	2.487	2.555
10/6/10 0:56	1016	2.488	2.556
10/6/10 0:57	1016	2.486	2.554
10/6/10 0:57	1017	2.490	2.558
10/6/10 0:57	1017	2.485	2.553
10/6/10 0:58	1017	2.488	2.556
10/6/10 0:58	1018	2.487	2.555
10/6/10 0:58	1018	2.488	2.556
10/6/10 0:59	1018	2.485	2.553
10/6/10 0:59	1019	2.483	2.551
10/6/10 0:59	1019	2.486	2.554
10/6/10 1:00	1019	2.487	2.555
10/6/10 1:00	1020	2.487	2.555
10/6/10 1:00	1020	2.491	2.559
10/6/10 1:01	1020	2.492	2.56
10/6/10 1:01	1021	2.485	2.553
10/6/10 1:01	1021	2.489	2.557
10/6/10 1:02	1021	2.488	2.556
10/6/10 1:02	1022	2.486	2.554
10/6/10 1:02	1022	2.487	2.555
10/6/10 1:03	1022	2.486	2.554
10/6/10 1:03	1023	2.487	2.555
10/6/10 1:03	1023	2.484	2.552
10/6/10 1:04	1023	2.487	2.555

10/6/10 1:04	1024	2.487	2.555
10/6/10 1:04	1024	2.490	2.558
10/6/10 1:05	1024	2.489	2.557
10/6/10 1:05	1025	2.484	2.552
10/6/10 1:05	1025	2.490	2.558
10/6/10 1:06	1025	2.494	2.562
10/6/10 1:06	1026	2.494	2.562
10/6/10 1:06	1026	2.495	2.563
10/6/10 1:07	1026	2.501	2.569
10/6/10 1:07	1027	2.503	2.571
10/6/10 1:07	1027	2.494	2.562
10/6/10 1:08	1027	2.492	2.56
10/6/10 1:08	1028	2.498	2.566
10/6/10 1:08	1028	2.497	2.565
10/6/10 1:09	1028	2.491	2.559
10/6/10 1:09	1029	2.492	2.56
10/6/10 1:09	1029	2.498	2.566
10/6/10 1:10	1029	2.494	2.562
10/6/10 1:10	1030	2.496	2.564
10/6/10 1:10	1030	2.495	2.563
10/6/10 1:11	1030	2.497	2.565
10/6/10 1:11	1031	2.496	2.564
10/6/10 1:11	1031	2.497	2.565
10/6/10 1:12	1031	2.494	2.562
10/6/10 1:12	1032	2.508	2.576
10/6/10 1:12	1032	2.498	2.566
10/6/10 1:13	1032	2.497	2.565
10/6/10 1:13	1033	2.497	2.565
10/6/10 1:13	1033	2.500	2.568
10/6/10 1:14	1033	2.501	2.569
10/6/10 1:14	1034	2.500	2.568
10/6/10 1:14	1034	2.496	2.564
10/6/10 1:15	1034	2.498	2.566
10/6/10 1:15	1035	2.498	2.566
10/6/10 1:15	1035	2.498	2.566
10/6/10 1:16	1035	2.497	2.565
10/6/10 1:16	1036	2.498	2.566
10/6/10 1:16	1036	2.498	2.566
10/6/10 1:17	1036	2.500	2.568
10/6/10 1:17	1037	2.501	2.569
10/6/10 1:17	1037	2.509	2.577
10/6/10 1:18	1037	2.500	2.568
10/6/10 1:18	1038	2.497	2.565
10/6/10 1:18	1038	2.499	2.567
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10/6/10 1:19	1039	2.505	2.573
10/6/10 1:20	1039	2.499	2.567
10/6/10 1:20	1040	2.502	2.57
10/6/10 1:20	1040	2.499	2.567
10/6/10 1:21	1040	2.497	2.565
10/6/10 1:21	1041	2.497	2.565
10/6/10 1:21	1041	2.497	2.565
10/6/10 1:22	1041	2.496	2.564
10/6/10 1:22	1042	2.498	2.566
10/6/10 1:22	1042	2.500	2.568
10/6/10 1:23	1042	2.499	2.567
10/6/10 1:23	1043	2.500	2.568
10/6/10 1:23	1043	2.500	2.568
10/6/10 1:24	1043	2.499	2.567
10/6/10 1:24	1044	2.500	2.568
10/6/10 1:24	1044	2.498	2.566
10/6/10 1:25	1044	2.498	2.566
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10/6/10 1:26	1045	2.497	2.565
10/6/10 1:26	1046	2.503	2.571
10/6/10 1:26	1046	2.495	2.563
10/6/10 1:27	1046	2.496	2.564
10/6/10 1:27	1047	2.499	2.567
10/6/10 1:27	1047	2.499	2.567
10/6/10 1:28	1047	2.501	2.569
10/6/10 1:28	1048	2.500	2.568
10/6/10 1:28	1048	2.500	2.568
10/6/10 1:29	1048	2.500	2.568
10/6/10 1:29	1049	2.502	2.57
10/6/10 1:29	1049	2.500	2.568
10/6/10 1:30	1049	2.501	2.569
10/6/10 1:30	1050	2.502	2.57
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10/6/10 1:31	1051	2.503	2.571
10/6/10 1:31	1051	2.500	2.568
10/6/10 1:32	1051	2.503	2.571
10/6/10 1:32	1052	2.504	2.572
10/6/10 1:32	1052	2.502	2.57
10/6/10 1:33	1052	2.501	2.569
10/6/10 1:33	1053	2.503	2.571
10/6/10 1:33	1053	2.506	2.574
10/6/10 1:34	1053	2.502	2.57
10/6/10 1:34	1054	2.502	2.57
10/6/10 1:34	1054	2.504	2.572
10/6/10 1:35	1054	2.504	2.572
10/6/10 1:35	1055	2.507	2.575
10/6/10 1:35	1055	2.505	2.573
10/6/10 1:36	1055	2.504	2.572
10/6/10 1:36	1056	2.507	2.575
10/6/10 1:36	1056	2.507	2.575
10/6/10 1:37	1056	2.505	2.573
10/6/10 1:37	1057	2.505	2.573
10/6/10 1:37	1057	2.508	2.576
10/6/10 1:38	1057	2.506	2.574
10/6/10 1:38	1058	2.507	2.575
10/6/10 1:38	1058	2.506	2.574
10/6/10 1:39	1058	2.507	2.575
10/6/10 1:39	1059	2.507	2.575
10/6/10 1:39	1059	2.507	2.575
10/6/10 1:40	1059	2.508	2.576
10/6/10 1:40	1060	2.509	2.577
10/6/10 1:40	1060	2.507	2.575
10/6/10 1:41	1060	2.509	2.577
10/6/10 1:41	1061	2.508	2.576
10/6/10 1:41	1061	2.509	2.577
10/6/10 1:42	1061	2.509	2.577
10/6/10 1:42	1062	2.508	2.576
10/6/10 1:42	1062	2.508	2.576
10/6/10 1:43	1062	2.512	2.58
10/6/10 1:43	1063	2.509	2.577
10/6/10 1:43	1063	2.511	2.579
10/6/10 1:44	1063	2.509	2.577
10/6/10 1:44	1064	2.510	2.578
10/6/10 1:44	1064	2.510	2.578
10/6/10 1:45	1064	2.512	2.58
10/6/10 1:45	1065	2.513	2.581
10/6/10 1:45	1065	2.511	2.579
10/6/10 1:46	1065	2.510	2.578
10/6/10 1:46	1066	2.509	2.577
10/6/10 1:46	1066	2.511	2.579
10/6/10 1:47	1066	2.514	2.582
10/6/10 1:47	1067	2.510	2.578
10/6/10 1:47	1067	2.514	2.582
10/6/10 1:48	1067	2.514	2.582
10/6/10 1:48	1068	2.512	2.58
10/6/10 1:48	1068	2.509	2.577
10/6/10 1:49	1068	2.514	2.582
10/6/10 1:49	1069	2.517	2.585
10/6/10 1:49	1069	2.517	2.585
10/6/10 1:50	1069	2.516	2.584
10/6/10 1:50	1070	2.513	2.581
10/6/10 1:50	1070	2.516	2.584
10/6/10 1:51	1070	2.515	2.583
10/6/10 1:51	1071	2.515	2.583
10/6/10 1:51	1071	2.512	2.58
10/6/10 1:52	1071	2.513	2.581
10/6/10 1:52	1072	2.514	2.582
10/6/10 1:52	1072	2.517	2.585
10/6/10 1:53	1072	2.513	2.581
10/6/10 1:53	1073	2.512	2.58
10/6/10 1:53	1073	2.514	2.582
10/6/10 1:54	1073	2.514	2.582
10/6/10 1:54	1074	2.518	2.586
10/6/10 1:54	1074	2.520	2.588
10/6/10 1:55	1074	2.515	2.583
10/6/10 1:55	1075	2.516	2.584
10/6/10 1:55	1075	2.517	2.585
10/6/10 1:56	1075	2.519	2.587
10/6/10 1:56	1076	2.515	2.583
10/6/10 1:56	1076	2.515	2.583
10/6/10 1:57	1076	2.517	2.585
10/6/10 1:57	1077	2.515	2.583
10/6/10 1:57	1077	2.518	2.586
10/6/10 1:58	1077	2.516	2.584
10/6/10 1:58	1078	2.514	2.582
10/6/10 1:58	1078	2.515	2.583
10/6/10 1:59	1078	2.517	2.585
10/6/10 1:59	1079	2.515	2.583
10/6/10 1:59	1079	2.515	2.583
10/6/10 2:00	1079	2.515	2.583
10/6/10 2:00	1080	2.519	2.587
10/6/10 2:00	1080	2.520	2.588
10/6/10 2:01	1080	2.516	2.584
10/6/10 2:01	1081	2.519	2.587
10/6/10 2:01	1081	2.518	2.586
10/6/10 2:02	1081	2.518	2.586
10/6/10 2:02	1082	2.521	2.589
10/6/10 2:02	1082	2.520	2.588
10/6/10 2:03	1082	2.523	2.591
10/6/10 2:03	1083	2.520	2.588
10/6/10 2:03	1083	2.519	2.587
10/6/10 2:04	1083	2.515	2.583
10/6/10 2:04	1084	2.518	2.586
10/6/10 2:04	1084	2.520	2.588
10/6/10 2:05	1084	2.522	2.59
10/6/10 2:05	1085	2.531	2.599
10/6/10 2:05	1085	2.521	2.589
10/6/10 2:06	1085	2.520	2.588
10/6/10 2:06	1086	2.522	2.59
10/6/10 2:06	1086	2.523	2.591
10/6/10 2:07	1086	2.522	2.59
10/6/10 2:07	1087	2.522	2.59
10/6/10 2:07	1087	2.527	2.595
10/6/10 2:08	1087	2.520	2.588

10/6/10 2:08	1088	2.532	2.6
10/6/10 2:08	1088	2.521	2.589
10/6/10 2:09	1088	2.524	2.592
10/6/10 2:09	1089	2.522	2.59
10/6/10 2:09	1089	2.522	2.59
10/6/10 2:10	1089	2.522	2.59
10/6/10 2:10	1090	2.523	2.591
10/6/10 2:10	1090	2.522	2.59
10/6/10 2:11	1090	2.526	2.594
10/6/10 2:11	1091	2.522	2.59
10/6/10 2:11	1091	2.525	2.593
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10/6/10 2:12	1092	2.521	2.589
10/6/10 2:13	1092	2.522	2.59
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10/6/10 2:13	1093	2.523	2.591
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10/6/10 2:14	1094	2.525	2.593
10/6/10 2:14	1094	2.524	2.592
10/6/10 2:15	1094	2.521	2.589
10/6/10 2:15	1095	2.524	2.592
10/6/10 2:15	1095	2.523	2.591
10/6/10 2:16	1095	2.524	2.592
10/6/10 2:16	1096	2.523	2.591
10/6/10 2:16	1096	2.526	2.594
10/6/10 2:17	1096	2.523	2.591
10/6/10 2:17	1097	2.522	2.59
10/6/10 2:17	1097	2.535	2.603
10/6/10 2:18	1097	2.521	2.589
10/6/10 2:18	1098	2.527	2.595
10/6/10 2:18	1098	2.523	2.591
10/6/10 2:19	1098	2.527	2.595
10/6/10 2:19	1099	2.523	2.591
10/6/10 2:19	1099	2.521	2.589
10/6/10 2:20	1099	2.523	2.591
10/6/10 2:20	1100	2.526	2.594
10/6/10 2:20	1100	2.524	2.592
10/6/10 2:21	1100	2.528	2.596
10/6/10 2:21	1101	2.527	2.595
10/6/10 2:21	1101	2.524	2.592
10/6/10 2:22	1101	2.524	2.592
10/6/10 2:22	1102	2.526	2.594
10/6/10 2:22	1102	2.526	2.594
10/6/10 2:23	1102	2.528	2.596
10/6/10 2:23	1103	2.528	2.596
10/6/10 2:23	1103	2.527	2.595
10/6/10 2:24	1103	2.527	2.595
10/6/10 2:24	1104	2.526	2.594
10/6/10 2:24	1104	2.525	2.593
10/6/10 2:25	1104	2.526	2.594
10/6/10 2:25	1105	2.531	2.599
10/6/10 2:25	1105	2.526	2.594
10/6/10 2:26	1105	2.526	2.594
10/6/10 2:26	1106	2.527	2.595
10/6/10 2:26	1106	2.527	2.595
10/6/10 2:27	1106	2.529	2.597
10/6/10 2:27	1107	2.529	2.597
10/6/10 2:27	1107	2.528	2.596
10/6/10 2:28	1107	2.528	2.596
10/6/10 2:28	1108	2.530	2.598
10/6/10 2:28	1108	2.525	2.593
10/6/10 2:29	1108	2.525	2.593
10/6/10 2:29	1109	2.526	2.594
10/6/10 2:29	1109	2.525	2.593
10/6/10 2:30	1109	2.530	2.598
10/6/10 2:30	1110	2.528	2.596
10/6/10 2:30	1110	2.528	2.596
10/6/10 2:31	1110	2.529	2.597
10/6/10 2:31	1111	2.539	2.607
10/6/10 2:31	1111	2.530	2.598
10/6/10 2:32	1111	2.529	2.597
10/6/10 2:32	1112	2.529	2.597
10/6/10 2:32	1112	2.527	2.595
10/6/10 2:33	1112	2.532	2.6
10/6/10 2:33	1113	2.528	2.596
10/6/10 2:33	1113	2.533	2.601
10/6/10 2:34	1113	2.529	2.597
10/6/10 2:34	1114	2.529	2.597
10/6/10 2:34	1114	2.528	2.596
10/6/10 2:35	1114	2.528	2.596
10/6/10 2:35	1115	2.528	2.596
10/6/10 2:35	1115	2.538	2.606
10/6/10 2:36	1115	2.527	2.595
10/6/10 2:36	1116	2.527	2.595
10/6/10 2:36	1116	2.530	2.598
10/6/10 2:37	1116	2.531	2.599
10/6/10 2:37	1117	2.531	2.599
10/6/10 2:37	1117	2.532	2.6
10/6/10 2:38	1117	2.530	2.598
10/6/10 2:38	1118	2.529	2.597
10/6/10 2:38	1118	2.529	2.597
10/6/10 2:39	1118	2.529	2.597
10/6/10 2:39	1119	2.529	2.597
10/6/10 2:39	1119	2.532	2.6
10/6/10 2:40	1119	2.533	2.601
10/6/10 2:40	1120	2.529	2.597
10/6/10 2:40	1120	2.532	2.6
10/6/10 2:41	1120	2.531	2.599
10/6/10 2:41	1121	2.528	2.596
10/6/10 2:41	1121	2.530	2.598
10/6/10 2:42	1121	2.530	2.598
10/6/10 2:42	1122	2.527	2.595
10/6/10 2:42	1122	2.532	2.6
10/6/10 2:43	1122	2.532	2.6
10/6/10 2:43	1123	2.532	2.6
10/6/10 2:43	1123	2.530	2.598
10/6/10 2:44	1123	2.528	2.596
10/6/10 2:44	1124	2.529	2.597
10/6/10 2:44	1124	2.527	2.595
10/6/10 2:45	1124	2.531	2.599
10/6/10 2:45	1125	2.532	2.6
10/6/10 2:45	1125	2.532	2.6
10/6/10 2:46	1125	2.532	2.6
10/6/10 2:46	1126	2.527	2.595
10/6/10 2:46	1126	2.529	2.597
10/6/10 2:47	1126	2.530	2.598
10/6/10 2:47	1127	2.528	2.596
10/6/10 2:47	1127	2.531	2.599
10/6/10 2:48	1127	2.530	2.598
10/6/10 2:48	1128	2.531	2.599
10/6/10 2:48	1128	2.530	2.598
10/6/10 2:49	1128	2.530	2.598
10/6/10 2:49	1129	2.532	2.6
10/6/10 2:49	1129	2.530	2.598
10/6/10 2:50	1129	2.533	2.601
10/6/10 2:50	1130	2.532	2.6
10/6/10 2:50	1130	2.536	2.604
10/6/10 2:51	1130	2.530	2.598
10/6/10 2:51	1131	2.532	2.6
10/6/10 2:51	1131	2.534	2.602
10/6/10 2:52	1131	2.532	2.6
10/6/10 2:52	1132	2.531	2.599
10/6/10 2:52	1132	2.531	2.599
10/6/10 2:53	1132	2.532	2.6
10/6/10 2:53	1133	2.533	2.601
10/6/10 2:53	1133	2.534	2.602
10/6/10 2:54	1133	2.532	2.6
10/6/10 2:54	1134	2.531	2.599
10/6/10 2:54	1134	2.537	2.605
10/6/10 2:55	1134	2.534	2.602
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10/6/10 2:56	1136	2.535	2.603
10/6/10 2:56	1136	2.531	2.599
10/6/10 2:57	1136	2.535	2.603
10/6/10 2:57	1137	2.534	2.602
10/6/10 2:57	1137	2.533	2.601
10/6/10 2:58	1137	2.533	2.601
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10/6/10 2:59	1138	2.535	2.603
10/6/10 2:59	1139	2.532	2.6
10/6/10 2:59	1139	2.532	2.6
10/6/10 3:00	1139	2.531	2.599
10/6/10 3:00	1140	2.531	2.599
10/6/10 3:00	1140	2.532	2.6
10/6/10 3:01	1140	2.531	2.599
10/6/10 3:01	1141	2.531	2.599
10/6/10 3:01	1141	2.533	2.601
10/6/10 3:02	1141	2.529	2.597
10/6/10 3:02	1142	2.530	2.598
10/6/10 3:02	1142	2.529	2.597
10/6/10 3:03	1142	2.531	2.599
10/6/10 3:03	1143	2.534	2.602
10/6/10 3:03	1143	2.539	2.607
10/6/10 3:04	1143	2.530	2.598
10/6/10 3:04	1144	2.531	2.599
10/6/10 3:04	1144	2.533	2.601
10/6/10 3:05	1144	2.534	2.602
10/6/10 3:05	1145	2.527	2.595
10/6/10 3:05	1145	2.541	2.609
10/6/10 3:06	1145	2.531	2.599
10/6/10 3:06	1146	2.532	2.6
10/6/10 3:06	1146	2.528	2.596
10/6/10 3:07	1146	2.533	2.601
10/6/10 3:07	1147	2.532	2.6
10/6/10 3:07	1147	2.532	2.6
10/6/10 3:08	1147	2.534	2.602
10/6/10 3:08	1148	2.527	2.595
10/6/10 3:08	1148	2.532	2.6
10/6/10 3:09	1148	2.530	2.598
10/6/10 3:09	1149	2.532	2.6
10/6/10 3:09	1149	2.531	2.599
10/6/10 3:10	1149	2.529	2.597
10/6/10 3:10	1150	2.534	2.602
10/6/10 3:10	1150	2.530	2.598
10/6/10 3:11	1150	2.533	2.601
10/6/10 3:11	1151	2.533	2.601
10/6/10 3:11	1151	2.532	2.6
10/6/10 3:12	1151	2.535	2.603

10/6/10 3:12	1152	2.531	2.599
10/6/10 3:12	1152	2.528	2.596
10/6/10 3:13	1152	2.533	2.601
10/6/10 3:13	1153	2.533	2.601
10/6/10 3:13	1153	2.533	2.601
10/6/10 3:14	1153	2.532	2.6
10/6/10 3:14	1154	2.532	2.6
10/6/10 3:14	1154	2.534	2.602
10/6/10 3:15	1154	2.536	2.604
10/6/10 3:15	1155	2.534	2.602
10/6/10 3:15	1155	2.534	2.602
10/6/10 3:16	1155	2.531	2.599
10/6/10 3:16	1156	2.533	2.601
10/6/10 3:16	1156	2.537	2.605
10/6/10 3:17	1156	2.533	2.601
10/6/10 3:17	1157	2.540	2.608
10/6/10 3:17	1157	2.532	2.6
10/6/10 3:18	1157	2.534	2.602
10/6/10 3:18	1158	2.533	2.601
10/6/10 3:18	1158	2.532	2.6
10/6/10 3:19	1158	2.533	2.601
10/6/10 3:19	1159	2.533	2.601
10/6/10 3:19	1159	2.533	2.601
10/6/10 3:20	1159	2.534	2.602
10/6/10 3:20	1160	2.533	2.601
10/6/10 3:20	1160	2.530	2.598
10/6/10 3:21	1160	2.546	2.614
10/6/10 3:21	1161	2.533	2.601
10/6/10 3:21	1161	2.531	2.599
10/6/10 3:22	1161	2.534	2.602
10/6/10 3:22	1162	2.532	2.6
10/6/10 3:22	1162	2.546	2.614
10/6/10 3:23	1162	2.530	2.598
10/6/10 3:23	1163	2.532	2.6
10/6/10 3:23	1163	2.535	2.603
10/6/10 3:24	1163	2.543	2.611
10/6/10 3:24	1164	2.534	2.602
10/6/10 3:24	1164	2.533	2.601
10/6/10 3:25	1164	2.534	2.602
10/6/10 3:25	1165	2.535	2.603
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10/6/10 3:26	1166	2.535	2.603
10/6/10 3:27	1166	2.534	2.602
10/6/10 3:27	1167	2.537	2.605
10/6/10 3:27	1167	2.535	2.603
10/6/10 3:28	1167	2.545	2.613
10/6/10 3:28	1168	2.532	2.6
10/6/10 3:28	1168	2.534	2.602
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10/6/10 3:29	1169	2.535	2.603
10/6/10 3:30	1169	2.544	2.612
10/6/10 3:30	1170	2.534	2.602
10/6/10 3:30	1170	2.534	2.602
10/6/10 3:31	1170	2.549	2.617
10/6/10 3:31	1171	2.536	2.604
10/6/10 3:31	1171	2.536	2.604
10/6/10 3:32	1171	2.545	2.613
10/6/10 3:32	1172	2.534	2.602
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10/6/10 3:33	1172	2.536	2.604
10/6/10 3:33	1173	2.537	2.605
10/6/10 3:33	1173	2.535	2.603
10/6/10 3:34	1173	2.536	2.604
10/6/10 3:34	1174	2.536	2.604
10/6/10 3:34	1174	2.535	2.603
10/6/10 3:35	1174	2.537	2.605
10/6/10 3:35	1175	2.538	2.606
10/6/10 3:35	1175	2.535	2.603
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10/6/10 3:36	1176	2.547	2.615
10/6/10 3:37	1176	2.536	2.604
10/6/10 3:37	1177	2.536	2.604
10/6/10 3:37	1177	2.537	2.605
10/6/10 3:38	1177	2.537	2.605
10/6/10 3:38	1178	2.536	2.604
10/6/10 3:38	1178	2.534	2.602
10/6/10 3:39	1178	2.534	2.602
10/6/10 3:39	1179	2.549	2.617
10/6/10 3:39	1179	2.549	2.617
10/6/10 3:40	1179	2.536	2.604
10/6/10 3:40	1180	2.535	2.603
10/6/10 3:40	1180	2.538	2.606
10/6/10 3:41	1180	2.536	2.604
10/6/10 3:41	1181	2.537	2.605
10/6/10 3:41	1181	2.537	2.605
10/6/10 3:42	1181	2.538	2.606
10/6/10 3:42	1182	2.538	2.606
10/6/10 3:42	1182	2.539	2.607
10/6/10 3:43	1182	2.541	2.609
10/6/10 3:43	1183	2.543	2.611
10/6/10 3:43	1183	2.543	2.611
10/6/10 3:44	1183	2.542	2.61
10/6/10 3:44	1184	2.544	2.612
10/6/10 3:44	1184	2.543	2.611
10/6/10 3:45	1184	2.540	2.608
10/6/10 3:45	1185	2.543	2.611
10/6/10 3:45	1185	2.540	2.608
10/6/10 3:46	1185	2.543	2.611
10/6/10 3:46	1186	2.542	2.61
10/6/10 3:46	1186	2.546	2.614
10/6/10 3:47	1186	2.544	2.612
10/6/10 3:47	1187	2.545	2.613
10/6/10 3:47	1187	2.544	2.612
10/6/10 3:48	1187	2.548	2.616
10/6/10 3:48	1188	2.543	2.611
10/6/10 3:48	1188	2.547	2.615
10/6/10 3:49	1188	2.543	2.611
10/6/10 3:49	1189	2.547	2.615
10/6/10 3:49	1189	2.544	2.612
10/6/10 3:50	1189	2.546	2.614
10/6/10 3:50	1190	2.546	2.614
10/6/10 3:50	1190	2.546	2.614
10/6/10 3:51	1190	2.544	2.612
10/6/10 3:51	1191	2.544	2.612
10/6/10 3:51	1191	2.547	2.615
10/6/10 3:52	1191	2.544	2.612
10/6/10 3:52	1192	2.547	2.615
10/6/10 3:52	1192	2.547	2.615
10/6/10 3:53	1192	2.552	2.62
10/6/10 3:53	1193	2.549	2.617
10/6/10 3:53	1193	2.546	2.614
10/6/10 3:54	1193	2.545	2.613
10/6/10 3:54	1194	2.551	2.619
10/6/10 3:54	1194	2.548	2.616
10/6/10 3:55	1194	2.544	2.612
10/6/10 3:55	1195	2.549	2.617
10/6/10 3:55	1195	2.549	2.617
10/6/10 3:56	1195	2.546	2.614
10/6/10 3:56	1196	2.549	2.617
10/6/10 3:56	1196	2.547	2.615
10/6/10 3:57	1196	2.551	2.619
10/6/10 3:57	1197	2.544	2.612
10/6/10 3:57	1197	2.552	2.62
10/6/10 3:58	1197	2.550	2.618
10/6/10 3:58	1198	2.546	2.614
10/6/10 3:58	1198	2.548	2.616
10/6/10 3:59	1198	2.553	2.621
10/6/10 3:59	1199	2.550	2.618
10/6/10 3:59	1199	2.551	2.619
10/6/10 4:00	1199	2.551	2.619
10/6/10 4:00	1200	2.550	2.618
10/6/10 4:00	1200	2.549	2.617
10/6/10 4:01	1200	2.548	2.616
10/6/10 4:01	1201	2.548	2.616
10/6/10 4:01	1201	2.551	2.619
10/6/10 4:02	1201	2.552	2.62
10/6/10 4:02	1202	2.554	2.622
10/6/10 4:02	1202	2.552	2.62
10/6/10 4:03	1202	2.552	2.62
10/6/10 4:03	1203	2.552	2.62
10/6/10 4:03	1203	2.552	2.62
10/6/10 4:04	1203	2.552	2.62
10/6/10 4:04	1204	2.552	2.62
10/6/10 4:04	1204	2.551	2.619
10/6/10 4:05	1204	2.552	2.62
10/6/10 4:05	1205	2.551	2.619
10/6/10 4:05	1205	2.555	2.623
10/6/10 4:06	1205	2.550	2.618
10/6/10 4:06	1206	2.552	2.62
10/6/10 4:06	1206	2.554	2.622
10/6/10 4:07	1206	2.554	2.622
10/6/10 4:07	1207	2.556	2.624
10/6/10 4:07	1207	2.552	2.62
10/6/10 4:08	1207	2.553	2.621
10/6/10 4:08	1208	2.554	2.622
10/6/10 4:08	1208	2.556	2.624
10/6/10 4:09	1208	2.556	2.624
10/6/10 4:09	1209	2.559	2.627
10/6/10 4:09	1209	2.555	2.623
10/6/10 4:10	1209	2.555	2.623
10/6/10 4:10	1210	2.556	2.624
10/6/10 4:10	1210	2.556	2.624
10/6/10 4:11	1210	2.554	2.622
10/6/10 4:11	1211	2.561	2.629
10/6/10 4:11	1211	2.565	2.633
10/6/10 4:12	1211	2.558	2.626
10/6/10 4:12	1212	2.556	2.624
10/6/10 4:12	1212	2.557	2.625
10/6/10 4:13	1212	2.558	2.626
10/6/10 4:13	1213	2.562	2.63
10/6/10 4:13	1213	2.558	2.626
10/6/10 4:14	1213	2.557	2.625
10/6/10 4:14	1214	2.558	2.626
10/6/10 4:14	1214	2.558	2.626
10/6/10 4:15	1214	2.560	2.628
10/6/10 4:15	1215	2.562	2.63
10/6/10 4:15	1215	2.560	2.628
10/6/10 4:16	1215	2.564	2.632

10/6/10 4:16	1216	2.564	2.632
10/6/10 4:16	1216	2.561	2.629
10/6/10 4:17	1216	2.564	2.632
10/6/10 4:17	1217	2.567	2.635
10/6/10 4:17	1217	2.560	2.628
10/6/10 4:18	1217	2.562	2.63
10/6/10 4:18	1218	2.565	2.633
10/6/10 4:18	1218	2.562	2.63
10/6/10 4:19	1218	2.562	2.63
10/6/10 4:19	1219	2.562	2.63
10/6/10 4:19	1219	2.560	2.628
10/6/10 4:20	1219	2.563	2.631
10/6/10 4:20	1220	2.565	2.633
10/6/10 4:20	1220	2.563	2.631
10/6/10 4:21	1220	2.565	2.633
10/6/10 4:21	1221	2.567	2.635
10/6/10 4:21	1221	2.568	2.636
10/6/10 4:22	1221	2.567	2.635
10/6/10 4:22	1222	2.567	2.635
10/6/10 4:22	1222	2.563	2.631
10/6/10 4:23	1222	2.564	2.632
10/6/10 4:23	1223	2.569	2.637
10/6/10 4:23	1223	2.570	2.638
10/6/10 4:24	1223	2.568	2.636
10/6/10 4:24	1224	2.570	2.638
10/6/10 4:24	1224	2.568	2.636
10/6/10 4:25	1224	2.567	2.635
10/6/10 4:25	1225	2.564	2.632
10/6/10 4:25	1225	2.571	2.639
10/6/10 4:26	1225	2.566	2.634
10/6/10 4:26	1226	2.569	2.637
10/6/10 4:26	1226	2.569	2.637
10/6/10 4:27	1226	2.568	2.636
10/6/10 4:27	1227	2.571	2.639
10/6/10 4:27	1227	2.571	2.639
10/6/10 4:28	1227	2.570	2.638
10/6/10 4:28	1228	2.570	2.638
10/6/10 4:28	1228	2.571	2.639
10/6/10 4:29	1228	2.571	2.639
10/6/10 4:29	1229	2.569	2.637
10/6/10 4:29	1229	2.570	2.638
10/6/10 4:30	1229	2.568	2.636
10/6/10 4:30	1230	2.578	2.646
10/6/10 4:30	1230	2.575	2.643
10/6/10 4:31	1230	2.577	2.645
10/6/10 4:31	1231	2.569	2.637
10/6/10 4:31	1231	2.569	2.637
10/6/10 4:32	1231	2.575	2.643
10/6/10 4:32	1232	2.572	2.64
10/6/10 4:32	1232	2.572	2.64
10/6/10 4:33	1232	2.575	2.643
10/6/10 4:33	1233	2.585	2.653
10/6/10 4:33	1233	2.574	2.642
10/6/10 4:34	1233	2.573	2.641
10/6/10 4:34	1234	2.577	2.645
10/6/10 4:34	1234	2.574	2.642
10/6/10 4:35	1234	2.575	2.643
10/6/10 4:35	1235	2.574	2.642
10/6/10 4:35	1235	2.575	2.643
10/6/10 4:36	1235	2.577	2.645
10/6/10 4:36	1236	2.579	2.647
10/6/10 4:36	1236	2.578	2.646
10/6/10 4:37	1236	2.572	2.64
10/6/10 4:37	1237	2.575	2.643
10/6/10 4:37	1237	2.575	2.643
10/6/10 4:38	1237	2.574	2.642
10/6/10 4:38	1238	2.574	2.642
10/6/10 4:38	1238	2.575	2.643
10/6/10 4:39	1238	2.577	2.645
10/6/10 4:39	1239	2.576	2.644
10/6/10 4:39	1239	2.576	2.644
10/6/10 4:40	1239	2.578	2.646
10/6/10 4:40	1240	2.575	2.643
10/6/10 4:40	1240	2.578	2.646
10/6/10 4:41	1240	2.577	2.645
10/6/10 4:41	1241	2.579	2.647
10/6/10 4:41	1241	2.579	2.647
10/6/10 4:42	1241	2.577	2.645
10/6/10 4:42	1242	2.575	2.643
10/6/10 4:42	1242	2.575	2.643
10/6/10 4:43	1242	2.579	2.647
10/6/10 4:43	1243	2.578	2.646
10/6/10 4:43	1243	2.581	2.649
10/6/10 4:44	1243	2.581	2.649
10/6/10 4:44	1244	2.581	2.649
10/6/10 4:44	1244	2.580	2.648
10/6/10 4:45	1244	2.582	2.65
10/6/10 4:45	1245	2.582	2.65
10/6/10 4:45	1245	2.582	2.65
10/6/10 4:46	1245	2.580	2.648
10/6/10 4:46	1246	2.579	2.647
10/6/10 4:46	1246	2.580	2.648
10/6/10 4:47	1246	2.585	2.653
10/6/10 4:47	1247	2.584	2.652
10/6/10 4:47	1247	2.585	2.653
10/6/10 4:48	1247	2.582	2.65
10/6/10 4:48	1248	2.585	2.653
10/6/10 4:48	1248	2.586	2.654
10/6/10 4:49	1248	2.587	2.655
10/6/10 4:49	1249	2.582	2.65
10/6/10 4:49	1249	2.587	2.655
10/6/10 4:50	1249	2.587	2.655
10/6/10 4:50	1250	2.584	2.652
10/6/10 4:50	1250	2.585	2.653
10/6/10 4:51	1250	2.583	2.651
10/6/10 4:51	1251	2.584	2.652
10/6/10 4:51	1251	2.587	2.655
10/6/10 4:52	1251	2.588	2.656
10/6/10 4:52	1252	2.591	2.659
10/6/10 4:52	1252	2.587	2.655
10/6/10 4:53	1252	2.592	2.66
10/6/10 4:53	1253	2.589	2.657
10/6/10 4:53	1253	2.594	2.662
10/6/10 4:54	1253	2.592	2.66
10/6/10 4:54	1254	2.591	2.659
10/6/10 4:54	1254	2.591	2.659
10/6/10 4:55	1254	2.591	2.659
10/6/10 4:55	1255	2.587	2.655
10/6/10 4:55	1255	2.592	2.66
10/6/10 4:56	1255	2.591	2.659
10/6/10 4:56	1256	2.592	2.66
10/6/10 4:56	1256	2.595	2.663
10/6/10 4:57	1256	2.594	2.662
10/6/10 4:57	1257	2.598	2.666
10/6/10 4:57	1257	2.595	2.663
10/6/10 4:58	1257	2.598	2.666
10/6/10 4:58	1258	2.597	2.665
10/6/10 4:58	1258	2.599	2.667
10/6/10 4:59	1258	2.594	2.662
10/6/10 4:59	1259	2.596	2.664
10/6/10 4:59	1259	2.594	2.662
10/6/10 5:00	1259	2.598	2.666
10/6/10 5:00	1260	2.600	2.668
10/6/10 5:00	1260	2.599	2.667
10/6/10 5:01	1260	2.604	2.672
10/6/10 5:01	1261	2.601	2.669
10/6/10 5:01	1261	2.601	2.669
10/6/10 5:02	1261	2.600	2.668
10/6/10 5:02	1262	2.602	2.67
10/6/10 5:02	1262	2.601	2.669
10/6/10 5:03	1262	2.607	2.675
10/6/10 5:03	1263	2.604	2.672
10/6/10 5:03	1263	2.608	2.676
10/6/10 5:04	1263	2.604	2.672
10/6/10 5:04	1264	2.605	2.673
10/6/10 5:04	1264	2.610	2.678
10/6/10 5:05	1264	2.605	2.673
10/6/10 5:05	1265	2.608	2.676
10/6/10 5:05	1265	2.606	2.674
10/6/10 5:06	1265	2.608	2.676
10/6/10 5:06	1266	2.612	2.68
10/6/10 5:06	1266	2.604	2.672
10/6/10 5:07	1266	2.610	2.678
10/6/10 5:07	1267	2.611	2.679
10/6/10 5:07	1267	2.605	2.673
10/6/10 5:08	1267	2.613	2.681
10/6/10 5:08	1268	2.606	2.674
10/6/10 5:08	1268	2.606	2.674
10/6/10 5:09	1268	2.607	2.675
10/6/10 5:09	1269	2.607	2.675
10/6/10 5:09	1269	2.608	2.676
10/6/10 5:10	1269	2.608	2.676
10/6/10 5:10	1270	2.611	2.679
10/6/10 5:10	1270	2.609	2.677
10/6/10 5:11	1270	2.612	2.68
10/6/10 5:11	1271	2.616	2.684
10/6/10 5:11	1271	2.614	2.682
10/6/10 5:12	1271	2.611	2.679
10/6/10 5:12	1272	2.612	2.68
10/6/10 5:12	1272	2.611	2.679
10/6/10 5:13	1272	2.614	2.682
10/6/10 5:13	1273	2.611	2.679
10/6/10 5:13	1273	2.608	2.676
10/6/10 5:14	1273	2.613	2.681
10/6/10 5:14	1274	2.611	2.679
10/6/10 5:14	1274	2.611	2.679
10/6/10 5:15	1274	2.613	2.681
10/6/10 5:15	1275	2.615	2.683
10/6/10 5:15	1275	2.613	2.681
10/6/10 5:16	1275	2.610	2.678
10/6/10 5:16	1276	2.617	2.685
10/6/10 5:16	1276	2.615	2.683
10/6/10 5:17	1276	2.618	2.686
10/6/10 5:17	1277	2.617	2.685
10/6/10 5:17	1277	2.617	2.685
10/6/10 5:18	1277	2.616	2.684
10/6/10 5:18	1278	2.617	2.685
10/6/10 5:18	1278	2.615	2.683
10/6/10 5:19	1278	2.617	2.685
10/6/10 5:19	1279	2.613	2.681
10/6/10 5:19	1279	2.613	2.681
10/6/10 5:20	1279	2.612	2.68

10/6/10 5:20	1280	2.613	2.681
10/6/10 5:20	1280	2.616	2.684
10/6/10 5:21	1280	2.615	2.683
10/6/10 5:21	1281	2.609	2.677
10/6/10 5:21	1281	2.612	2.68
10/6/10 5:22	1281	2.612	2.68
10/6/10 5:22	1282	2.612	2.68
10/6/10 5:22	1282	2.613	2.681
10/6/10 5:23	1282	2.612	2.68
10/6/10 5:23	1283	2.613	2.681
10/6/10 5:23	1283	2.614	2.682
10/6/10 5:24	1283	2.612	2.68
10/6/10 5:24	1284	2.614	2.682
10/6/10 5:24	1284	2.616	2.684
10/6/10 5:25	1284	2.615	2.683
10/6/10 5:25	1285	2.620	2.688
10/6/10 5:25	1285	2.618	2.686
10/6/10 5:26	1285	2.617	2.685
10/6/10 5:26	1286	2.617	2.685
10/6/10 5:26	1286	2.617	2.685
10/6/10 5:27	1286	2.614	2.682
10/6/10 5:27	1287	2.617	2.685
10/6/10 5:27	1287	2.617	2.685
10/6/10 5:28	1287	2.618	2.686
10/6/10 5:28	1288	2.622	2.69
10/6/10 5:28	1288	2.618	2.686
10/6/10 5:29	1288	2.620	2.688
10/6/10 5:29	1289	2.619	2.687
10/6/10 5:29	1289	2.613	2.681
10/6/10 5:30	1289	2.617	2.685
10/6/10 5:30	1290	2.618	2.686
10/6/10 5:30	1290	2.617	2.685
10/6/10 5:31	1290	2.623	2.691
10/6/10 5:31	1291	2.617	2.685
10/6/10 5:31	1291	2.622	2.69
10/6/10 5:32	1291	2.623	2.691
10/6/10 5:32	1292	2.623	2.691
10/6/10 5:32	1292	2.620	2.688
10/6/10 5:33	1292	2.617	2.685
10/6/10 5:33	1293	2.627	2.695
10/6/10 5:33	1293	2.618	2.686
10/6/10 5:34	1293	2.621	2.689
10/6/10 5:34	1294	2.621	2.689
10/6/10 5:34	1294	2.620	2.688
10/6/10 5:35	1294	2.621	2.689
10/6/10 5:35	1295	2.616	2.684
10/6/10 5:35	1295	2.617	2.685
10/6/10 5:36	1295	2.618	2.686
10/6/10 5:36	1296	2.622	2.69
10/6/10 5:36	1296	2.622	2.69
10/6/10 5:37	1296	2.620	2.688
10/6/10 5:37	1297	2.619	2.687
10/6/10 5:37	1297	2.627	2.695
10/6/10 5:38	1297	2.627	2.695
10/6/10 5:38	1298	2.624	2.692
10/6/10 5:38	1298	2.621	2.689
10/6/10 5:39	1298	2.627	2.695
10/6/10 5:39	1299	2.625	2.693
10/6/10 5:39	1299	2.623	2.691
10/6/10 5:40	1299	2.627	2.695
10/6/10 5:40	1300	2.623	2.691
10/6/10 5:40	1300	2.629	2.697
10/6/10 5:41	1300	2.640	2.708
10/6/10 5:41	1301	2.629	2.697
10/6/10 5:41	1301	2.628	2.696
10/6/10 5:42	1301	2.629	2.697
10/6/10 5:42	1302	2.641	2.709
10/6/10 5:42	1302	2.632	2.7
10/6/10 5:43	1302	2.634	2.702
10/6/10 5:43	1303	2.634	2.702
10/6/10 5:43	1303	2.630	2.698
10/6/10 5:44	1303	2.634	2.702
10/6/10 5:44	1304	2.633	2.701
10/6/10 5:44	1304	2.632	2.7
10/6/10 5:45	1304	2.632	2.7
10/6/10 5:45	1305	2.635	2.703
10/6/10 5:45	1305	2.630	2.698
10/6/10 5:46	1305	2.631	2.699
10/6/10 5:46	1306	2.632	2.7
10/6/10 5:46	1306	2.633	2.701
10/6/10 5:47	1306	2.632	2.7
10/6/10 5:47	1307	2.636	2.704
10/6/10 5:47	1307	2.634	2.702
10/6/10 5:48	1307	2.634	2.702
10/6/10 5:48	1308	2.629	2.697
10/6/10 5:48	1308	2.635	2.703
10/6/10 5:49	1308	2.628	2.696
10/6/10 5:49	1309	2.631	2.699
10/6/10 5:49	1309	2.630	2.698
10/6/10 5:50	1309	2.634	2.702
10/6/10 5:50	1310	2.632	2.7
10/6/10 5:50	1310	2.632	2.7
10/6/10 5:51	1310	2.638	2.706
10/6/10 5:51	1311	2.638	2.706
10/6/10 5:51	1311	2.638	2.706
10/6/10 5:52	1311	2.638	2.706
10/6/10 5:52	1312	2.638	2.706
10/6/10 5:52	1312	2.644	2.712
10/6/10 5:53	1312	2.642	2.71
10/6/10 5:53	1313	2.640	2.708
10/6/10 5:53	1313	2.640	2.708
10/6/10 5:54	1313	2.641	2.709
10/6/10 5:54	1314	2.641	2.709
10/6/10 5:54	1314	2.639	2.707
10/6/10 5:55	1314	2.641	2.709
10/6/10 5:55	1315	2.643	2.711
10/6/10 5:55	1315	2.642	2.71
10/6/10 5:56	1315	2.638	2.706
10/6/10 5:56	1316	2.639	2.707
10/6/10 5:56	1316	2.638	2.706
10/6/10 5:57	1316	2.640	2.708
10/6/10 5:57	1317	2.638	2.706
10/6/10 5:57	1317	2.642	2.71
10/6/10 5:58	1317	2.638	2.706
10/6/10 5:58	1318	2.644	2.712
10/6/10 5:58	1318	2.644	2.712
10/6/10 5:59	1318	2.642	2.71
10/6/10 5:59	1319	2.640	2.708
10/6/10 5:59	1319	2.634	2.702
10/6/10 6:00	1319	2.644	2.712
10/6/10 6:00	1320	2.648	2.716
10/6/10 6:00	1320	2.647	2.715
10/6/10 6:01	1320	2.644	2.712
10/6/10 6:01	1321	2.640	2.708
10/6/10 6:01	1321	2.647	2.715
10/6/10 6:02	1321	2.647	2.715
10/6/10 6:02	1322	2.644	2.712
10/6/10 6:02	1322	2.646	2.714
10/6/10 6:03	1322	2.645	2.713
10/6/10 6:03	1323	2.645	2.713
10/6/10 6:03	1323	2.646	2.714
10/6/10 6:04	1323	2.647	2.715
10/6/10 6:04	1324	2.645	2.713
10/6/10 6:04	1324	2.648	2.716
10/6/10 6:05	1324	2.645	2.713
10/6/10 6:05	1325	2.651	2.719
10/6/10 6:05	1325	2.657	2.725
10/6/10 6:06	1325	2.655	2.723
10/6/10 6:06	1326	2.653	2.721
10/6/10 6:06	1326	2.653	2.721
10/6/10 6:07	1326	2.655	2.723
10/6/10 6:07	1327	2.655	2.723
10/6/10 6:07	1327	2.655	2.723
10/6/10 6:08	1327	2.652	2.72
10/6/10 6:08	1328	2.655	2.723
10/6/10 6:08	1328	2.654	2.722
10/6/10 6:09	1328	2.651	2.719
10/6/10 6:09	1329	2.655	2.723
10/6/10 6:09	1329	2.654	2.722
10/6/10 6:10	1329	2.648	2.716
10/6/10 6:10	1330	2.647	2.715
10/6/10 6:10	1330	2.649	2.717
10/6/10 6:11	1330	2.650	2.718
10/6/10 6:11	1331	2.650	2.718
10/6/10 6:11	1331	2.649	2.717
10/6/10 6:12	1331	2.650	2.718
10/6/10 6:12	1332	2.650	2.718
10/6/10 6:12	1332	2.651	2.719
10/6/10 6:13	1332	2.647	2.715
10/6/10 6:13	1333	2.659	2.727
10/6/10 6:13	1333	2.647	2.715
10/6/10 6:14	1333	2.650	2.718
10/6/10 6:14	1334	2.651	2.719
10/6/10 6:14	1334	2.652	2.72
10/6/10 6:15	1334	2.653	2.721
10/6/10 6:15	1335	2.654	2.722
10/6/10 6:15	1335	2.648	2.716
10/6/10 6:16	1335	2.658	2.726
10/6/10 6:16	1336	2.651	2.719
10/6/10 6:16	1336	2.649	2.717
10/6/10 6:17	1336	2.652	2.72
10/6/10 6:17	1337	2.652	2.72
10/6/10 6:17	1337	2.652	2.72
10/6/10 6:18	1337	2.652	2.72
10/6/10 6:18	1338	2.654	2.722
10/6/10 6:18	1338	2.652	2.72
10/6/10 6:19	1338	2.650	2.718
10/6/10 6:19	1339	2.660	2.728
10/6/10 6:19	1339	2.649	2.717
10/6/10 6:20	1339	2.651	2.719
10/6/10 6:20	1340	2.654	2.722
10/6/10 6:20	1340	2.647	2.715
10/6/10 6:21	1340	2.650	2.718
10/6/10 6:21	1341	2.651	2.719
10/6/10 6:21	1341	2.652	2.72
10/6/10 6:22	1341	2.647	2.715
10/6/10 6:22	1342	2.649	2.717
10/6/10 6:22	1342	2.650	2.718
10/6/10 6:23	1342	2.645	2.713
10/6/10 6:23	1343	2.646	2.714
10/6/10 6:23	1343	2.649	2.717
10/6/10 6:24	1343	2.650	2.718

10/6/10 6:24	1344	2.654	2.722
10/6/10 6:24	1344	2.653	2.721
10/6/10 6:25	1344	2.651	2.719
10/6/10 6:25	1345	2.651	2.719
10/6/10 6:25	1345	2.652	2.72
10/6/10 6:26	1345	2.652	2.72
10/6/10 6:26	1346	2.649	2.717
10/6/10 6:26	1346	2.652	2.72
10/6/10 6:27	1346	2.654	2.722
10/6/10 6:27	1347	2.662	2.73
10/6/10 6:27	1347	2.649	2.717
10/6/10 6:28	1347	2.651	2.719
10/6/10 6:28	1348	2.651	2.719
10/6/10 6:28	1348	2.650	2.718
10/6/10 6:29	1348	2.654	2.722
10/6/10 6:29	1349	2.653	2.721
10/6/10 6:29	1349	2.650	2.718
10/6/10 6:30	1349	2.650	2.718
10/6/10 6:30	1350	2.652	2.72
10/6/10 6:30	1350	2.651	2.719
10/6/10 6:31	1350	2.655	2.723
10/6/10 6:31	1351	2.651	2.719
10/6/10 6:31	1351	2.652	2.72
10/6/10 6:32	1351	2.657	2.725
10/6/10 6:32	1352	2.661	2.729
10/6/10 6:32	1352	2.661	2.729
10/6/10 6:33	1352	2.658	2.726
10/6/10 6:33	1353	2.659	2.727
10/6/10 6:33	1353	2.660	2.728
10/6/10 6:34	1353	2.659	2.727
10/6/10 6:34	1354	2.660	2.728
10/6/10 6:34	1354	2.658	2.726
10/6/10 6:35	1354	2.660	2.728
10/6/10 6:35	1355	2.669	2.737
10/6/10 6:35	1355	2.662	2.73
10/6/10 6:36	1355	2.659	2.727
10/6/10 6:36	1356	2.657	2.725
10/6/10 6:36	1356	2.660	2.728
10/6/10 6:37	1356	2.661	2.729
10/6/10 6:37	1357	2.659	2.727
10/6/10 6:37	1357	2.660	2.728
10/6/10 6:38	1357	2.654	2.722
10/6/10 6:38	1358	2.664	2.732
10/6/10 6:38	1358	2.659	2.727
10/6/10 6:39	1358	2.663	2.731
10/6/10 6:39	1359	2.673	2.741
10/6/10 6:39	1359	2.662	2.73
10/6/10 6:40	1359	2.661	2.729
10/6/10 6:40	1360	2.662	2.73
10/6/10 6:40	1360	2.658	2.726
10/6/10 6:41	1360	2.662	2.73
10/6/10 6:41	1361	2.663	2.731
10/6/10 6:41	1361	2.661	2.729
10/6/10 6:42	1361	2.662	2.73
10/6/10 6:42	1362	2.661	2.729
10/6/10 6:42	1362	2.664	2.732
10/6/10 6:43	1362	2.664	2.732
10/6/10 6:43	1363	2.665	2.733
10/6/10 6:43	1363	2.661	2.729
10/6/10 6:44	1363	2.662	2.73
10/6/10 6:44	1364	2.674	2.742
10/6/10 6:44	1364	2.659	2.727
10/6/10 6:45	1364	2.667	2.735
10/6/10 6:45	1365	2.663	2.731
10/6/10 6:45	1365	2.678	2.746
10/6/10 6:46	1365	2.663	2.731
10/6/10 6:46	1366	2.662	2.73
10/6/10 6:46	1366	2.663	2.731
10/6/10 6:47	1366	2.661	2.729
10/6/10 6:47	1367	2.661	2.729
10/6/10 6:47	1367	2.665	2.733
10/6/10 6:48	1367	2.668	2.736
10/6/10 6:48	1368	2.666	2.734
10/6/10 6:48	1368	2.668	2.736
10/6/10 6:49	1368	2.662	2.73
10/6/10 6:49	1369	2.666	2.734
10/6/10 6:49	1369	2.657	2.725
10/6/10 6:50	1369	2.659	2.727
10/6/10 6:50	1370	2.666	2.734
10/6/10 6:50	1370	2.651	2.719
10/6/10 6:51	1370	2.664	2.732
10/6/10 6:51	1371	2.657	2.725
10/6/10 6:51	1371	2.659	2.727
10/6/10 6:52	1371	2.664	2.732
10/6/10 6:52	1372	2.659	2.727
10/6/10 6:52	1372	2.658	2.726
10/6/10 6:53	1372	2.662	2.73
10/6/10 6:53	1373	2.676	2.744
10/6/10 6:53	1373	2.658	2.726
10/6/10 6:54	1373	2.660	2.728
10/6/10 6:54	1374	2.656	2.724
10/6/10 6:54	1374	2.658	2.726
10/6/10 6:55	1374	2.664	2.732
10/6/10 6:55	1375	2.664	2.732
10/6/10 6:55	1375	2.663	2.731
10/6/10 6:56	1375	2.661	2.729
10/6/10 6:56	1376	2.658	2.726
10/6/10 6:56	1376	2.660	2.728
10/6/10 6:57	1376	2.659	2.727
10/6/10 6:57	1377	2.660	2.728
10/6/10 6:57	1377	2.656	2.724
10/6/10 6:58	1377	2.659	2.727
10/6/10 6:58	1378	2.658	2.726
10/6/10 6:58	1378	2.659	2.727
10/6/10 6:59	1378	2.663	2.731
10/6/10 6:59	1379	2.662	2.73
10/6/10 6:59	1379	2.663	2.731
10/6/10 7:00	1379	2.661	2.729
10/6/10 7:00	1380	2.661	2.729
10/6/10 7:00	1380	2.662	2.73
10/6/10 7:01	1380	2.663	2.731
10/6/10 7:01	1381	2.678	2.746
10/6/10 7:01	1381	2.666	2.734
10/6/10 7:02	1381	2.665	2.733
10/6/10 7:02	1382	2.665	2.733
10/6/10 7:02	1382	2.670	2.738
10/6/10 7:03	1382	2.661	2.729
10/6/10 7:03	1383	2.666	2.734
10/6/10 7:03	1383	2.665	2.733
10/6/10 7:04	1383	2.672	2.74
10/6/10 7:04	1384	2.660	2.728
10/6/10 7:04	1384	2.657	2.725
10/6/10 7:05	1384	2.657	2.725
10/6/10 7:05	1385	2.663	2.731
10/6/10 7:05	1385	2.667	2.735
10/6/10 7:06	1385	2.668	2.736
10/6/10 7:06	1386	2.676	2.744
10/6/10 7:06	1386	2.671	2.739
10/6/10 7:07	1386	2.678	2.746
10/6/10 7:07	1387	2.668	2.736
10/6/10 7:07	1387	2.671	2.739
10/6/10 7:08	1387	2.675	2.743
10/6/10 7:08	1388	2.671	2.739
10/6/10 7:08	1388	2.670	2.738
10/6/10 7:09	1388	2.678	2.746
10/6/10 7:09	1389	2.671	2.739
10/6/10 7:09	1389	2.670	2.738
10/6/10 7:10	1389	2.668	2.736
10/6/10 7:10	1390	2.672	2.74
10/6/10 7:10	1390	2.681	2.749
10/6/10 7:11	1390	2.668	2.736
10/6/10 7:11	1391	2.669	2.737
10/6/10 7:11	1391	2.672	2.74
10/6/10 7:12	1391	2.672	2.74
10/6/10 7:12	1392	2.675	2.743
10/6/10 7:12	1392	2.673	2.741
10/6/10 7:13	1392	2.669	2.737
10/6/10 7:13	1393	2.667	2.735
10/6/10 7:13	1393	2.665	2.733
10/6/10 7:14	1393	2.669	2.737
10/6/10 7:14	1394	2.672	2.74
10/6/10 7:14	1394	2.671	2.739
10/6/10 7:15	1394	2.671	2.739
10/6/10 7:15	1395	2.671	2.739
10/6/10 7:15	1395	2.668	2.736
10/6/10 7:16	1395	2.664	2.732
10/6/10 7:16	1396	2.679	2.747
10/6/10 7:16	1396	2.673	2.741
10/6/10 7:17	1396	2.674	2.742
10/6/10 7:17	1397	2.673	2.741
10/6/10 7:17	1397	2.667	2.735
10/6/10 7:18	1397	2.671	2.739
10/6/10 7:18	1398	2.669	2.737
10/6/10 7:18	1398	2.684	2.752
10/6/10 7:19	1398	2.686	2.754
10/6/10 7:19	1399	2.669	2.737
10/6/10 7:19	1399	2.669	2.737
10/6/10 7:20	1399	2.670	2.738
10/6/10 7:20	1400	2.670	2.738
10/6/10 7:20	1400	2.671	2.739
10/6/10 7:21	1400	2.670	2.738
10/6/10 7:21	1401	2.672	2.74
10/6/10 7:21	1401	2.670	2.738
10/6/10 7:22	1401	2.673	2.741
10/6/10 7:22	1402	2.678	2.746
10/6/10 7:22	1402	2.674	2.742
10/6/10 7:23	1402	2.674	2.742
10/6/10 7:23	1403	2.664	2.732
10/6/10 7:23	1403	2.663	2.731
10/6/10 7:24	1403	2.682	2.75
10/6/10 7:24	1404	2.676	2.744
10/6/10 7:24	1404	2.673	2.741
10/6/10 7:25	1404	2.675	2.743
10/6/10 7:25	1405	2.673	2.741
10/6/10 7:25	1405	2.679	2.747
10/6/10 7:26	1405	2.671	2.739
10/6/10 7:26	1406	2.673	2.741
10/6/10 7:26	1406	2.685	2.753
10/6/10 7:27	1406	2.672	2.74
10/6/10 7:27	1407	2.674	2.742
10/6/10 7:27	1407	2.675	2.743
10/6/10 7:28	1407	2.678	2.746

10/6/10 7:28	1408	2.677	2.745
10/6/10 7:28	1408	2.680	2.748
10/6/10 7:29	1408	2.679	2.747
10/6/10 7:29	1409	2.679	2.747
10/6/10 7:29	1409	2.680	2.748
10/6/10 7:30	1409	2.677	2.745
10/6/10 7:30	1410	2.675	2.743
10/6/10 7:30	1410	2.679	2.747
10/6/10 7:31	1410	2.675	2.743
10/6/10 7:31	1411	2.670	2.738
10/6/10 7:31	1411	2.676	2.744
10/6/10 7:32	1411	2.673	2.741
10/6/10 7:32	1412	2.677	2.745
10/6/10 7:32	1412	2.678	2.746
10/6/10 7:33	1412	2.678	2.746
10/6/10 7:33	1413	2.679	2.747
10/6/10 7:33	1413	2.680	2.748
10/6/10 7:34	1413	2.682	2.75
10/6/10 7:34	1414	2.682	2.75
10/6/10 7:34	1414	2.681	2.749
10/6/10 7:35	1414	2.679	2.747
10/6/10 7:35	1415	2.679	2.747
10/6/10 7:35	1415	2.680	2.748
10/6/10 7:36	1415	2.681	2.749
10/6/10 7:36	1416	2.682	2.75
10/6/10 7:36	1416	2.693	2.761
10/6/10 7:37	1416	2.697	2.765
10/6/10 7:37	1417	2.685	2.753
10/6/10 7:37	1417	2.685	2.753
10/6/10 7:38	1417	2.681	2.749
10/6/10 7:38	1418	2.678	2.746
10/6/10 7:38	1418	2.681	2.749
10/6/10 7:39	1418	2.676	2.744
10/6/10 7:39	1419	2.684	2.752
10/6/10 7:39	1419	2.678	2.746
10/6/10 7:40	1419	2.674	2.742
10/6/10 7:40	1420	2.675	2.743
10/6/10 7:40	1420	2.677	2.745
10/6/10 7:41	1420	2.681	2.749
10/6/10 7:41	1421	2.680	2.748
10/6/10 7:41	1421	2.681	2.749
10/6/10 7:42	1421	2.680	2.748
10/6/10 7:42	1422	2.680	2.748
10/6/10 7:42	1422	2.681	2.749
10/6/10 7:43	1422	2.678	2.746
10/6/10 7:43	1423	2.683	2.751
10/6/10 7:43	1423	2.680	2.748
10/6/10 7:44	1423	2.685	2.753
10/6/10 7:44	1424	2.677	2.745
10/6/10 7:44	1424	2.679	2.747
10/6/10 7:45	1424	2.678	2.746
10/6/10 7:45	1425	2.684	2.752
10/6/10 7:45	1425	2.681	2.749
10/6/10 7:46	1425	2.681	2.749
10/6/10 7:46	1426	2.693	2.761
10/6/10 7:46	1426	2.675	2.743
10/6/10 7:47	1426	2.679	2.747
10/6/10 7:47	1427	2.683	2.751
10/6/10 7:47	1427	2.682	2.75
10/6/10 7:48	1427	2.679	2.747
10/6/10 7:48	1428	2.680	2.748
10/6/10 7:48	1428	2.676	2.744
10/6/10 7:49	1428	2.677	2.745
10/6/10 7:49	1429	2.688	2.756
10/6/10 7:49	1429	2.691	2.759
10/6/10 7:50	1429	2.681	2.749
10/6/10 7:50	1430	2.683	2.751
10/6/10 7:50	1430	2.685	2.753
10/6/10 7:51	1430	2.688	2.756
10/6/10 7:51	1431	2.686	2.754
10/6/10 7:51	1431	2.688	2.756
10/6/10 7:52	1431	2.688	2.756
10/6/10 7:52	1432	2.684	2.752
10/6/10 7:52	1432	2.686	2.754
10/6/10 7:53	1432	2.697	2.765
10/6/10 7:53	1433	2.690	2.758
10/6/10 7:53	1433	2.689	2.757
10/6/10 7:54	1433	2.689	2.757
10/6/10 7:54	1434	2.691	2.759
10/6/10 7:54	1434	2.687	2.755
10/6/10 7:55	1434	2.690	2.758
10/6/10 7:55	1435	2.694	2.762
10/6/10 7:55	1435	2.696	2.764
10/6/10 7:56	1435	2.694	2.762
10/6/10 7:56	1436	2.693	2.761
10/6/10 7:56	1436	2.687	2.755
10/6/10 7:57	1436	2.692	2.76
10/6/10 7:57	1437	2.694	2.762
10/6/10 7:57	1437	2.696	2.764
10/6/10 7:58	1437	2.697	2.765
10/6/10 7:58	1438	2.693	2.761
10/6/10 7:58	1438	2.690	2.758
10/6/10 7:59	1438	2.699	2.767
10/6/10 7:59	1439	2.704	2.772
10/6/10 7:59	1439	2.695	2.763
10/6/10 8:00	1439	2.697	2.765
10/6/10 8:00	1440	2.696	2.764
10/6/10 8:00	1440	1.691	1.759
10/6/10 8:01	1440	1.291	1.359
10/6/10 8:01	1441	1.222	1.29
10/6/10 8:01	1441	1.204	1.272
10/6/10 8:02	1441	1.206	1.274
10/6/10 8:02	1442	1.220	1.288
10/6/10 8:02	1442	1.236	1.304
10/6/10 8:03	1442	1.261	1.329
10/6/10 8:03	1443	1.283	1.351
10/6/10 8:03	1443	1.314	1.382
10/6/10 8:04	1443	1.348	1.416
10/6/10 8:04	1444	1.385	1.453
10/6/10 8:04	1444	1.427	1.495
10/6/10 8:05	1444	1.481	1.549
10/6/10 8:05	1445	1.534	1.602
10/6/10 8:05	1445	1.547	1.615
10/6/10 8:06	1445	1.547	1.615
10/6/10 8:06	1446	1.546	1.614
10/6/10 8:06	1446	1.539	1.607
10/6/10 8:07	1446	1.539	1.607
10/6/10 8:07	1447	1.536	1.604
10/6/10 8:07	1447	1.533	1.601
10/6/10 8:08	1447	1.530	1.598
10/6/10 8:08	1448	1.526	1.594
10/6/10 8:08	1448	1.522	1.59
10/6/10 8:09	1448	1.519	1.587
10/6/10 8:09	1449	1.518	1.586
10/6/10 8:09	1449	1.514	1.582
10/6/10 8:10	1449	1.511	1.579
10/6/10 8:10	1450	1.504	1.572
10/6/10 8:10	1450	1.504	1.572
10/6/10 8:11	1450	1.498	1.566
10/6/10 8:11	1451	1.499	1.567
10/6/10 8:11	1451	1.493	1.561
10/6/10 8:12	1451	1.490	1.558
10/6/10 8:12	1452	1.490	1.558
10/6/10 8:12	1452	1.485	1.553
10/6/10 8:13	1452	1.480	1.548
10/6/10 8:13	1453	1.480	1.548
10/6/10 8:13	1453	1.481	1.549
10/6/10 8:14	1453	1.473	1.541
10/6/10 8:14	1454	1.469	1.537
10/6/10 8:14	1454	1.471	1.539
10/6/10 8:15	1454	1.470	1.538
10/6/10 8:15	1455	1.462	1.53
10/6/10 8:15	1455	1.461	1.529
10/6/10 8:16	1455	1.461	1.529
10/6/10 8:16	1456	1.454	1.522
10/6/10 8:16	1456	1.454	1.522
10/6/10 8:17	1456	1.453	1.521
10/6/10 8:17	1457	1.447	1.515
10/6/10 8:17	1457	1.445	1.513
10/6/10 8:18	1457	1.443	1.511
10/6/10 8:18	1458	1.440	1.508
10/6/10 8:18	1458	1.437	1.505
10/6/10 8:19	1458	1.436	1.504
10/6/10 8:19	1459	1.432	1.5
10/6/10 8:19	1459	1.427	1.495
10/6/10 8:20	1459	1.427	1.495
10/6/10 8:20	1460	1.426	1.494
10/6/10 8:20	1460	1.422	1.49
10/6/10 8:21	1460	1.421	1.489
10/6/10 8:21	1461	1.417	1.485
10/6/10 8:21	1461	1.416	1.484
10/6/10 8:22	1461	1.411	1.479
10/6/10 8:22	1462	1.411	1.479
10/6/10 8:22	1462	1.408	1.476
10/6/10 8:23	1462	1.407	1.475
10/6/10 8:23	1463	1.404	1.472
10/6/10 8:23	1463	1.402	1.47
10/6/10 8:24	1463	1.398	1.466
10/6/10 8:24	1464	1.396	1.464
10/6/10 8:24	1464	1.400	1.468
10/6/10 8:25	1464	1.391	1.459
10/6/10 8:25	1465	1.393	1.461
10/6/10 8:25	1465	1.386	1.454
10/6/10 8:26	1465	1.385	1.453
10/6/10 8:26	1466	1.382	1.45
10/6/10 8:26	1466	1.379	1.447
10/6/10 8:27	1466	1.379	1.447
10/6/10 8:27	1467	1.378	1.446
10/6/10 8:27	1467	1.376	1.444
10/6/10 8:28	1467	1.374	1.442
10/6/10 8:28	1468	1.373	1.441
10/6/10 8:28	1468	1.356	1.424
10/6/10 8:29	1468	1.367	1.435
10/6/10 8:29	1469	1.367	1.435
10/6/10 8:29	1469	1.361	1.429
10/6/10 8:30	1469	1.349	1.417
10/6/10 8:30	1470	1.359	1.427
10/6/10 8:30	1470	1.357	1.425
10/6/10 8:31	1470	1.355	1.423
10/6/10 8:31	1471	1.352	1.42
10/6/10 8:31	1471	1.352	1.42
10/6/10 8:32	1471	1.351	1.419

10/6/10 8:32	1472	1.347	1.415
10/6/10 8:32	1472	1.347	1.415
10/6/10 8:33	1472	1.343	1.411
10/6/10 8:33	1473	1.341	1.409
10/6/10 8:33	1473	1.342	1.41
10/6/10 8:34	1473	1.338	1.406
10/6/10 8:34	1474	1.338	1.406
10/6/10 8:34	1474	1.337	1.405
10/6/10 8:35	1474	1.336	1.404
10/6/10 8:35	1475	1.332	1.4
10/6/10 8:35	1475	1.330	1.398
10/6/10 8:36	1475	1.332	1.4
10/6/10 8:36	1476	1.328	1.396
10/6/10 8:36	1476	1.328	1.396
10/6/10 8:37	1476	1.325	1.393
10/6/10 8:37	1477	1.325	1.393
10/6/10 8:37	1477	1.322	1.39
10/6/10 8:38	1477	1.318	1.386
10/6/10 8:38	1478	1.320	1.388
10/6/10 8:38	1478	1.316	1.384
10/6/10 8:39	1478	1.315	1.383
10/6/10 8:39	1479	1.313	1.381
10/6/10 8:39	1479	1.310	1.378
10/6/10 8:40	1479	1.296	1.364
10/6/10 8:40	1480	1.308	1.376
10/6/10 8:40	1480	1.305	1.373
10/6/10 8:41	1480	1.307	1.375
10/6/10 8:41	1481	1.307	1.375
10/6/10 8:41	1481	1.301	1.369
10/6/10 8:42	1481	1.302	1.37
10/6/10 8:42	1482	1.289	1.357
10/6/10 8:42	1482	1.298	1.366
10/6/10 8:43	1482	1.297	1.365
10/6/10 8:43	1483	1.284	1.352
10/6/10 8:43	1483	1.293	1.361
10/6/10 8:44	1483	1.289	1.357
10/6/10 8:44	1484	1.289	1.357
10/6/10 8:44	1484	1.290	1.358
10/6/10 8:45	1484	1.288	1.356
10/6/10 8:45	1485	1.286	1.354
10/6/10 8:45	1485	1.283	1.351
10/6/10 8:46	1485	1.281	1.349
10/6/10 8:46	1486	1.280	1.348
10/6/10 8:46	1486	1.280	1.348
10/6/10 8:47	1486	1.277	1.345
10/6/10 8:47	1487	1.277	1.345
10/6/10 8:47	1487	1.274	1.342
10/6/10 8:48	1487	1.275	1.343
10/6/10 8:48	1488	1.271	1.339
10/6/10 8:48	1488	1.261	1.329
10/6/10 8:49	1488	1.268	1.336
10/6/10 8:49	1489	1.267	1.335
10/6/10 8:49	1489	1.267	1.335
10/6/10 8:50	1489	1.266	1.334
10/6/10 8:50	1490	1.263	1.331
10/6/10 8:50	1490	1.264	1.332
10/6/10 8:51	1490	1.260	1.328
10/6/10 8:51	1491	1.261	1.329
10/6/10 8:51	1491	1.260	1.328
10/6/10 8:52	1491	1.260	1.328
10/6/10 8:52	1492	1.257	1.325
10/6/10 8:52	1492	1.257	1.325
10/6/10 8:53	1492	1.254	1.322
10/6/10 8:53	1493	1.254	1.322
10/6/10 8:53	1493	1.252	1.32
10/6/10 8:54	1493	1.248	1.316
10/6/10 8:54	1494	1.249	1.317
10/6/10 8:54	1494	1.237	1.305
10/6/10 8:55	1494	1.245	1.313
10/6/10 8:55	1495	1.233	1.301
10/6/10 8:55	1495	1.245	1.313
10/6/10 8:56	1495	1.248	1.316
10/6/10 8:56	1496	1.243	1.311
10/6/10 8:56	1496	1.241	1.309
10/6/10 8:57	1496	1.228	1.296
10/6/10 8:57	1497	1.227	1.295
10/6/10 8:57	1497	1.234	1.302
10/6/10 8:58	1497	1.236	1.304
10/6/10 8:58	1498	1.222	1.29
10/6/10 8:58	1498	1.222	1.29
10/6/10 8:59	1498	1.220	1.288
10/6/10 8:59	1499	1.231	1.299
10/6/10 8:59	1499	1.227	1.295
10/6/10 9:00	1499	1.228	1.296
10/6/10 9:00	1500	1.230	1.298
10/6/10 9:00	1500	1.226	1.294
10/6/10 9:01	1500	1.229	1.297
10/6/10 9:01	1501	1.214	1.282
10/6/10 9:01	1501	1.210	1.278
10/6/10 9:02	1501	1.219	1.287
10/6/10 9:02	1502	1.209	1.277
10/6/10 9:02	1502	1.208	1.276
10/6/10 9:03	1502	1.204	1.272
10/6/10 9:03	1503	1.205	1.273
10/6/10 9:03	1503	1.217	1.285
10/6/10 9:04	1503	1.204	1.272
10/6/10 9:04	1504	1.202	1.27
10/6/10 9:04	1504	1.212	1.28
10/6/10 9:05	1504	1.210	1.278
10/6/10 9:05	1505	1.198	1.266
10/6/10 9:05	1505	1.211	1.279
10/6/10 9:06	1505	1.204	1.272
10/6/10 9:06	1506	1.194	1.262
10/6/10 9:06	1506	1.205	1.273
10/6/10 9:07	1506	1.193	1.261
10/6/10 9:07	1507	1.190	1.258
10/6/10 9:07	1507	1.200	1.268
10/6/10 9:08	1507	1.200	1.268
10/6/10 9:08	1508	1.188	1.256
10/6/10 9:08	1508	1.186	1.254
10/6/10 9:09	1508	1.197	1.265
10/6/10 9:09	1509	1.184	1.252
10/6/10 9:09	1509	1.184	1.252
10/6/10 9:10	1509	1.185	1.253
10/6/10 9:10	1510	1.180	1.248
10/6/10 9:10	1510	1.179	1.247
10/6/10 9:11	1510	1.191	1.259
10/6/10 9:11	1511	1.190	1.258
10/6/10 9:11	1511	1.191	1.259
10/6/10 9:12	1511	1.177	1.245
10/6/10 9:12	1512	1.177	1.245
10/6/10 9:12	1512	1.185	1.253
10/6/10 9:13	1512	1.175	1.243
10/6/10 9:13	1513	1.183	1.251
10/6/10 9:13	1513	1.175	1.243
10/6/10 9:14	1513	1.171	1.239
10/6/10 9:14	1514	1.171	1.239
10/6/10 9:14	1514	1.166	1.234
10/6/10 9:15	1514	1.164	1.232
10/6/10 9:15	1515	1.167	1.235
10/6/10 9:15	1515	1.163	1.231
10/6/10 9:16	1515	1.167	1.235
10/6/10 9:16	1516	1.163	1.231
10/6/10 9:16	1516	1.160	1.228
10/6/10 9:17	1516	1.161	1.229
10/6/10 9:17	1517	1.161	1.229
10/6/10 9:17	1517	1.158	1.226
10/6/10 9:18	1517	1.160	1.228
10/6/10 9:18	1518	1.155	1.223
10/6/10 9:18	1518	1.156	1.224
10/6/10 9:19	1518	1.156	1.224
10/6/10 9:19	1519	1.151	1.219
10/6/10 9:19	1519	1.151	1.219
10/6/10 9:20	1519	1.153	1.221
10/6/10 9:20	1520	1.152	1.22
10/6/10 9:20	1520	1.147	1.215
10/6/10 9:21	1520	1.149	1.217
10/6/10 9:21	1521	1.147	1.215
10/6/10 9:21	1521	1.145	1.213
10/6/10 9:22	1521	1.145	1.213
10/6/10 9:22	1522	1.141	1.209
10/6/10 9:22	1522	1.142	1.21
10/6/10 9:23	1522	1.137	1.205
10/6/10 9:23	1523	1.153	1.221
10/6/10 9:23	1523	1.139	1.207
10/6/10 9:24	1523	1.137	1.205
10/6/10 9:24	1524	1.137	1.205
10/6/10 9:24	1524	1.137	1.205
10/6/10 9:25	1524	1.134	1.202
10/6/10 9:25	1525	1.133	1.201
10/6/10 9:25	1525	1.131	1.199
10/6/10 9:26	1525	1.130	1.198
10/6/10 9:26	1526	1.131	1.199
10/6/10 9:26	1526	1.129	1.197
10/6/10 9:27	1526	1.126	1.194
10/6/10 9:27	1527	1.129	1.197
10/6/10 9:27	1527	1.128	1.196
10/6/10 9:28	1527	1.126	1.194
10/6/10 9:28	1528	1.126	1.194
10/6/10 9:28	1528	1.125	1.193
10/6/10 9:29	1528	1.123	1.191
10/6/10 9:29	1529	1.132	1.2
10/6/10 9:29	1529	1.123	1.191
10/6/10 9:30	1529	1.132	1.2
10/6/10 9:30	1530	1.118	1.186
10/6/10 9:30	1530	1.118	1.186
10/6/10 9:31	1530	1.115	1.183
10/6/10 9:31	1531	1.113	1.181
10/6/10 9:31	1531	1.116	1.184
10/6/10 9:32	1531	1.113	1.181
10/6/10 9:32	1532	1.114	1.182
10/6/10 9:32	1532	1.114	1.182
10/6/10 9:33	1532	1.111	1.179
10/6/10 9:33	1533	1.114	1.182
10/6/10 9:33	1533	1.111	1.179
10/6/10 9:34	1533	1.108	1.176
10/6/10 9:34	1534	1.108	1.176
10/6/10 9:34	1534	1.109	1.177
10/6/10 9:35	1534	1.104	1.172
10/6/10 9:35	1535	1.106	1.174
10/6/10 9:35	1535	1.107	1.175
10/6/10 9:36	1535	1.101	1.169

10/6/10 9:36	1536	1.101	1.169
10/6/10 9:36	1536	1.103	1.171
10/6/10 9:37	1536	1.102	1.17
10/6/10 9:37	1537	1.104	1.172
10/6/10 9:37	1537	1.096	1.164
10/6/10 9:38	1537	1.099	1.167
10/6/10 9:38	1538	1.096	1.164
10/6/10 9:38	1538	1.096	1.164
10/6/10 9:39	1538	1.095	1.163
10/6/10 9:39	1539	1.096	1.164
10/6/10 9:39	1539	1.096	1.164
10/6/10 9:40	1539	1.091	1.159
10/6/10 9:40	1540	1.092	1.16
10/6/10 9:40	1540	1.091	1.159
10/6/10 9:41	1540	1.090	1.158
10/6/10 9:41	1541	1.090	1.158
10/6/10 9:41	1541	1.091	1.159
10/6/10 9:42	1541	1.089	1.157
10/6/10 9:42	1542	1.088	1.156
10/6/10 9:42	1542	1.088	1.156
10/6/10 9:43	1542	1.086	1.154
10/6/10 9:43	1543	1.084	1.152
10/6/10 9:43	1543	1.085	1.153
10/6/10 9:44	1543	1.088	1.156
10/6/10 9:44	1544	1.081	1.149
10/6/10 9:44	1544	1.083	1.151
10/6/10 9:45	1544	1.083	1.151
10/6/10 9:45	1545	1.082	1.15
10/6/10 9:45	1545	1.080	1.148
10/6/10 9:46	1545	1.079	1.147
10/6/10 9:46	1546	1.078	1.146
10/6/10 9:46	1546	1.079	1.147
10/6/10 9:47	1546	1.076	1.144
10/6/10 9:47	1547	1.076	1.144
10/6/10 9:47	1547	1.075	1.143
10/6/10 9:48	1547	1.075	1.143
10/6/10 9:48	1548	1.076	1.144
10/6/10 9:48	1548	1.073	1.141
10/6/10 9:49	1548	1.070	1.138
10/6/10 9:49	1549	1.071	1.139
10/6/10 9:49	1549	1.071	1.139
10/6/10 9:50	1549	1.068	1.136
10/6/10 9:50	1550	1.067	1.135
10/6/10 9:50	1550	1.067	1.135
10/6/10 9:51	1550	1.066	1.134
10/6/10 9:51	1551	1.068	1.136
10/6/10 9:51	1551	1.064	1.132
10/6/10 9:52	1551	1.074	1.142
10/6/10 9:52	1552	1.061	1.129
10/6/10 9:52	1552	1.062	1.13
10/6/10 9:53	1552	1.064	1.132
10/6/10 9:53	1553	1.059	1.127
10/6/10 9:53	1553	1.060	1.128
10/6/10 9:54	1553	1.056	1.124
10/6/10 9:54	1554	1.057	1.125
10/6/10 9:54	1554	1.057	1.125
10/6/10 9:55	1554	1.058	1.126
10/6/10 9:55	1555	1.054	1.122
10/6/10 9:55	1555	1.055	1.123
10/6/10 9:56	1555	1.052	1.12
10/6/10 9:56	1556	1.055	1.123
10/6/10 9:56	1556	1.058	1.126
10/6/10 9:57	1556	1.053	1.121
10/6/10 9:57	1557	1.048	1.116

10/6/10 9:57	1557	1.049	1.117
10/6/10 9:58	1557	1.047	1.115
10/6/10 9:58	1558	1.046	1.114
10/6/10 9:58	1558	1.048	1.116
10/6/10 9:59	1558	1.045	1.113
10/6/10 9:59	1559	1.046	1.114
10/6/10 9:59	1559	1.046	1.114
10/6/10 10:00	1559	1.043	1.111
10/6/10 10:00	1560	1.046	1.114
10/6/10 10:00	1560	1.046	1.114
10/6/10 10:01	1560	1.039	1.107
10/6/10 10:01	1561	1.040	1.108
10/6/10 10:01	1561	1.036	1.104
10/6/10 10:02	1561	1.042	1.11
10/6/10 10:02	1562	1.037	1.105
10/6/10 10:02	1562	1.037	1.105
10/6/10 10:03	1562	1.034	1.102
10/6/10 10:03	1563	1.034	1.102
10/6/10 10:03	1563	1.035	1.103
10/6/10 10:04	1563	1.033	1.101
10/6/10 10:04	1564	1.033	1.101
10/6/10 10:04	1564	1.028	1.096
10/6/10 10:05	1564	1.027	1.095
10/6/10 10:05	1565	1.027	1.095
10/6/10 10:05	1565	1.028	1.096
10/6/10 10:06	1565	1.029	1.097
10/6/10 10:06	1566	1.026	1.094
10/6/10 10:06	1566	1.026	1.094
10/6/10 10:07	1566	1.023	1.091
10/6/10 10:07	1567	1.023	1.091
10/6/10 10:07	1567	1.025	1.093
10/6/10 10:08	1567	1.021	1.089
10/6/10 10:08	1568	1.018	1.086
10/6/10 10:08	1568	1.020	1.088
10/6/10 10:09	1568	1.021	1.089
10/6/10 10:09	1569	1.020	1.088
10/6/10 10:09	1569	1.021	1.089
10/6/10 10:10	1569	1.017	1.085
10/6/10 10:10	1570	1.016	1.084
10/6/10 10:10	1570	1.018	1.086
10/6/10 10:11	1570	1.017	1.085
10/6/10 10:11	1571	1.014	1.082
10/6/10 10:11	1571	1.016	1.084
10/6/10 10:12	1571	1.011	1.079
10/6/10 10:12	1572	1.012	1.08
10/6/10 10:12	1572	1.010	1.078
10/6/10 10:13	1572	1.011	1.079
10/6/10 10:13	1573	1.009	1.077
10/6/10 10:13	1573	1.009	1.077
10/6/10 10:14	1573	1.010	1.078
10/6/10 10:14	1574	1.008	1.076
10/6/10 10:14	1574	1.010	1.078
10/6/10 10:15	1574	1.009	1.077
10/6/10 10:15	1575	1.006	1.074
10/6/10 10:15	1575	1.007	1.075
10/6/10 10:16	1575	1.005	1.073
10/6/10 10:16	1576	1.004	1.072
10/6/10 10:16	1576	1.001	1.069
10/6/10 10:17	1576	1.001	1.069
10/6/10 10:17	1577	1.003	1.071
10/6/10 10:17	1577	1.005	1.073
10/6/10 10:18	1577	1.001	1.069
10/6/10 10:18	1578	0.999	1.067
10/6/10 10:18	1578	1.000	1.068

10/6/10 10:19	1578	0.999	1.067
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10/6/10 12:03	1683	0.804	0.872
10/6/10 12:04	1683	0.803	0.871

Appendix E

Groundwater Flow Model

Appendix E

Groundwater Flow Model

Prepared for:

Bighorn-Desert View Water Agency

622 S. Jemez Trail

Yucca Valley, California 92284

Prepared by:

Todd Engineers

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February 2011

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E1. INTRODUCTION

This appendix to the Reche Spreading Grounds Recharge Feasibility Study Report (Feasibility Study report) and Groundwater Management Plan for the Ames Groundwater Basin, Pipes and Reche subbasins (GMMP) documents the construction and results of a water balance and numerical groundwater flow model used to assist in estimation of basin sustainable yield, characterization of groundwater flow conditions, and evaluation of recharge basin feasibility.

E1.1 Model Objectives

The objectives of the groundwater flow model are to 1) aid in characterization and evaluation of groundwater flow conditions (sources, sinks, flow rates and directions) in the Pipes and Reche groundwater subbasins and adjacent areas where BDVWA and others operate groundwater supply wells, 2) evaluate hydraulic impacts (water table mounding, groundwater flow paths) associated with future operation of the proposed Reche groundwater recharge spreading basin, and 3) evaluate sustainable yield of the Reche subbasin in support of the focused groundwater management plan and Amendment to the Water Agreement between BDVWA, Hi-Desert Water District (HDWD), and Mojave Water Agency (MWA).

E1.2 Model Approach and Scope

The numerical model simulates steady-state and transient groundwater flow in the Pipes and Reche subbasins. Groundwater recharge rates via subsurface inflow from Antelope Creek/Pipes Wash, Whalen's Wash, Ruby Mountain Wash, and distributed mountain-front recharge were estimated, along with rates of return flow from septic systems. Groundwater outflow via wells was defined based on metered pumping rates, and subsurface outflow from the Reche subbasin to the Giant Rock subbasin was simulated. After calibration, the model was used to predict water table mounding beneath the recharge basin, drawdown around nearby water supply wells, and flowpaths through the subbasins, across major geologic faults, from the recharge basin, and to the production wells.

The model was constructed using the United States Geologic Survey (USGS) numerical finite-difference codes MODFLOW and MODPATH. MODFLOW was selected for its usability, accuracy, efficiency and transportability. In particular the transportability of the public domain MODFLOW program and site model input files are advantageous for future site modeling. MODFLOW files have been provided to BDVWA and can be run without any proprietary software. Model construction and calibration was performed using the Groundwater Modeling System (GMS) v7.1 which pre-processes and post-processes MODFLOW and MODPATH files. Most of the input data were constructed and stored in GMS "GIS", "Map", "Scatter Point" and "2D Grid" modules. GMS software is not required to run the MODFLOW model. The MODFLOW

2000 files created by GMS also can be imported to other commercial MODFLOW software such as Visual MODFLOW or Groundwater Vistas with minor modification, or run using only executable MODFLOW and MODPATH codes.

Critical input parameters and controls on flow include water-budget components (inflows, outflows, and changes in storage), along with aquifer hydraulic properties (aquifer geometry and hydraulic properties of the alluvium and faults). The model inflows and outflows are based on an updated and refined water balance for the Pipes and Reche subbasins. The water balance was developed using available data and methodologies including those previously documented in the *Basin Conceptual Model and Assessment of Water Supply and Demand for the Ames Valley, Johnson Valley, and Means Valley Groundwater Basins* (Todd Engineers, 2007). This previous water balance was developed for the combined Ames Valley groundwater basin for the period 1990 through 2000. For this evaluation, the water balance period was extended through water year 2008-2009 (period ending September 30, 2009). Estimates for some key water balance components (including subsurface inflow and septic return flow) were refined. Each element of the water balance was evaluated independently, including inflows (e.g., recharge from rainfall resulting in subsurface inflow from Antelope Creek/Pipes Wash, Whalen's wash, and Ruby Mountain Wash, and septic return flows), and outflows (e.g., subsurface outflow, groundwater pumping). As part of the development of the GWMP, basin perennial yield was calculated and used in support of the Water Agreement Amendment.

The groundwater model domain and boundaries are shown on Figure E1. The active model area includes all of the Pipes and Reche subbasins, and a portion of the Giant Rock subbasin. The model domain also includes the proposed Reche spreading grounds recharge site and nearby BDVWA, HDWD, and San Bernardino County Service Area No. 70 W-1 (CSA No. 70 W-1) water supply wells.

Hydraulic properties including permeability of basin alluvium and geologic faults, aquifer thickness, and storage coefficients were simulated appropriately across the model area. Appropriate boundary conditions were selected based on the water balance and observed groundwater elevations.

The model was calibrated to observed historical water levels between 1994 and 2009. The calibration process includes trial and error adjustment of input parameters and auto-calibration using the Parameter Estimation (PEST) computer code. Once calibrated, flow paths and travel times between the recharge site and downgradient areas, including production wells, were simulated using anticipated recharge and pumping rates and schedules. Forward flowpaths were simulated to evaluate groundwater flow directions and rates from recharge site to the production wells and outflow boundaries, and reverse flowpaths were simulated to identify capture zones of the existing production wells.

E2. MODEL INPUT AND CALIBRATION

This section documents the approach and input parameters used to calibrate the groundwater flow model. Existing data were used to formulate the initial model input parameters. As described below, initial estimates of some input parameter values were modified during model calibration. Some input parameters, including extraction well pumping rates and water use/septic return flows, were defined on the basis of site measurements or estimates and were not varied for most of the model simulations. Other parameters, including aquifer hydraulic conductivity and boundary conditions, were adjusted within defined ranges to achieve model calibration.

E2.1 Calibration Process and Criteria

Model calibration was accomplished by defining and achieving quantitative and semi-quantitative calibration goals or targets. Calibration was assessed through evaluation of residuals, or the difference between observed and simulated groundwater elevations (heads), hydraulic gradient directions, and volumetric flow rates. For the steady-state site models constructed to simulate 1994 (wet) and 2007 (dry) conditions, head residuals were calculated for wells located throughout the Pipes and Reche subbasins. For the transient calibration period of 1994 to 2009, residuals were calculated in both space and time. Error residuals at each point were averaged in a variety of ways and statistical parameters including mean error and root mean squared error were calculated.

Criteria as were defined to evaluate the quality of model calibration. The two criteria used were the ASTM-recommended Root Mean Square (RMS) head residual error of less than ten percent of the model area groundwater elevation range and a mean error residual of less than five percent. The calibration criteria for the Pipes-Reche model are an RMS of 100 feet and Mean Error of 50 feet. This corresponds to a water table elevation range of about 3,600 feet above mean sea level (feet msl) where Pipes Wash enters Pipes Subbasin and 2,600 feet msl in the western portion of Giant Rock Subbasin.

E2.1.1. Historical Calibration Periods

Both transient and steady-state models were constructed for calibration. The transient model included 180 monthly stress periods between October 1994 and September 2009. Steady-state models were also constructed and calibrated to reflect “average” groundwater flow conditions. To simulate the variability in hydrologic conditions at the site, steady-state models were constructed to simulate two different historical periods, Water Year (WY) 1994 and WY 2007. WY 1994 represents peak “wet” or “high groundwater” conditions, based on several years of above-average rainfall and associated recharge rates preceding this period, high pumping rates, and peak historical groundwater elevation conditions, based on water level hydrographs. WY 2007 represents “dry” or “low groundwater” conditions after several below-average rainfall years between late 2005 and 2007. Models were calibrated to both 1994 and 2007 conditions by adjusting hydraulic conductivities and boundary conditions. The transient calibration simulated changes in groundwater elevations over time, and presentation of the calibration results in this Appendix focuses on this transient simulation.

E2.1.2. Water Level Calibration Data

Available water level data were reviewed to define a set of wells used for model calibration. Figure E2 shows the location of wells used to assess model calibration. The observed water level calibration data set includes most of the existing active production wells and a few dedicated monitoring wells. As shown in the figure, the spatial distribution calibration wells is favorable considering calibration wells are located both in the upgradient and downgradient portions of the Pipes and Reche subbasins.

E2.1.3. Calibration Approach

The model was constructed and calibrated using both trial-and-error and PEST auto-calibration methods. Initial model construction and calibration runs were based on estimated input parameter values. Boundary conditions were developed based on observed groundwater elevations and estimated fluxes through Pipes, Whalen’s, and Ruby Mountain washes. Minor modifications to the flux boundary locations and rates were made during calibration. Estimates of groundwater recharge from septic return flow were developed from water use data over time and a consumption factor for each land parcel. Estimated recharge from septic return was not adjusted during calibration. Initial estimates of hydraulic conductivity and aquifer storage coefficients were developed based initially on aquifer pumping test results and subsequently modified based on initial calibration and PEST results. Production well pumping rates were not adjusted during calibration runs.

Several parameter estimation simulations were performed using PEST simulating steady-state 1994 and 2009 conditions and a transient period of 1994 through 2009. The parameters selected for inversion were hydraulic conductivity and specific storage. PEST simulations inverted all polygons for hydraulic conductivity and specific storage simultaneously, with the exception of a polygon between the recharge site and Production well HDWD No. 24, which was assigned a fixed hydraulic conductivity value based on the constant-rate pumping test performed in October 2010. Minor hand adjustments of PEST-calculated conductivities were made for the final calibration. Results of the PEST simulations and final calibration are discussed in Section E3.0.

E2.2 Model Domain and Discretization

The MODFLOW model simulates groundwater flow in a defined area and solves the governing equations controlling groundwater flow using the finite-difference method. For this numerical method, a rectangular grid of model cells is constructed, and hydraulic head is calculated at each grid cell.

E2.2.1. Model Area and Grid

The Pipes/Reche subbasin active model domain includes the area bounded by:

- The valley floor at the base of the mountain front to the west;
- An east-west trending arc to the north coinciding with a broad bedrock high and thin saturated aquifer thickness in the northern portion of the Pipes and Reche subbasins;
- An arc east of the Homestead Valley Fault within the Giant Rock subbasin to the east
- A southwest-northeast trending arc beneath the Mesa area (southeast of Pipes Wash) where the alluvial aquifer becomes unsaturated.

A uniform row and column grid spacing of 100 feet was used. The model comprises 430 rows by 387 columns. A single MODFLOW layer represents the alluvial aquifer.

E2.2.2. Model Depth

The model grid was constructed using the MODFLOW Layer Property Flow (LPF) Package and a “true layer” approach, with defined aquifer bottom elevations. Figure E3 illustrates the geometry of the base of the alluvial aquifer. The bedrock contact surface dips to the east from elevations of around 3,400 feet msl at the edge of the valley at the base of the mountains to elevations of around 2,600 feet in the thickest portions of the alluvial basin. A shallow bedrock ridge occurs beneath the Mesa area with alluvium-bedrock contact elevations of around 3,500 feet msl in the southwestern portion of the model to around 3,000 feet msl in the southeastern portion. A broad shallow bedrock ridge also occurs along the northern model boundary in the northern portion of the Pipes and Reche subbasins. The modeled bedrock elevation in the western portion of the Giant Rock Subbasin is around 2,500 feet msl. A bedrock surface discontinuity of 200 feet was simulated across the Homestead Valley Fault separating the Reche and Giant Rock subbasins.

E2.3 Boundary Conditions

Figure E4 shows the model boundary condition locations and types. The Pipes/Reche groundwater model includes the following boundary conditions:

- Lateral time-varying specified fluxes via arcs across Pipes Wash, Whalen's Wash, Ruby Mountain Wash, and along the valley-mountain front boundary to the west;
- Lateral specified flux (no-flow) boundaries representing 1) the broad bedrock ridge and thin saturated aquifer thickness to the north and 2) shallow bedrock ridge beneath the Mesa area (southeast of Pipes Wash) where the alluvial aquifer becomes unsaturated to the south;
- A lateral general head boundary east of the Homestead Valley Fault within the Giant Rock groundwater basin to the east;
- Time varying specified flux boundaries via the top of the model representing aerial recharge from septic return flow;
- A specified flux (no flow) boundary at the base of the model.

For the specified flux boundaries (subsurface inflow and return flow), monthly rates were estimated and used in the transient flow model. The following sections describe quantification of the boundary flux rates and heads used in the mathematical model.

E2.3.1. Western Specified Flux Boundaries

The principal source of natural groundwater recharge to the Pipes and Reche subbasins is the subsurface inflow of groundwater through the alluvium within Pipes Wash, Whalen's Wash, and Ruby Mountain Wash. This groundwater inflow originates from runoff of rainfall in the San Bernardino Mountains and recharge to the alluvium in the wash channel valleys east of the Pipes Subbasin. Runoff from rainfall infiltrates through the vadose zone to the water table prior to entering Pipes Subbasin as subsurface inflow mainly through the three major drainages entering the valley. Subsurface inflow rates from bedrock along the rest of the mountain-front are unknown, but the amount is assumed to represent a small portion of subsurface inflow, as discussed below.

Direct recharge from rainfall on the basin floor is assumed to be negligible given the small amounts of rainfall on the valley floor, deep water table, and high evapotranspiration rates. Intermittent flash flooding through Pipes Wash, Whalen's Wash, Ruby Mountain Wash and other drainage pathways occasionally brings water into and through the valley floor, but for the purposes of this analysis, the net amount of stormwater recharging groundwater is assumed to be negligible.

Figure 3 in the Feasibility Study report shows the contributing watershed area and annual rainfall isohyets for the model flux boundaries. The contributing watershed area is divided into three major drainages. Antelope Creek (tributary to Pipes Wash) has the largest contributing catchment area to the basin, representing over 60 percent of the overall contributing watershed area. Whalen's Wash and Ruby Mountain Wash to the north have smaller catchment sizes and lower average annual rainfall rates.

Based on a focused study of the watershed area and groundwater flow rates through Whalen's Wash and Antelope Creek/Pipes Wash, average natural subsurface inflow to the Pipes Subbasin is estimated at 2 percent of rainfall in the contributing watershed area. This average rainfall-recharge ratio is the basis for the boundary condition flux rates developed for the model.

Based on a 20-year study period from water year (WY) 1989-1990 to WY 2008-2009, the average annual recharge from rainfall for the Pipes Subbasin is 668 acre-feet per year (AFY). The Antelope Creek Catchment is the largest contributor of recharge (472 AFY), followed by Whalen's Wash (127 AFY), and Ruby Mountain Wash (69 AFY).

In order to vary the amount of natural subsurface inflow to the model boundary over time, precipitation over time across the contributing watersheds was calculated based on data from the rainfall gage at Big Bear and the average annual precipitation isohyetal map (Figure 3 in the Feasibility Study report). The Big Bear rainfall gage has been active since July 1960. Average annual precipitation for Water Year (WY) 1960-61 through WY 2008-2009 for the Big Bear gage is 21.60 inches. To estimate monthly rainfall in which precipitation at the Big Bear gage was not reported, the average relative monthly precipitation between the Big Bear gage and Lake Arrowhead gage was applied to Lake Arrowhead gage data for that month. Note that average annual rainfall in the contributing watershed areas of the three major drainages to the Pipes Subbasin is much lower than rainfall reported at the Big Bear gage, ranging from 8.54 inches for Antelope Valley (Pipes Wash), 6.35 inches for Whalen's Wash, and 5.39 inches for Ruby Mountain Wash.

To estimate annual recharge from rainfall over varying climatic conditions, the ratio of annual rainfall at the Big Bear gage to the long-term average annual rainfall at the Big Bear gage was applied to the average annual rainfall for the contributing watershed (based on spatial analysis of the isohyetal map) multiplied by 2 percent.

Additionally, for any given period, the percentage of rainfall that represents runoff is expected to be positively related to the rainfall amount (i.e. less than 2 percent runoff is expected when rainfall is below normal, while greater than 2 percent runoff is expected when rainfall is above average). To account for this variability, a variable runoff factor ranging from 0.5 percent (applied to years when annual rainfall at the Big Bear gage is less than 10 inches) up to 3.0 percent (for years when annual rainfall is 30 inches or greater) was applied to rainfall in the contributing catchment areas. The weighted-average runoff factor of 2 percent was maintained over study period.

To account for the vadose and saturated zone travel time and time lag for recharge entering the Pipes Subbasin as subsurface inflow, monthly rainfall reported at the Big Bear rainfall gage was compared with groundwater elevations in Well 1N/5E-2N1, located along Pipes Wash near the intersection of Pipes Wash and Highway 247 (Figure E2). Figure E5 shows that groundwater levels in Well 1N/5E-2N1 respond gradually to significant rainfall events in the San Bernardino Mountains and continue to do so for up to 2 years before receding. This process reflects the capacity of the alluvial materials to detain runoff generated in the contributing watersheds of the major drainages upgradient of the modeled area. For the model, a retention time was developed to "lag" and re-distribute the subsurface inflow over time. To simulate this process in the MODFLOW model, the effective monthly subsurface inflow rate was calculated by lagging rainfall amounts by one year and applying a detention coefficient of 0.90. A lag of one year combined with a detention coefficient of 0.90 was found to best simulate the effective subsurface inflow rate over the model period. Figure E5 shows the effective subsurface inflow rates for Antelope Creek/Pipes Wash using the method described above compared to groundwater levels in Well 1N/5E-2N1. Table E1 shows the effective annual subsurface inflow rates for all three of the major drainages in the model (Flux Arcs 2, 5, and 9).

A small portion of the total estimated subsurface inflow for each period was redistributed along the mountain-front arc segments between the three washes (see Figure E6 for final specified flux arc boundary locations). Again, the overall total subsurface inflow flow was maintained at 2 percent of rainfall. During calibration, the amount re-allocated to mountain-front recharge was varied, and ultimately 10 percent was used in the final calibrated model.

The annual flux rates used for each specific flux boundary arc are tabulated in Table E1. The average total model influx through Pipes Wash, Whalen's Wash, Ruby Mountain Wash, and mountain front arcs for the simulated period from WY 1994-95 to WY 2004-05 was 796 AFY, of which 703 AFY represents the influx through the main washes, 61 AFY represents the influx through mountain flux arcs, and 31 AFY represents return flows from parcels west of the flux arc boundaries (see Section E2.3.4. for additional discussion on return flows). It is noted that the estimated natural inflow (764 AFY) for the transient model period (WY1994-95 to WY 2004-05) is slightly higher than the average annual recharge estimated for the 20-year study period (WY 1989-1990 to WY 2008-2009) in the basin conceptual model report (Todd Engineers, 2007). This is due primarily to the modeled detention/lag of rainfall runoff generated during the winter storms of 1992/1993.

E2.3.2. Northern and Southern No-Flow Boundaries

Portions of the alluvial aquifer beneath the Mesa separating the Pipes/Reche subbasins from the Copper Mountain Subbasin to the south and in the northern portion of the Pipes/Reche subbasins are thinly saturated to unsaturated (the water table occurs below the alluvium/bedrock contact). The location of these unsaturated areas were determined based on comparisons of the water table and bedrock elevation surfaces and defined in the MODFLOW model as no-flow boundaries (Figure E4).

E2.3.3. Eastern General Head Boundary

Figure E4 shows the location of a constant-head boundary arc used along the eastern model boundary in Giant Rock Subbasin. A constant head of 2,600 feet above mean sea level (feet msl) was defined along the arc based on groundwater elevations measured in the subbasin. The location of the boundary head arc and elevation value was based on a regional groundwater elevation map (Figure 4 in the Feasibility Study report).

E2.3.4. Return Flow Recharge Boundary

In addition to natural runoff from rainfall, inflow to the groundwater basin occurs via return flow from septic tanks. Return flows in the Pipes and Reche subbasins were simulated as a time-varying recharge boundary at the top of the model using the MODFLOW recharge package. Water use over time for each BDVWA water customer and estimated net septic return flow rates were analyzed to accurately simulate the rate and distribution of aerial recharge.

Monthly water use rates for each assessor parcel number for the period 1995 – 2009 was obtained from BDVWA. Figure E7 shows the locations of the BDVWA water customer parcels and recharge areas. Monthly water use rates were converted to recharge rates using a consumptive use factor of 20 percent, or a return flow rate of 80 percent of water use. The relatively high consumptive use factor was selected, since water use in the area is predominantly indoor, and because water use as metered at each customer site is considered under-reported by 10 to 20 percent by BDVWA. Historic water use of HDWD customers in the Mesa area was not available for this study but is relatively small compared to natural recharge estimates and water use of BDVWA customers in the study area.

To account for travel time from the near-surface septic systems to groundwater, the vadose zone flow model CHEMFLO™-2000 (USEPA, 2003) was used. Input parameters for the vadose zone model include soil hydraulic properties, initial soil water conditions, and assignment of appropriate boundary conditions at the top and bottom of the soil profile. A vertical hydraulic conductivity of 3 centimeters per hour (cm/hr) (or about 2.4 feet per day) was selected for use in the model. This was initially based on an average horizontal hydraulic conductivity of about 30 cm/hr (or about 24 feet per day) for existing wells in the Pipes and Reche subbasins and an assumed 10-to-1 ratio for horizontal-to-vertical hydraulic conductivity. The estimate is on the lower end of the range of vertical hydraulic conductivities from soil cores collected from the recently installed monitoring well (MW1) in Pipes Wash. Other required soil hydraulic properties for the model (vanGenuchten coefficients) are provided in CHEMFLO for various soils. These hydraulic properties were estimated based on interpolation between sandy loam and loam soils with vertical hydraulic conductivity of 4.0 and 1.0 cm/hr, respectively. The hydraulic boundary condition at the point of applied water was simulated by applying a soil matric potential of zero at the top of the soil profile (i.e., saturated conditions). This approach assumes that the amount of indoor water use by parcel is positively correlated with the number of septic tanks required to treat the water (i.e., as such, vadose zone travel times are considered similar for smaller and larger water use parcels). A uniform volumetric water content of 11 percent (matric potential of -300 mm) was assigned to the soil profile to simulate initial conditions, and a free drainage boundary condition was applied to the bottom of the soil profile.

Results of the vadose zone model were applied to the average depth to water beneath all return flow parcels in the model area (233 feet below ground surface) to estimate the average travel time of septic return flows through the vadose zone. Results of the model suggest that return flows require an average of about one year to travel through the vadose zone. Accordingly, return flow rates for each parcel were lagged by one year prior to introducing recharge to the MODFLOW model. Field and laboratory confirmation of vadose zone hydraulic properties are needed to further refine estimated vadose zone travel times. However, for the purposes of the groundwater model, the one-year travel time is considered reasonable.

Time-varying recharge rates were used during the transient model simulations. For the steady-state simulations representing 1994 and 2007 conditions, representative return flow rates corresponding to the average rate over the three-year period prior to and during the calibration period were used. Figure E8 shows the average return flow recharge rates by parcel over time.

E2.4 Groundwater Production

Groundwater pumping from all existing BDVWA, HDWD, and CSA No. 70 W-1 production wells were simulated using the MODFLOW Well Package. Production well locations are shown on Figure E7. Time-varying pumping rates were used during the transient model simulations. For the steady-state simulations representing 1994 and 2007 conditions, representative flow rates corresponding to the average rate over the three years period prior to and during the calibration period were used. Pumping rates are tabulated and plotted in Table E2 and Figure E9.

E2.5 Aquifer Hydraulic Properties

The model grid and aquifer hydraulic properties were simulated using the LPF Package. Heterogeneous hydraulic conductivities were assigned to polygons representing wash and non-wash areas and fault zone hydraulic barriers. Based on evaluation of the aquifer pumping test results and geologic mapping of alluvium, the aquifer permeability distribution appears to be controlled by the extent of relatively high permeability alluvium in the wash areas, and by the faults crossing the study area, which represent partial barriers to groundwater flow. Therefore, hydraulic conductivity polygons were constructed to represent the more permeable areas along Pipes Wash, Whalen's Wash, and Ruby Mountain Wash, the areas between the washes, and the fault zones. Figure E10 shows the polygon distribution.

Initial values of hydraulic conductivity were developed based on the mapped distribution of geologic materials and aquifer pumping testing data and were adjusted during model calibration. Analysis of existing pumping test data was performed in the 2007 study of the Ames Basin. In addition, a constant-rate pumping test of Well HDWD 24 was performed in October 2010, and the results of this test were applied in the vicinity of Well HDWD 24.

During model calibration, trial-and–error and PEST simulations were performed and permeabilities for the alluvium and faults were adjusted relative to the initial estimated values. The following Sections discuss the initial and final simulated properties of the alluvium and fault barriers.

E2.5.1. Alluvium Hydraulic Properties

Forty-four permeability polygons were ultimately used to simulate the alluvium and faults. The polygons were constructed on the basis of the mapped distribution of the wash and non-wash areas, with the wash areas assumed to have the highest permeabilities. During calibration, additional polygons were constructed to provide detail and flexibility to increase calibration quality. For the initial model setup and runs, relatively higher permeabilities of 20 to 100 feet per day were assigned to wash areas and lower permeabilities of 10 feet per day were assigned to areas between the washes.

Based on the results of the pumping test performed on HDWD 24, the hydraulic conductivity polygon representing the eastern portion of Pipes Wash between the proposed recharge site and HDWD 24 was assigned a fixed hydraulic conductivity of 150 feet per day (ft/day). Hydraulic conductivities for all other polygons were optimized using PEST. Figure E10 shows the final hydraulic conductivities used in the calibrated model. In general, the final hydraulic conductivity values used in the model are consistent with the site conceptual model with higher permeability in the washes and lower permeability in non-wash (more clay-rich) areas. The PEST results are also consistent with the range of hydraulic conductivities estimated from reported production well specific capacities. The highest permeabilities were simulated in the wash channels. Lower hydraulic conductivities were calculated for non-wash areas. The simulated hydraulic conductivity values are consistent with the site conceptual model and available aquifer property data.

E2.5.2. Fault Barrier Hydraulic Properties

Narrow hydraulic conductivity polygons were constructed to simulate the fault barriers including the Johnson Valley Fault and Pipes Barrier, separating the Pipes and Reche subbasins, and the Homestead Valley Fault, separating the Reche and Giant Rock subbasins (Figure E10). Hydraulic conductivity zones were used to represent the fault barriers (rather than the MODFLOW Horizontal Flow Barrier Package), because the polygons better represented the multiple en-echelon fault splays associated with each fault zone rather than a single fault alignment. Horizontal hydraulic conductivities for the fault polygons calculated by PEST ranged from 0.0012 to 100 feet/day. Higher permeabilities were estimated for the Johnson Valley Fault segment crossing Pipes Wash than for the other fault segments. These results are consistent with the site conceptual model, which indicates significant groundwater flow occurs through the Pipes Wash area, while more resistance to flow is created by the Pipes Barrier, just west of the proposed recharge site.

E2.5.3. Aquifer Storage Properties

For the transient flow simulations, specific storage was defined to account for release of water from aquifer storage. Specific storage is equivalent to the aquifer storage coefficient divided by the aquifer thickness. For the preliminary simulations, a uniform specific storage of 0.001 ft^{-1} was used. During the transient PEST simulation, an optimal specific storage of 0.0021 $foot^{-1}$ was estimated. Although the aquifer saturated thickness varies, on average it is around 150 feet, which yields a storage coefficient of approximately 30 percent.

E3. MODEL RESULTS

This section presents the model results, including calibration quality, simulated groundwater elevations, volumetric mass budgets for the model inflow and outflow components, and flowpath results. The results presented in this Section focuses on the 1994 through 2009 transient calibration.

The final model was developed after calibration runs based on the initial results and modified based on observed model response to input parameter changes. After construction and specification of model depth, boundaries, pumping well flow rates, and septic return flows, the PEST program was used to adjust net hydraulic conductivities and specific storage. For the 1994-2009 auto-calibration run, hydraulic conductivities and specific storage values were optimized with good results. Final manual adjustments were then made to some of the parameter values, including certain hydraulic conductivity zones.

Over the course of model development, numerous modifications of the values and distribution of input parameters were made in attempts to improve model calibration. Due to uncertainties in the actual distribution of hydraulic conductivity, and the inherent limitations of groundwater model approximations, perfect calibration in space and time is difficult or impossible to achieve. However, the Pipes/Reche MODFLOW model was reasonably well calibrated with respect to observed and simulated groundwater elevations in both space and time.

E3.1 Calibration Results

To assess model accuracy, simulated heads were compared with observed heads. Model calibration also focused on simulating flow through the groundwater subbasins in accordance with the basin conceptual model. The final calibrated models simulate flow conditions which are consistent with the basin conceptual model.

Charts E1 through E15 present observed versus simulated groundwater elevations between 1994 and 2009. As illustrated on the charts, the simulated and actual groundwater elevations and fluctuations over time are well-correlated. In particular, the overall water-level declines observed in many of the wells between 1994 and 2009 accurately simulated.

Observed and simulated heads at each calibration point were compared and calibration was assessed quantitatively through head residuals. Overall calibration of the model meets the calibration criteria defined in Section 2.0. As shown on Table E3, correlation between observed and simulated heads is good. The mean head residual and RMS error are significantly less than the ASTM guideline of five and ten percent of the model area groundwater elevation range.

Because the simulated groundwater elevations across the study area are well calibrated with observed elevations in both space and time, the model calibration is judged to be acceptable.

Accordingly, the model can be applied confidently to assess groundwater flow paths and flow rates and used to predict effects of recharge at the proposed spreading grounds.

E3.2 Simulated Heads

Model-simulated groundwater elevation contour maps and charts of observed and simulated elevations over time were constructed (Figures E11 and E12). For the 1994 through 2009 transient calibration, simulated groundwater elevations within the entire model domain range from around 3,600 feet above mean sea level (feet msl) at the eastern flux boundary in Pipes Wash to 2,600 feet msl in Giant Rock Subbasin.

The final calibrated model simulates flow conditions that are consistent with the basin conceptual model. Groundwater inflow occurs via the western boundary conditions along the mountain front. Within the model area, the groundwater elevation contour patterns reflect the boundary conditions, recharge sources and pumping sinks, and permeability zones, which cause changes in gradient magnitudes and directions. The low-permeability zones associated with the fault barriers result in groundwater elevation drops across the faults, particularly across the Pipes Barrier, where the water table difference across the fault is about 100 feet.

Groundwater elevation contour patterns for 1994 (Figure E11) are generally similar to patterns for 2009 (Figure E12), but 2009 groundwater elevations are lower reflecting the observed declines in basin wells. Figure E13 shows the simulated differences in groundwater elevations between 1994 and 2009. In the area of the proposed Reche spreading grounds, water levels declined between 20 and 30 feet from 1994 to 2009.

E3.3 Flowpath Results

Using the calibrated model, forward and reverse flowpaths were simulated using the USGS particle track code MODPATH. MODPATH uses flow budget files generated by MODFLOW and calculates groundwater flow paths and travel times for particles in the groundwater flow system. MODPATH was used to determine ultimate discharge points for particles entering the groundwater system as recharge as well as the capture zones of production wells. Forward flowpaths were simulated by generating single particles in selected individual model cells along the western model boundaries, which move advectively through the flow field. Reverse flowpaths were simulated by generating a series of particles in an arc around each pumping well which move advectively backward through the flow field to the sources of inflow contributing to the extraction point.

Figure E14 shows the forward flowpaths for particles generated along the western model boundaries. Forward particles track through the flow field and ultimately discharge to the production wells or into the Giant Rock Subbasin. Most of the flowpaths originating along the mountain front between Pipes and Ruby Mountain washes are captured by BDVWA production wells 2, 3, 4, and 8. The sources of water pumped from BDVWA wells 6, 7, and 9 include both inflow from Ruby Mountain Wash and adjacent mountain-front areas and septic return flows. The sources of water to production wells HDWD 24 and CSA No. 70 W-1 1, 2, and 3 are inflow via Pipes Wash and septic return flows. Figure E15 shows reverse track flowpaths or “capture zones” of the production wells.

E3.4 Water Balance and Volumetric Fluxes

Volumetric inflow and pumping data used as model input and subsurface outflow and change in storage rates generated by MODFLOW were plotted and evaluated to determine the magnitudes of water balance components within the model domain. Tables E4 and E5 summarize the annual and cumulative water balance results for the 1994-2009 transient simulation; water balance components over time are charted on Figure E16. The overall water balances for the model simulation had very low net error, and the magnitudes of inflows (through recharge and boundary conditions) and outflows (through boundaries and wells) are consistent and in accordance with the rates assigned in the basin conceptual model.

E3.5 Predicted Mounding and Flowpaths from Reche Spreading Grounds

To determine the fate of water recharged via the proposed spreading grounds, additional MODFLOW and forward MODPATH simulations were made using a future recharge scenario of three recharge events of 1,500 AF recharged over 6 months in alternating years. A six-acre recharge area was simulated in Pipes Wash, and transient flow was simulated in response to the multiple recharge events. Groundwater elevations and flowpaths were simulated over time and used to assess performance of the recharge facility and groundwater basin response.

For a surface recharge project, water levels rise beneath the recharge area creating a groundwater mound. The height and lateral extent of the mound varies over time as a function of aquifer hydraulic properties, recharge rate, and recharge area. The development of a groundwater mound beneath the spreading grounds was evaluated using the MODFLOW model. The model estimates the groundwater elevations and corresponding height of the groundwater recharge mound as a function of time and distance from the recharge area.

The calculated shape of the mound at the end of the first six-month recharge period is illustrated on Figure E17. The mound height directly beneath the spreading grounds over time is illustrated on Figure E18. As shown on the figures, the maximum mound height beneath the spreading grounds is approximately 19 feet after the first six-month recharge period, 20 feet after the second six-month recharge period, and 22 feet after the third six-month recharge period. Groundwater levels are expected to increase 1 foot or more up to 8,000 feet to the northwest of the spreading grounds. As shown on Figure 15, water levels contours stack up against Pipes

Barrier due to the low permeability of the fault zone. The predicted maximum groundwater level rise is approximately 5 feet at HDWD 24 (4,300 feet from the center of the spreading grounds).

To assess the fate of recharged water, MODPATH particles were started at the water table beneath the spreading grounds and forward-tracked to their downgradient discharge locations. Figure E19 shows the simulated groundwater flowpaths from the Reche Spreading Grounds after three 6-month recharge events. As shown on the figure, recharge water diverges radially away from the recharge area before trending northeast in the general direction of HDWD 24. The travel time between the recharge site and HDWD 24 is approximately 2 to 3 years.

E4. REFERENCES

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United States Environmental Protection Agency (USEPA) (2003) CHEMFLO™-2000: Interactive Software for Simulating Water and Chemical Movement in Unsaturated Soils. National Risk Management Research Laboratory (by D.L. Nofziger and Jinqaun Wu, Department of Plant and Soil Sciences, Oklahoma State University).

Tables

Table E1
Boundary Condition Specified Flux Rates

Flux Arc	1 North of Ruby Mountain Wash (+ return flow)	2 Ruby Mountain Wash	3 South of Ruby Wash (+ return flow)	4 North of Whalen's Wash (no return flow)	5 Whalen's Wash	6 South of Whalen's Wash (no return flow)	7 South of Whalen's Wash (+ return flow)	8 North of Pipes Wash (no return flow)	9 Pipes Wash	Total Influx Western Model Boundary
Water Year										
1994-95	17	106	15	12	194	8	21	11	690	1,073
1995-96	17	136	15	12	252	8	21	11	893	1,366
1996-97	19	84	16	12	159	8	21	11	559	890
1997-98	21	45	17	12	84	8	21	11	296	515
1998-99	20	115	14	12	212	8	20	11	756	1,168
1999-00	25	69	16	12	125	8	21	11	450	736
2000-01	27	42	19	12	77	8	22	11	275	493
2001-02	29	34	20	12	63	8	22	11	224	424
2002-03	25	15	20	12	29	8	23	11	101	244
2003-04	23	62	20	12	115	8	22	11	406	680
2004-05	23	54	18	12	100	8	23	11	355	604
2005-06	22	157	16	12	288	8	22	11	1,028	1,564
2006-07	24	105	17	12	191	8	23	11	676	1,066
2007-08	24	41	18	12	74	8	24	11	266	477
2008-09	21	59	18	12	108	8	24	11	379	640
Average	23	75	17	12	138	8	22	11	490	796

Values in acre-feet

Table E2
Well Production

	BDVWA							HDWD	CSA 70 W-1			BDVWA Total	HDWD Total	CSA 70 W-1 Total	Total Well Production
	Well 2	Well 3	Well 4	Well 6	Well 7	Well 8	Well 9	Well 24	Well 1	Well 2	Well 3				
Water Year															
1994-95	88	112	124	109	79	404	20	495	67	71	0	935	495	138	1,568
1995-96	88	231	219	99	80	305	89	815	107	98	166	1,112	815	370	2,297
1996-97	79	77	80	156	190	77	78	511	149	99	40	737	511	288	1,537
1997-98	87	90	82	156	156	110	135	851	94	86	55	815	851	235	1,901
1998-99	37	38	39	51	-	57	168	773	77	67	117	391	773	261	1,424
1999-00	27	0	109	41	22	72	135	532	45	38	116	406	532	198	1,135
2000-01	45	0	50	33	28	66	175	706	60	40	91	398	706	191	1,296
2001-02	60	39	79	51	40	42	202	755	35	30	56	515	755	120	1,390
2002-03	34	37	20	47	35	110	184	549	28	24	79	468	549	131	1,148
2003-04	41	30	81	39	52	49	171	723	30	29	77	464	723	136	1,322
2004-05	10	17	58	28	34	116	180	473	43	42	63	442	473	149	1,064
2005-06	35	35	48	12	73	113	175	255	48	47	61	490	255	155	899
2006-07	65	49	42	33	91	73	145	514	48	48	48	499	514	144	1,156
2007-08	54	39	27	145	98	100	13	599	48	150	48	476	599	246	1,321
2008-09	50	64	-	118	73	96	62	640	51	63	69	462	640	183	1,285
Average	53	57	71	74	70	119	129	613	62	62	72	574	613	196	1,383

Values in acre-feet
BDVWA = Bighorn-Desert View Water Agency
HDWD = Hi-Desert Water District
CSA 70 W-1 = San Bernardino County Service Area 70 W-1

Table E3
Model Calibration Summary

Well	Measured Nov-1994 Groundwater Elevation (feet msl)	Measured Sep/Oct-2009 Groundwater Elevation (feet msl)	Mean Error Measured minus Simulated	Root Mean Error Measured minus Simulated
BDVWA 1	3247.50	Dry	-0.60	2.35
BDVWA 2	3245.48	3225.01	-2.10	3.55
BDVWA 3	3245.34	3224.84	-2.55	3.77
BDVWA 4	3245.17	3230.27	-2.59	3.32
BDVWA 6	2912.85	2895.05	2.20	4.40
BDVWA 7	2913.88	2895.71	2.43	4.45
BDVWA 8	3242.88	3222.28	-2.26	4.22
BDVWA 9	2923.47	2909.00	0.68	3.02
HDWD 24	3009.00	2985.73	-7.41	8.61
CSA 70 W-1 1	2867.00	2834.00	-9.37	10.80
CSA 70 W-1 2	2867.50	2849.50	-7.86	9.38
1N/5E-2N1	3462.73[a]	3465.52	7.83	16.79
USGS Monitoring	3246.80	3228.10	-1.49	3.16
Gubler Farm 1G1	2897.60	2906.10	-0.23	1.87
Gubler Farm 1K1	2897.60	2903.92	-5.54	5.93
Average			-1.92	5.71

[a]May-1994 measurement

Table E4
Annual Water Budget

	Subsurface Inflow	Return Flow	Pumping	Subsurface Outflow[1]	Annual Storage Change
Water Year					
1994-95	1,051	204	-1,568	-579	-834
1995-96	1,344	204	-2,297	-579	-1,270
1996-97	864	238	-1,537	-579	-955
1997-98	486	240	-1,901	-579	-1,695
1998-99	1,144	243	-1,424	-579	-557
1999-00	705	268	-1,135	-579	-682
2000-01	456	297	-1,296	-579	-1,063
2001-02	382	293	-1,390	-579	-1,234
2002-03	207	304	-1,148	-579	-1,157
2003-04	645	270	-1,322	-579	-927
2004-05	570	265	-1,064	-579	-749
2005-06	1,534	252	-899	-579	367
2006-07	1,033	273	-1,156	-579	-370
2007-08	442	295	-1,321	-579	-1,104
2008-09	608	273	-1,285	-579	-925
Average	765	261	-1,383	-579	-877

Values in acre-feet
[1]Value represents average based on steady-state simulation

Table E5
Cumulative Water Budget

	Cumulative Subsurface Inflow	Cumulative Return Flow	Cumulative Pumping	Cumulative Subsurface Outflow	Cumulative Annual Storage Change
Water Year					
1994-95	1,051	204	-1,568	-579	-834
1995-96	2,394	407	-3,865	-1,159	-2,104
1996-97	3,258	646	-5,402	-1,738	-3,059
1997-98	3,744	886	-7,303	-2,317	-4,754
1998-99	4,888	1,129	-8,727	-2,896	-5,311
1999-00	5,593	1,397	-9,863	-3,476	-5,993
2000-01	6,049	1,694	-11,159	-4,055	-7,056
2001-02	6,431	1,987	-12,548	-4,634	-8,290
2002-03	6,638	2,291	-13,696	-5,213	-9,447
2003-04	7,282	2,562	-15,018	-5,793	-10,374
2004-05	7,853	2,827	-16,082	-6,372	-11,122
2005-06	9,387	3,079	-16,981	-6,951	-10,755
2006-07	10,419	3,352	-18,137	-7,530	-11,125
2007-08	10,861	3,647	-19,458	-8,110	-12,230
2008-09	11,469	3,920	-20,743	-8,689	-13,154

Values in acre-feet

Figures

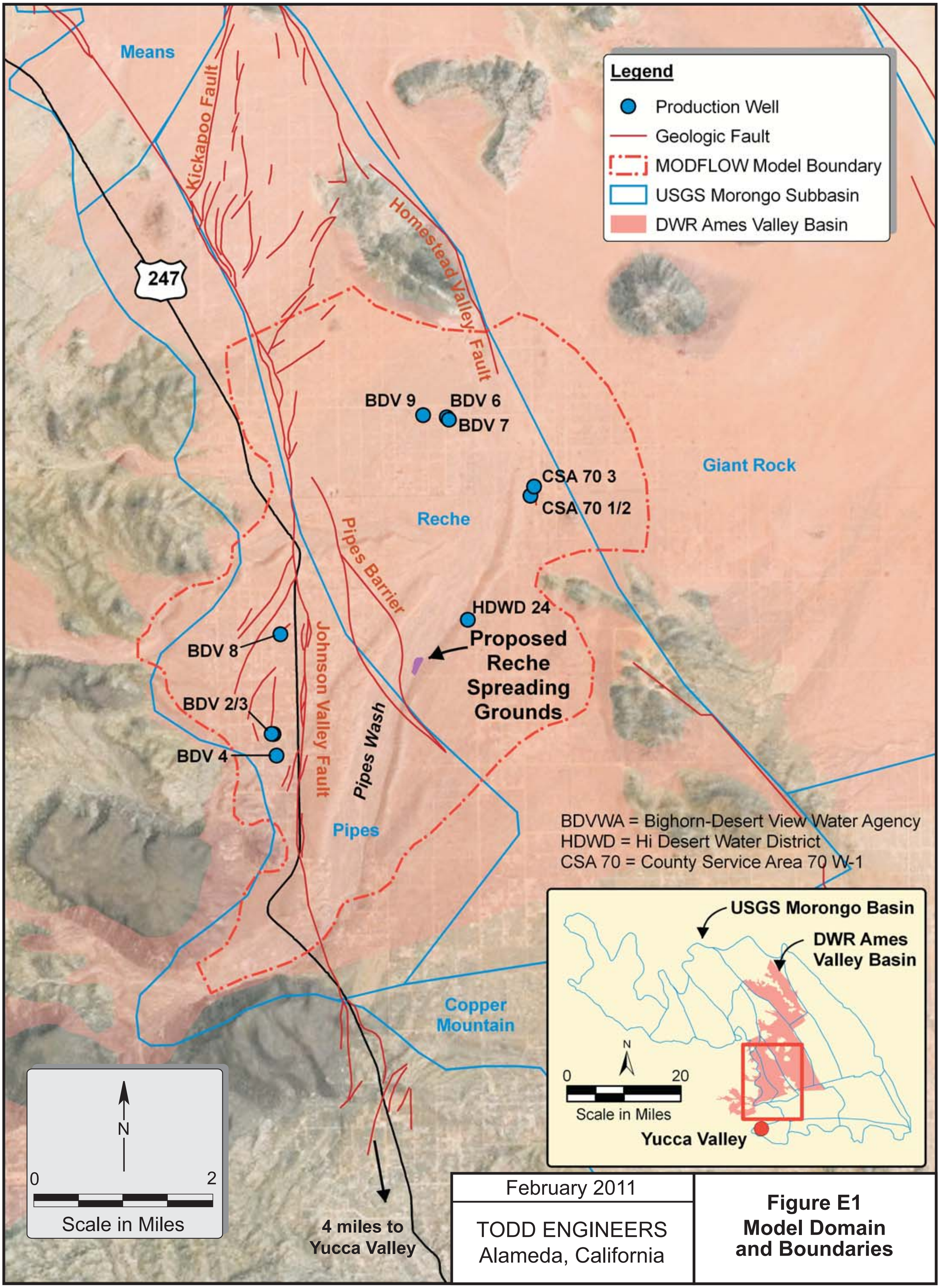

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Figure E1
Model Domain and Boundaries

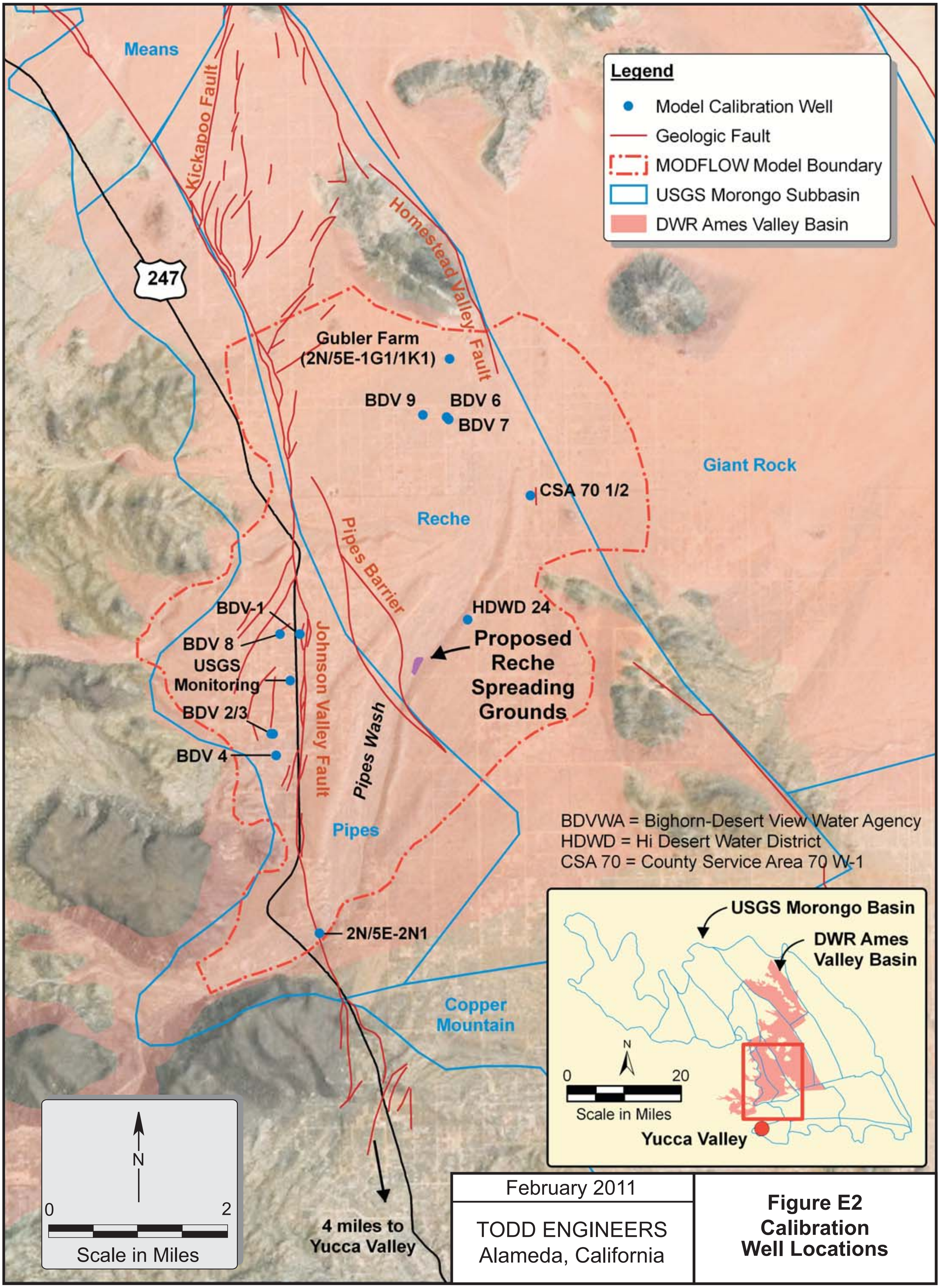

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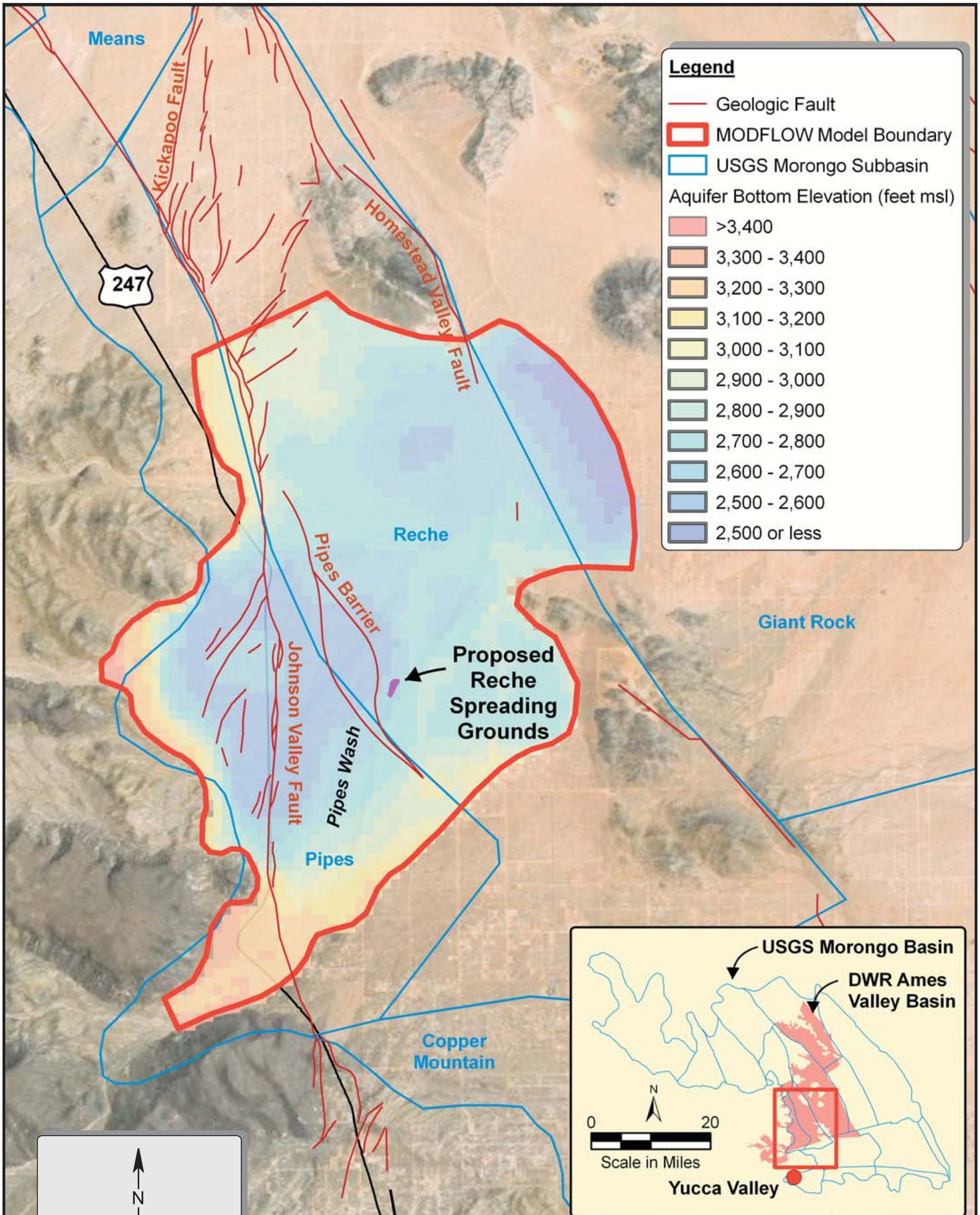
Figure E2
Calibration
Well Locations



February 2011	**Figure E3**
TODD ENGINEERS Alameda, California	**Aquifer Bottom Elevations**

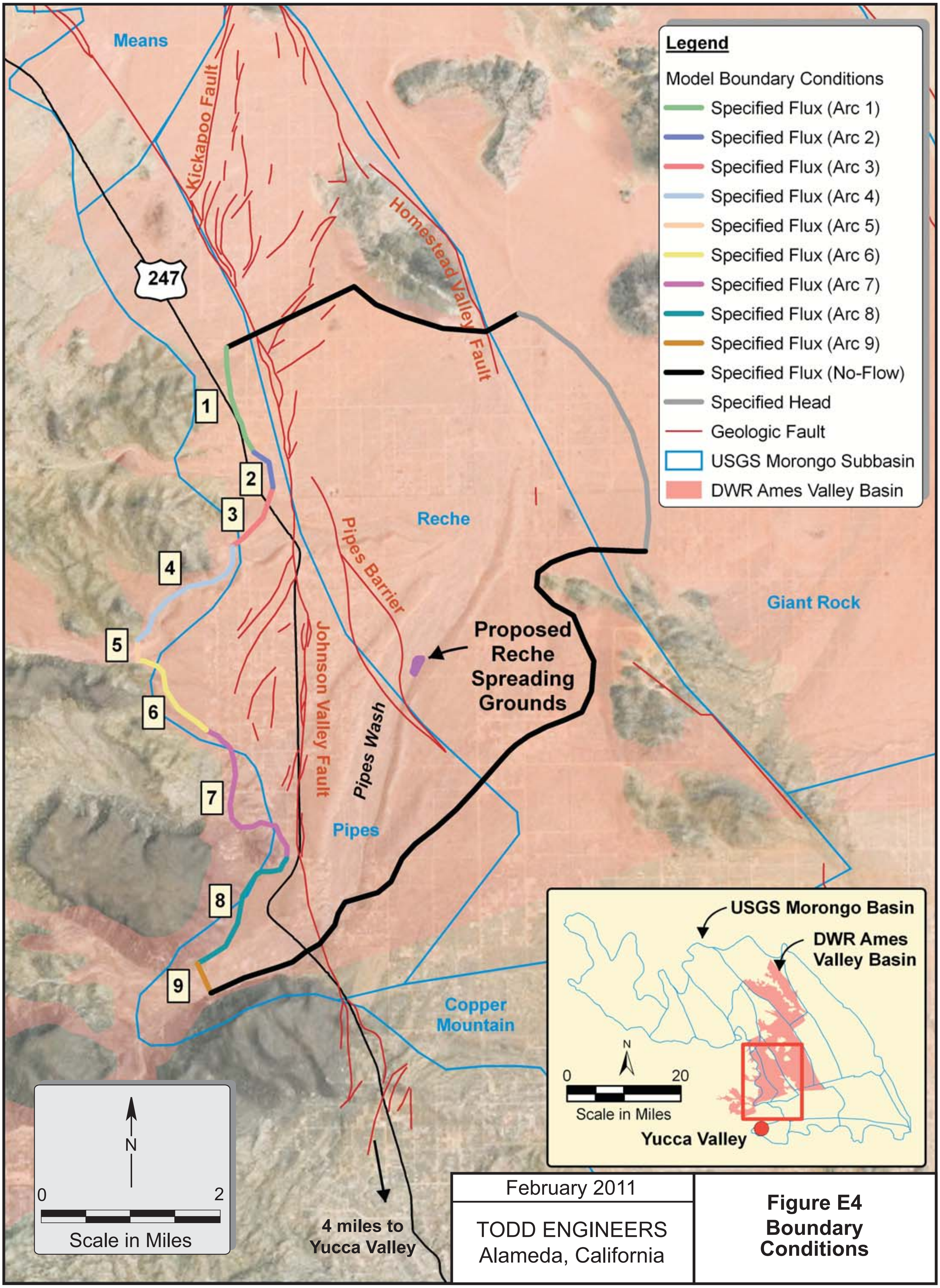


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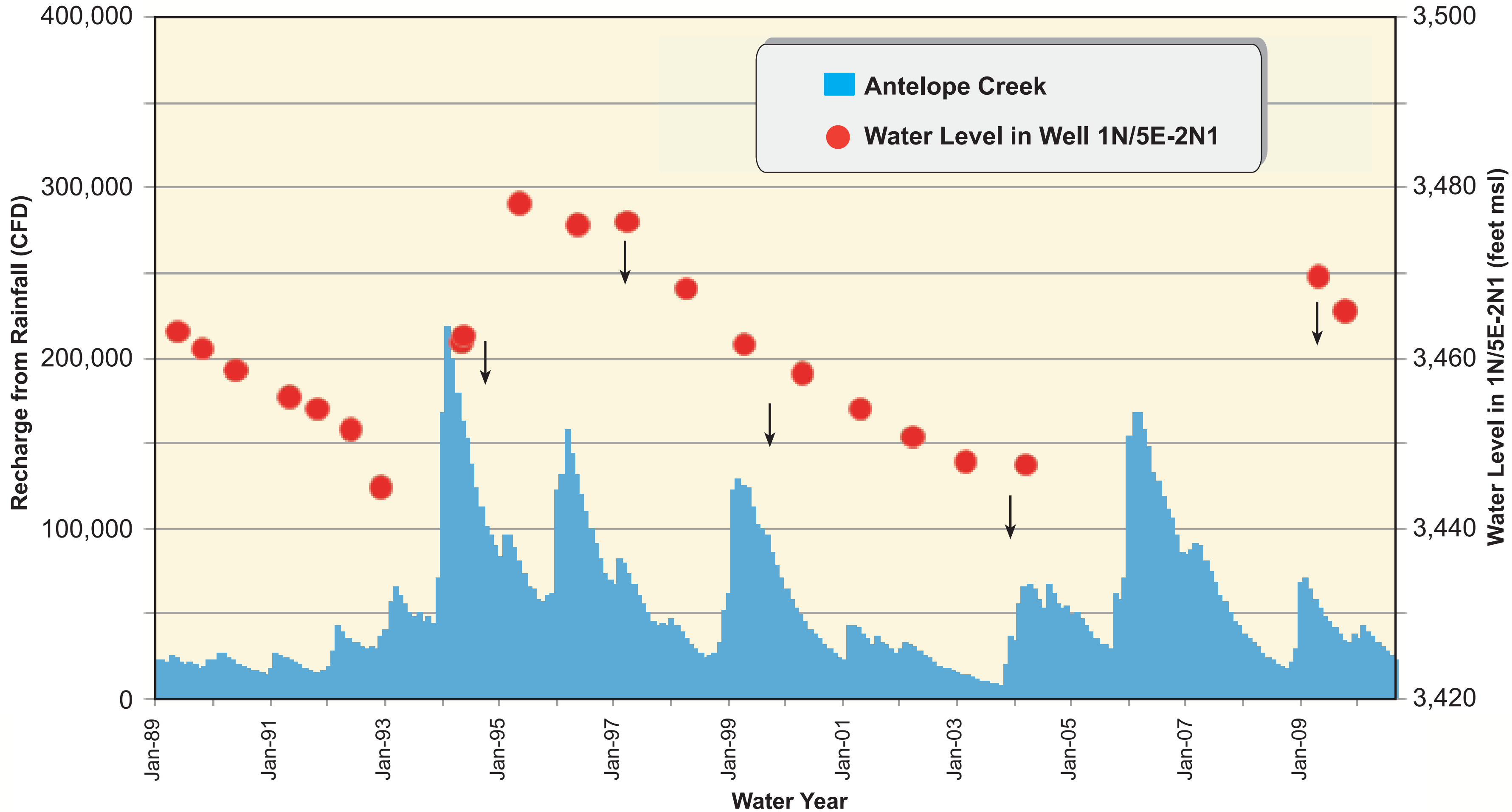
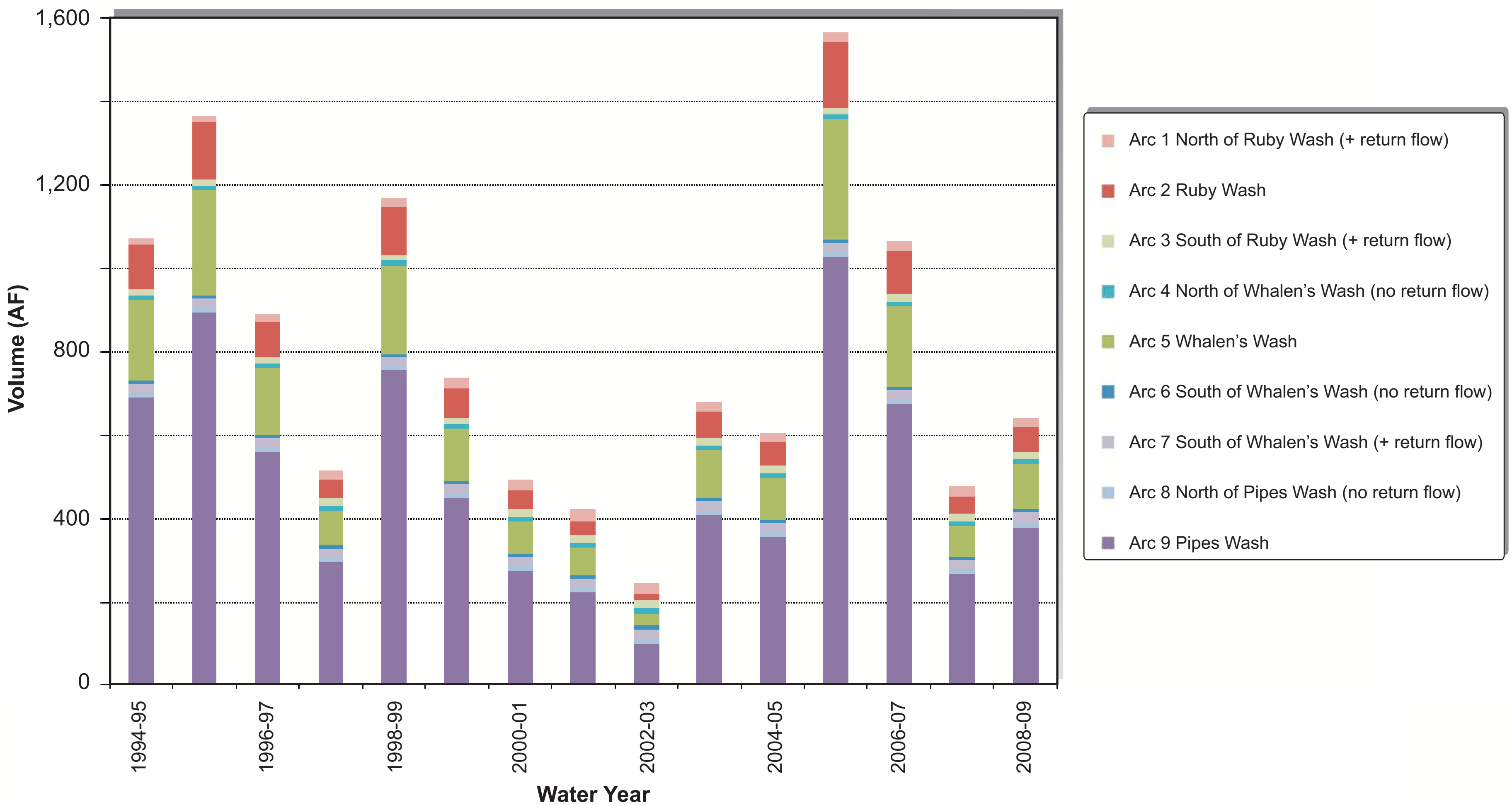
Figure E4
Boundary Conditions



February 2011	**Figure E5**
TODD ENGINEERS Alameda, California	**Relationship Between Rainfall and Water Levels in Pipes Wash Well 1N/5E-2N1**



February 2011	**Figure E6**
TODD ENGINEERS Alameda, California	**Recharge Rates for Western Flux Boundary**

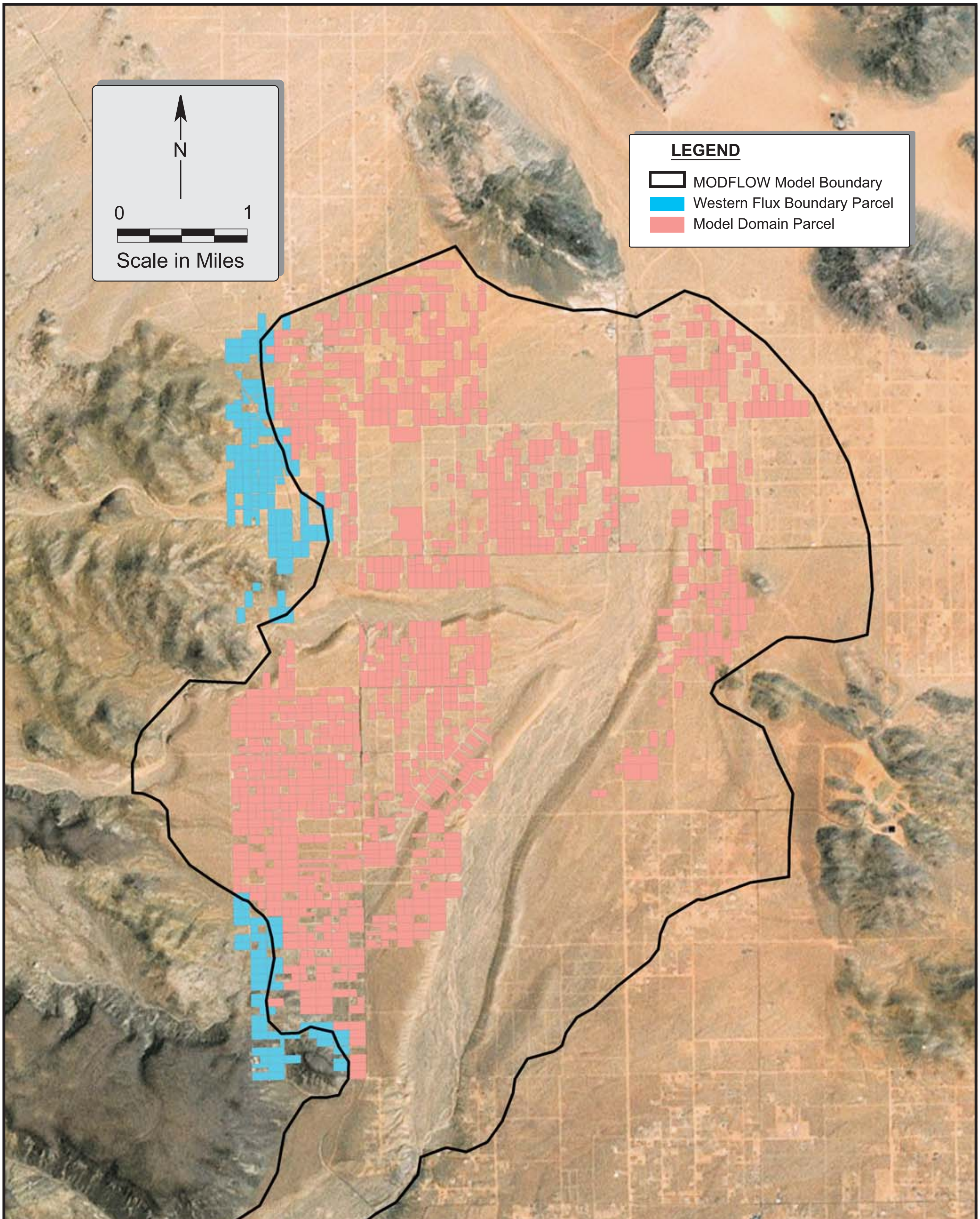


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Figure E7
BDVWA
Water Customer Parcels
and Recharge Areas

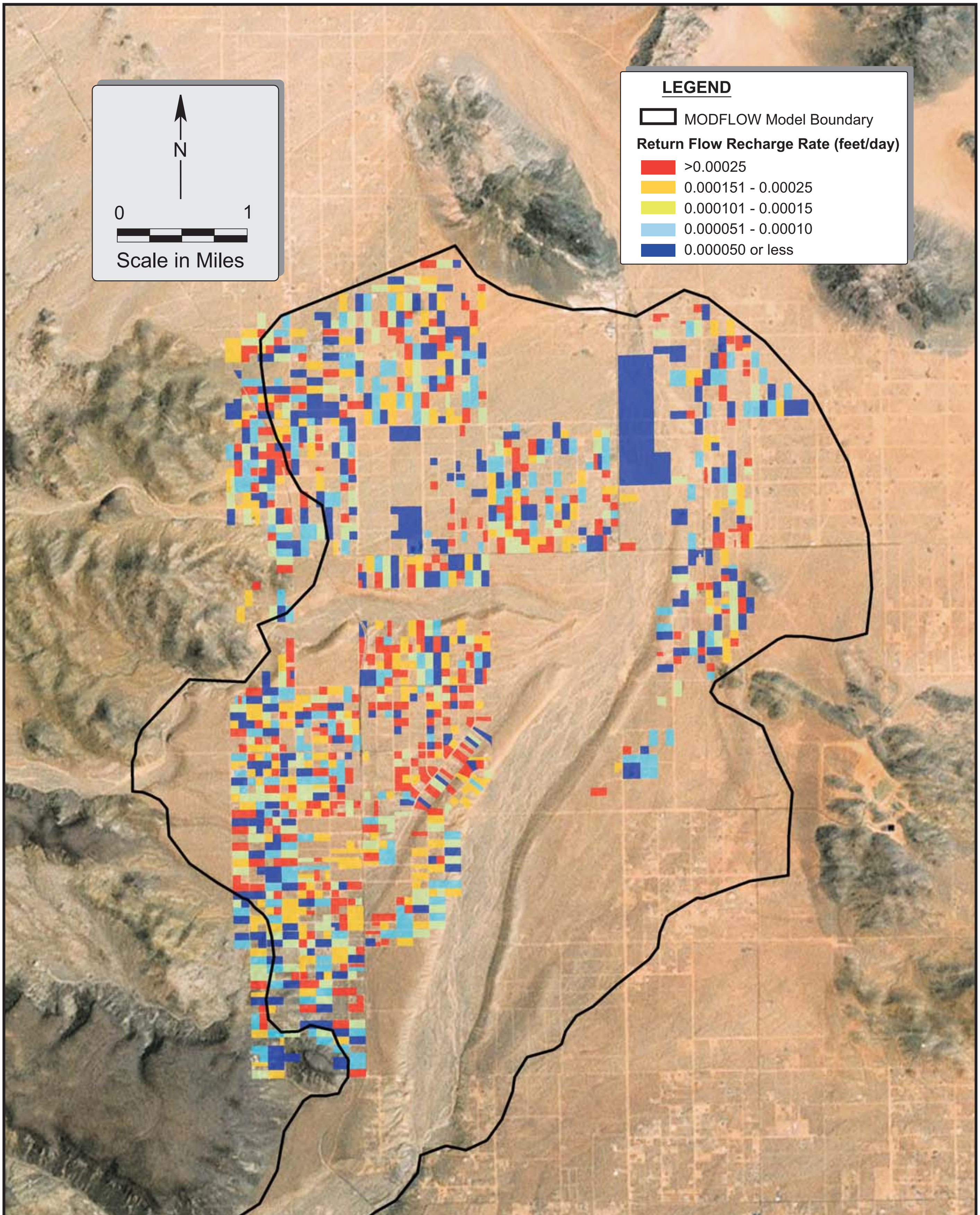

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Figure E8
Return Flow
Recharge Rates

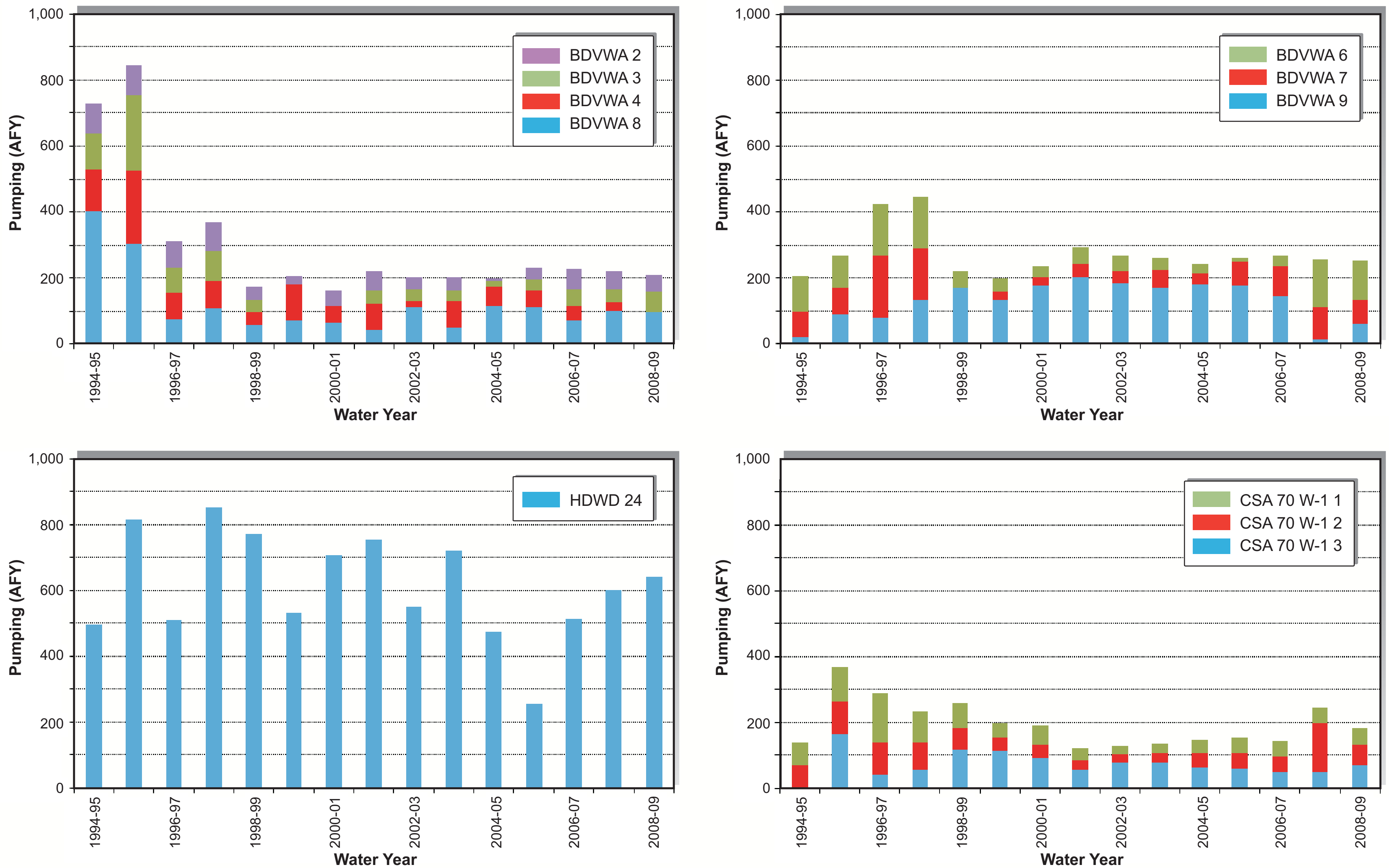

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Figure E9
Production Well Pumping Rates

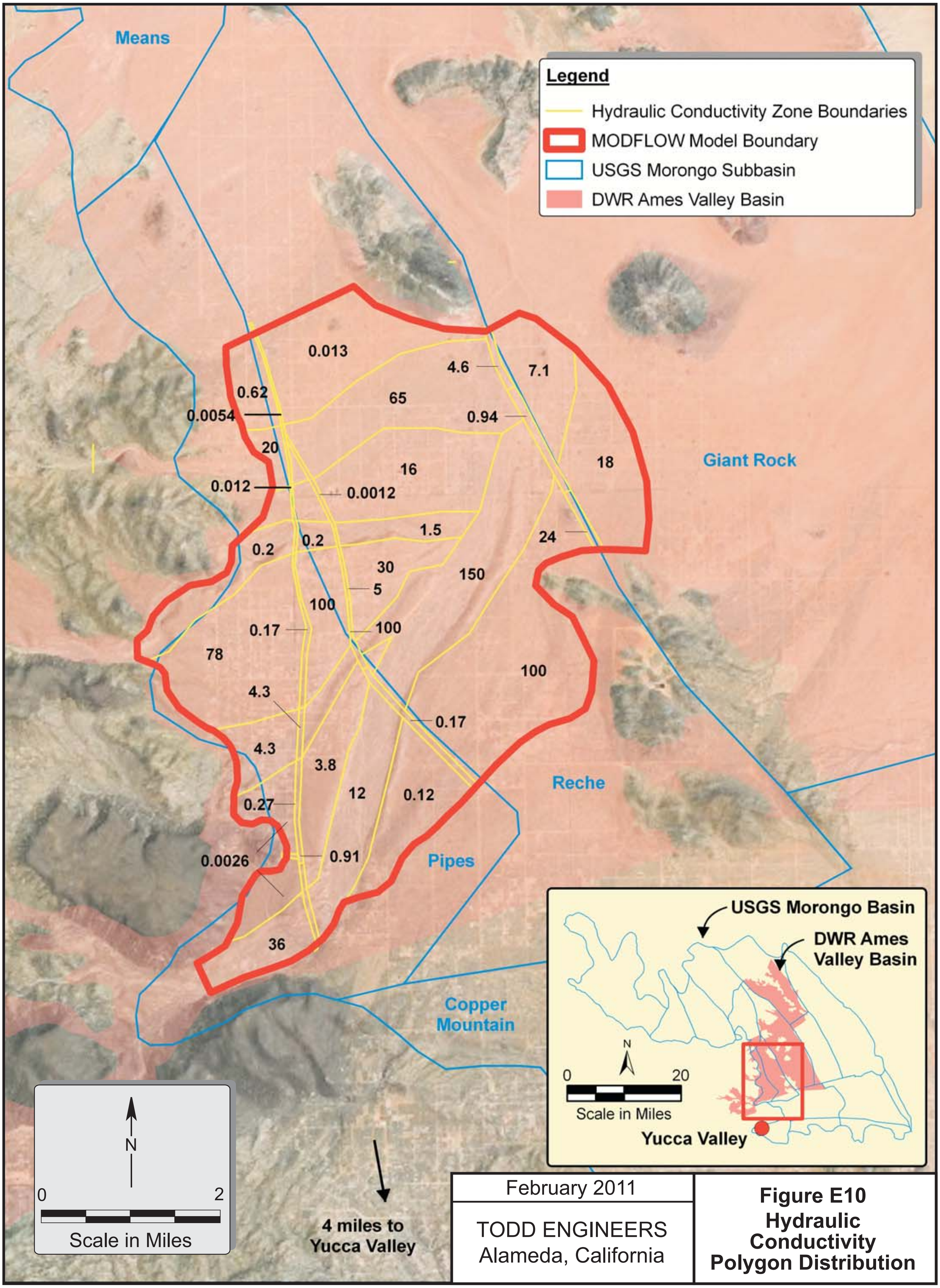

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Figure E10
Hydraulic Conductivity Polygon Distribution

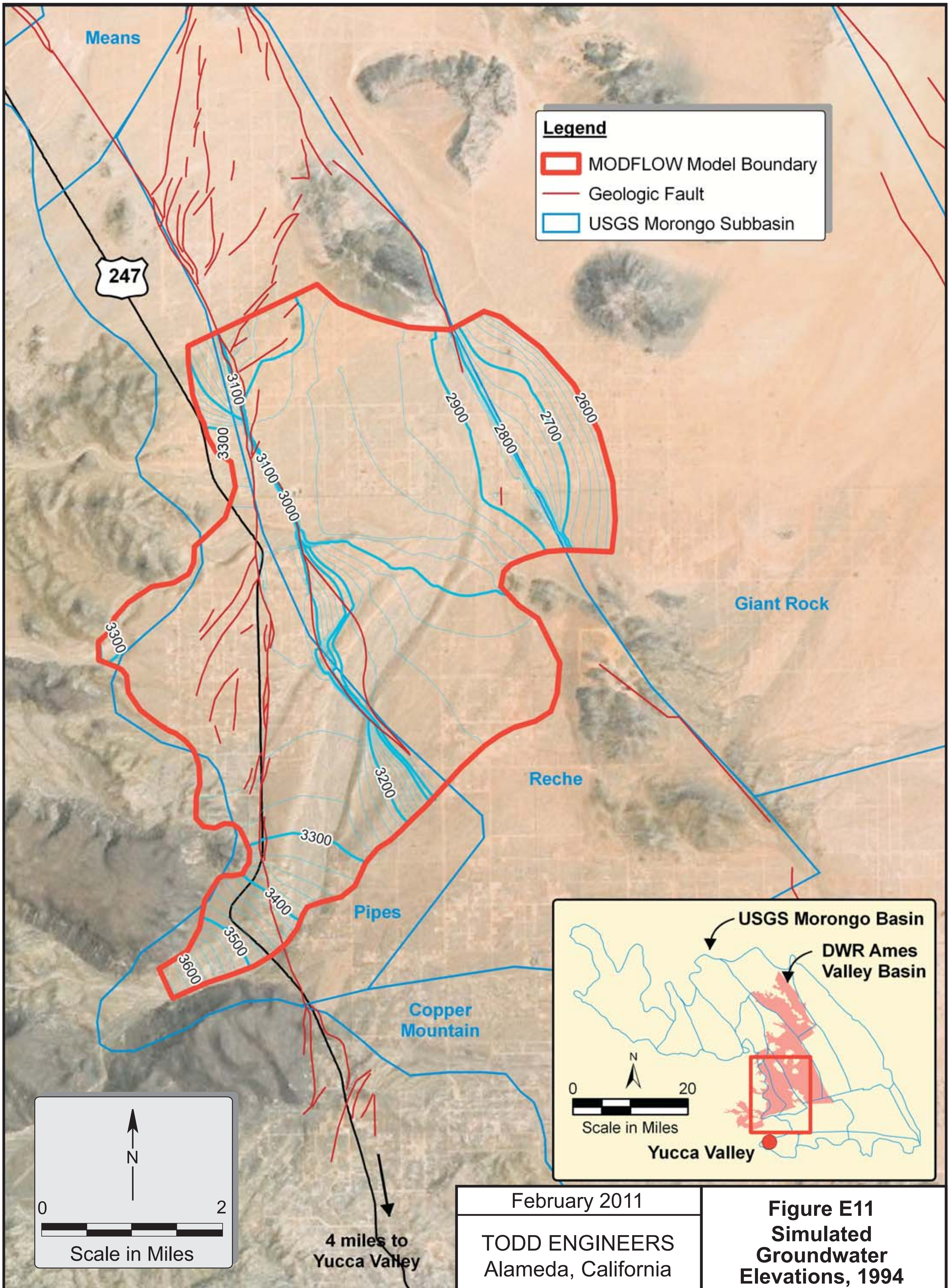

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Figure E11
Simulated Groundwater Elevations, 1994

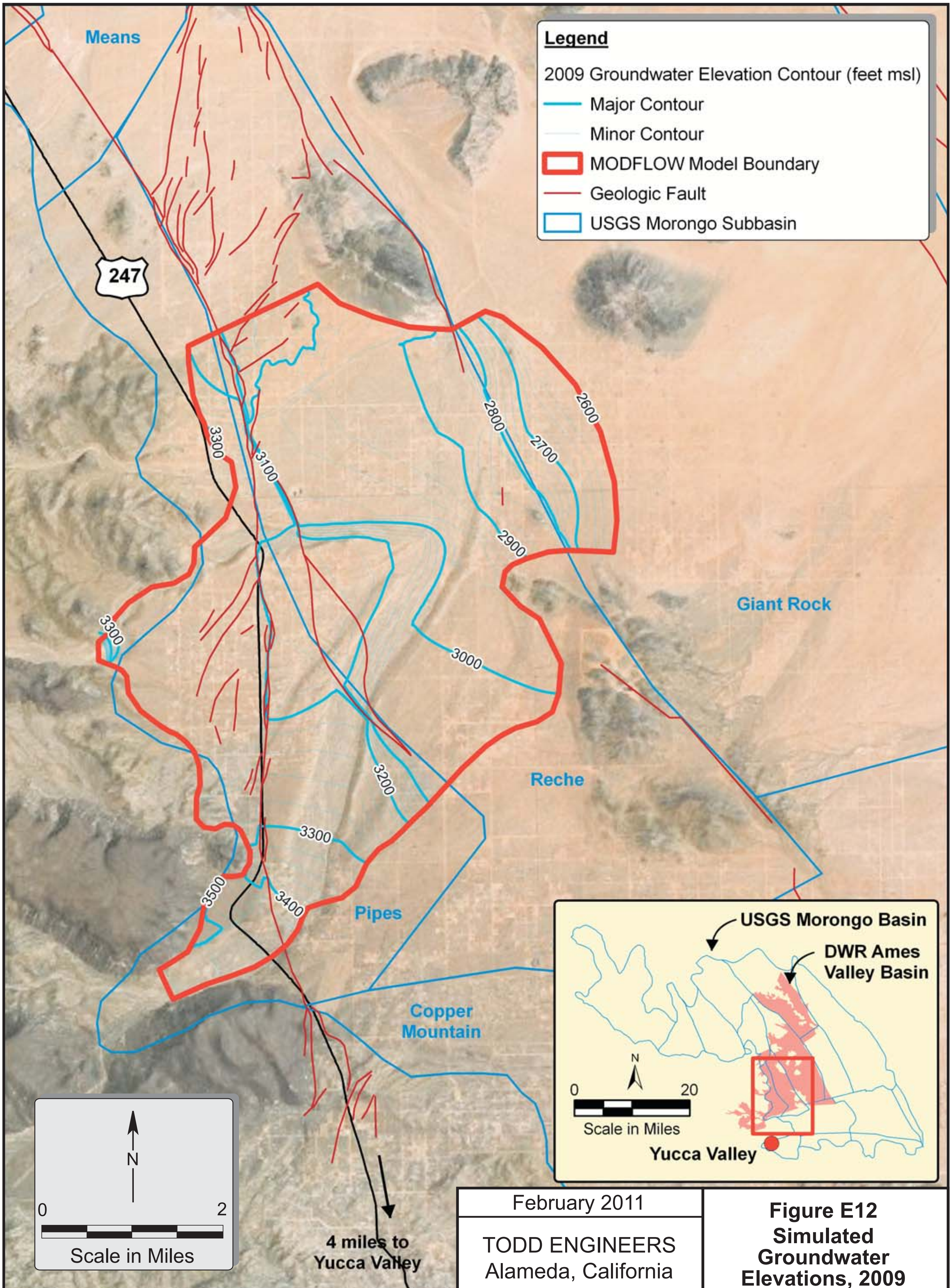

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Figure E12
Simulated Groundwater Elevations, 2009

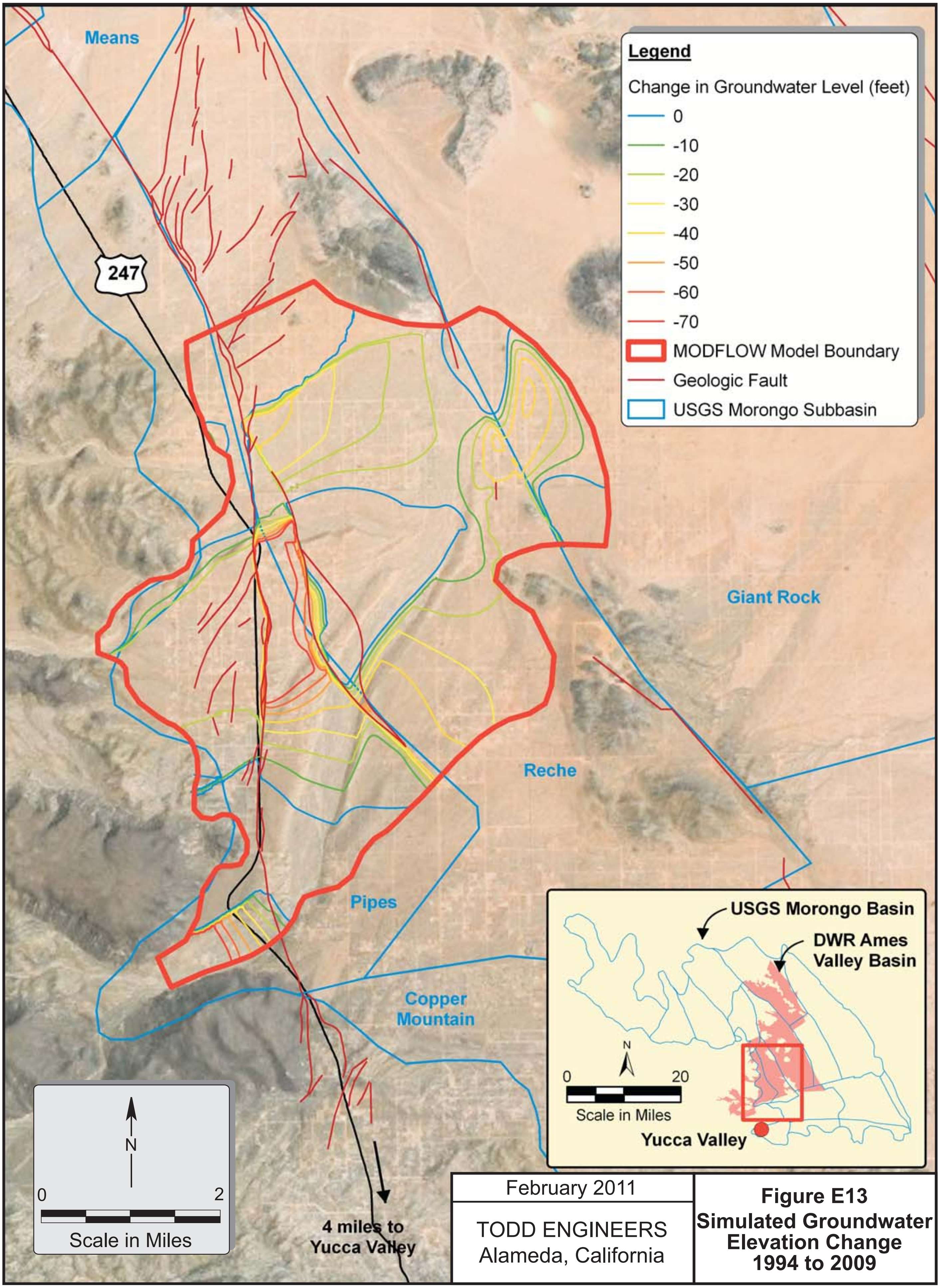

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Figure E13
Simulated Groundwater Elevation Change
1994 to 2009

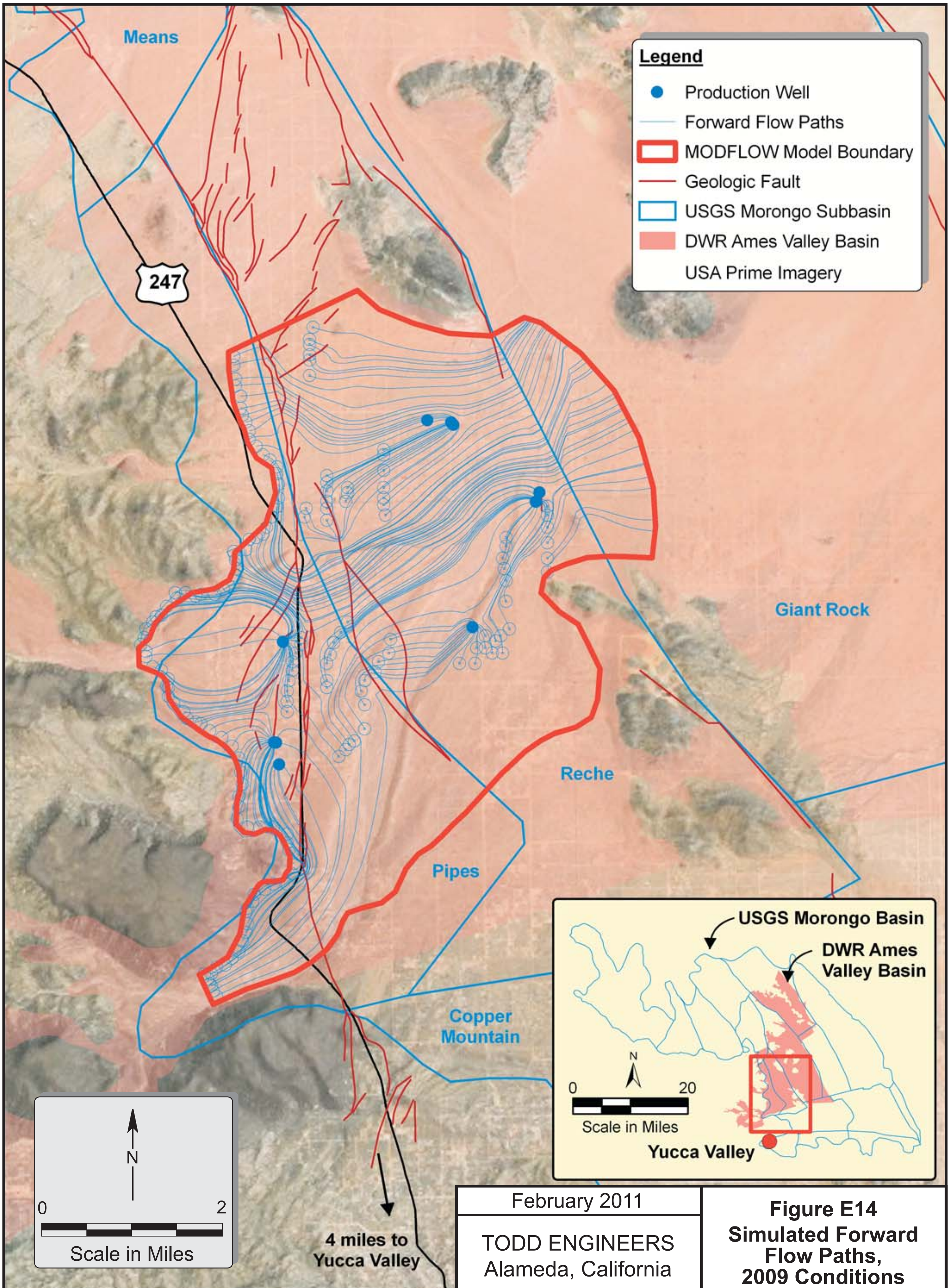

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Figure E14
Simulated Forward Flow Paths, 2009 Conditions

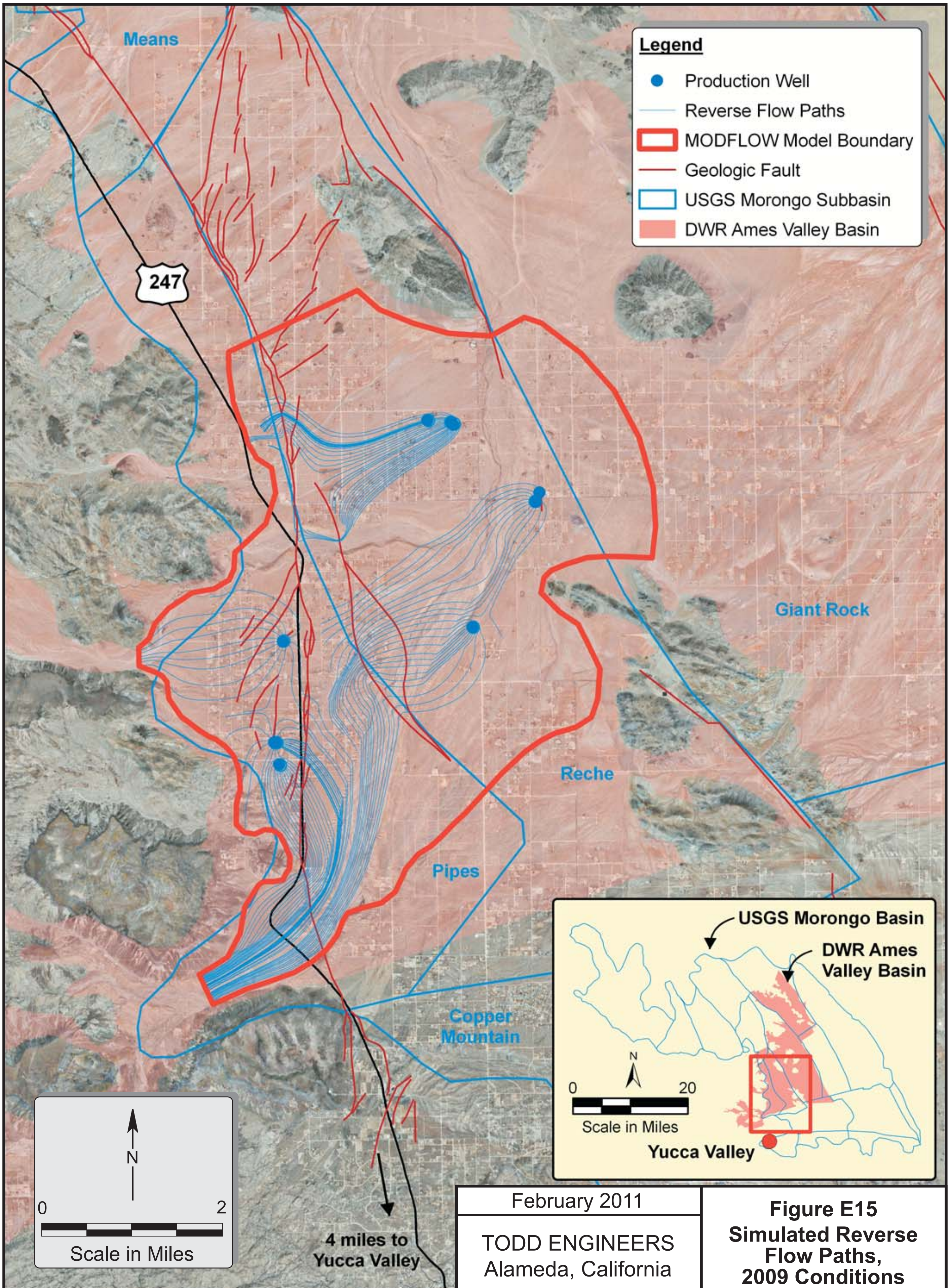

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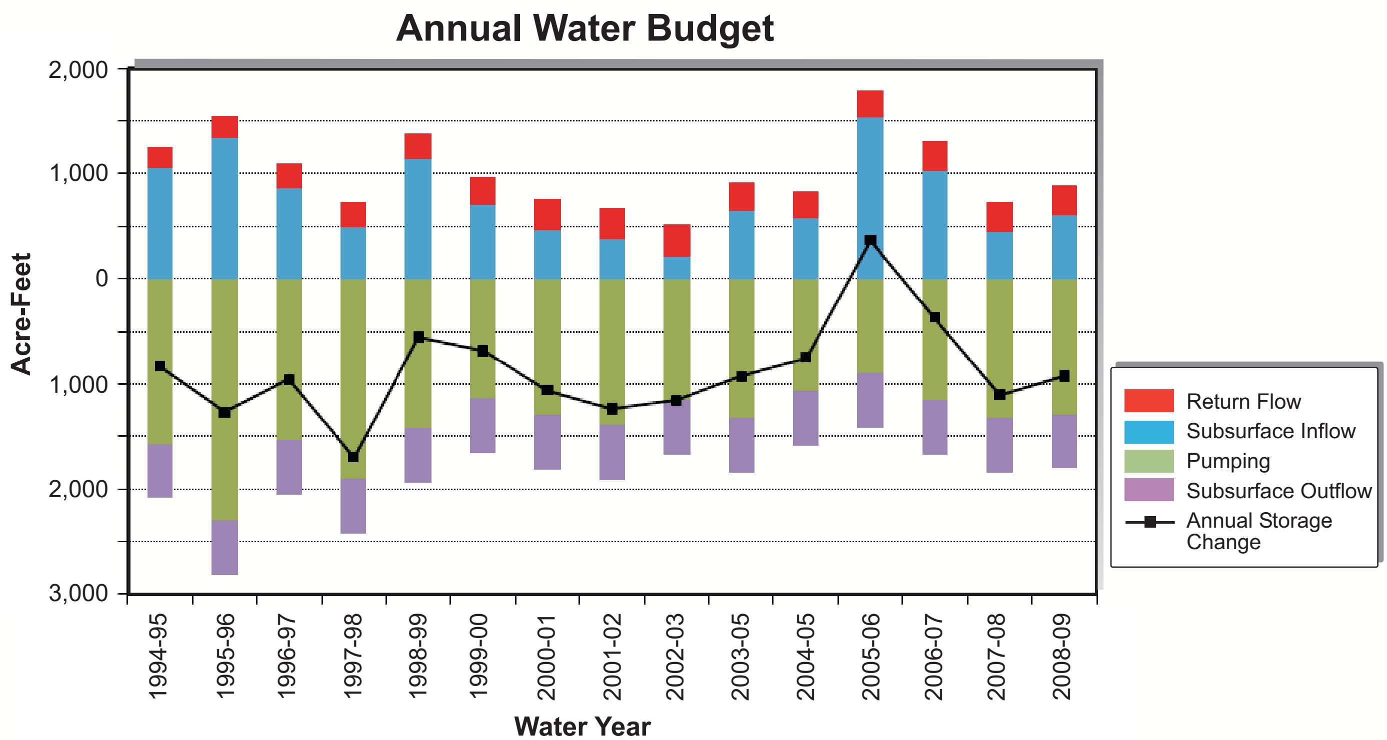
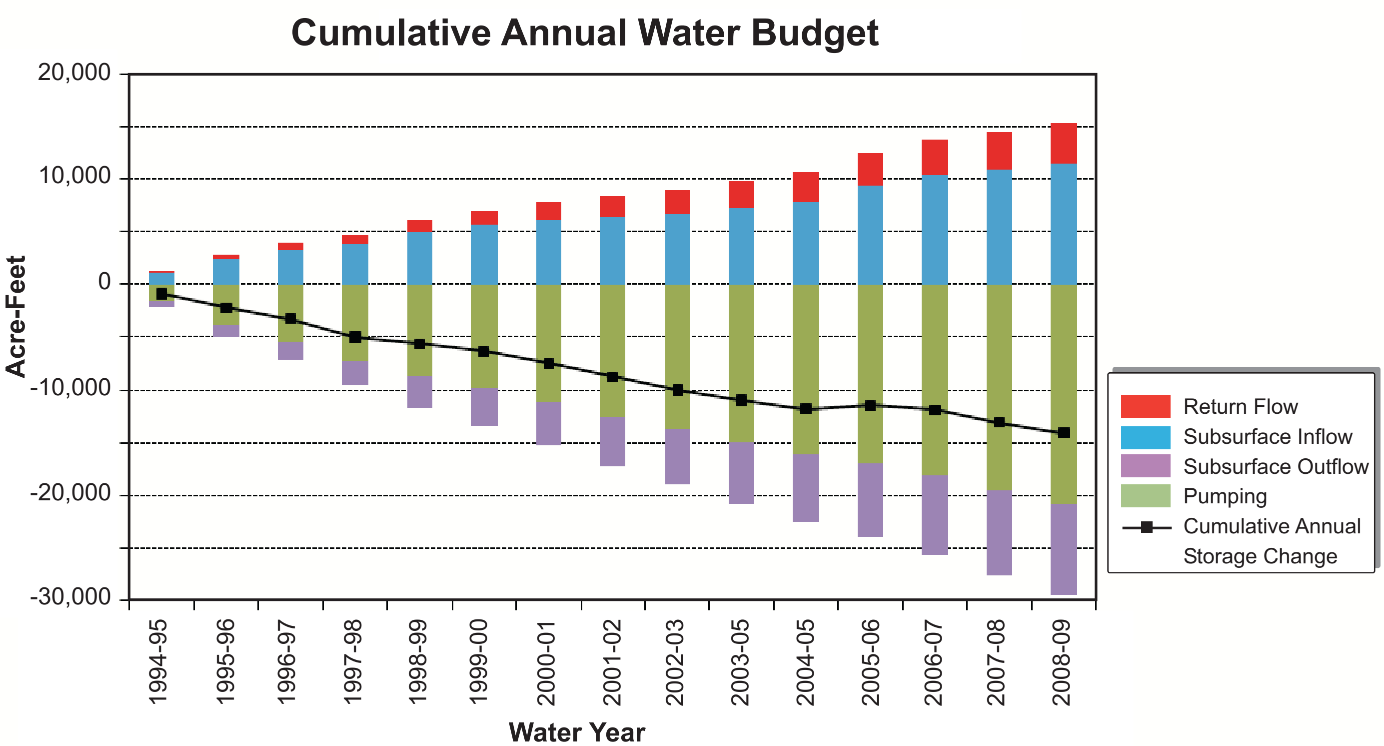
Figure E15
Simulated Reverse Flow Paths, 2009 Conditions





February 2011	**Figure E16**
TODD ENGINEERS Alameda, California	**Water Budget Summary 1994 - 2009**

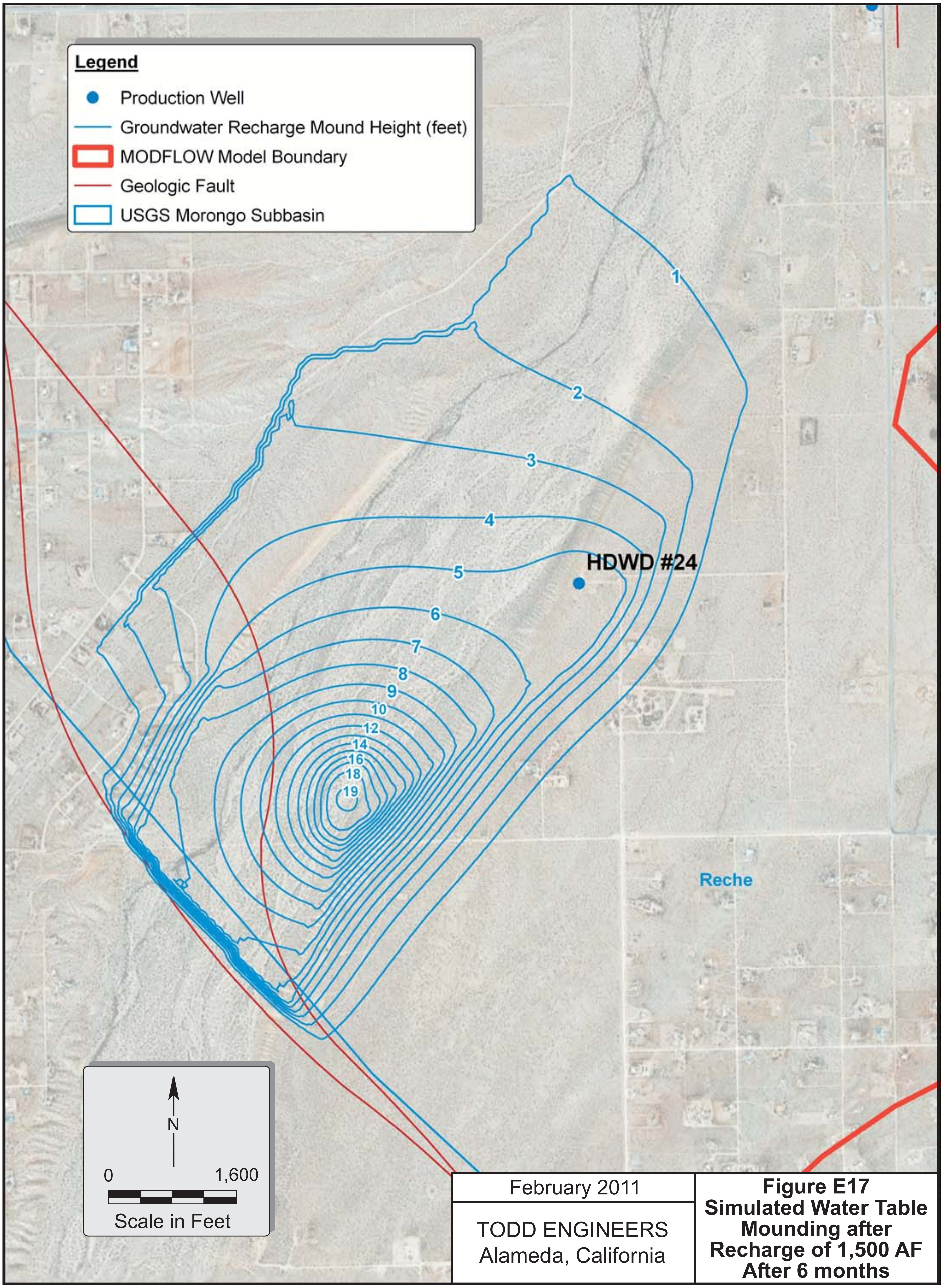


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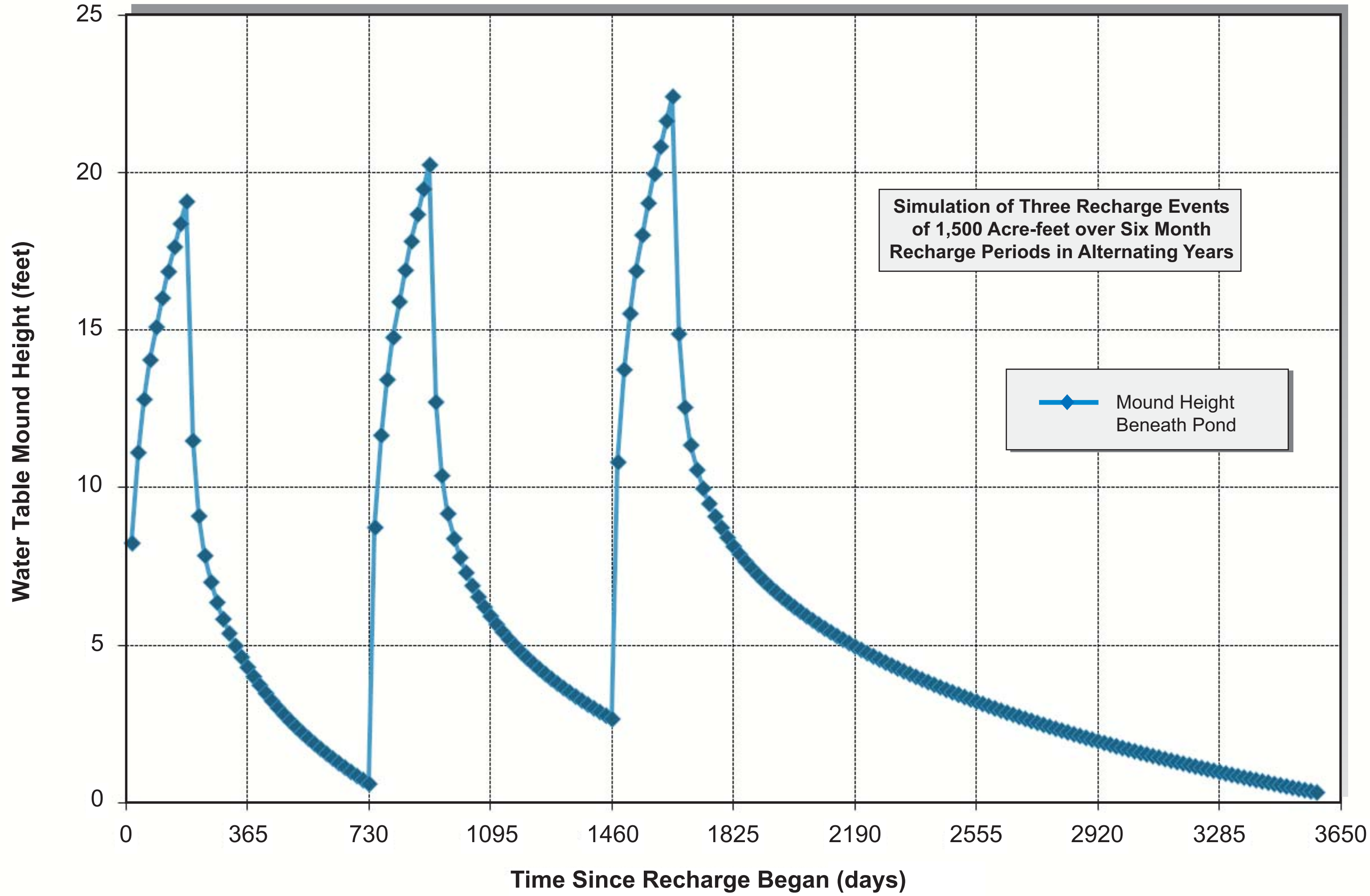
Figure E17
Simulated Water Table Mounding after Recharge of 1,500 AF After 6 months



February 2011	**Figure E18**
TODD ENGINEERS Alameda, California	**Simulated Water Levels over Time from Recharge of 1,500 AF in Alternating Years**

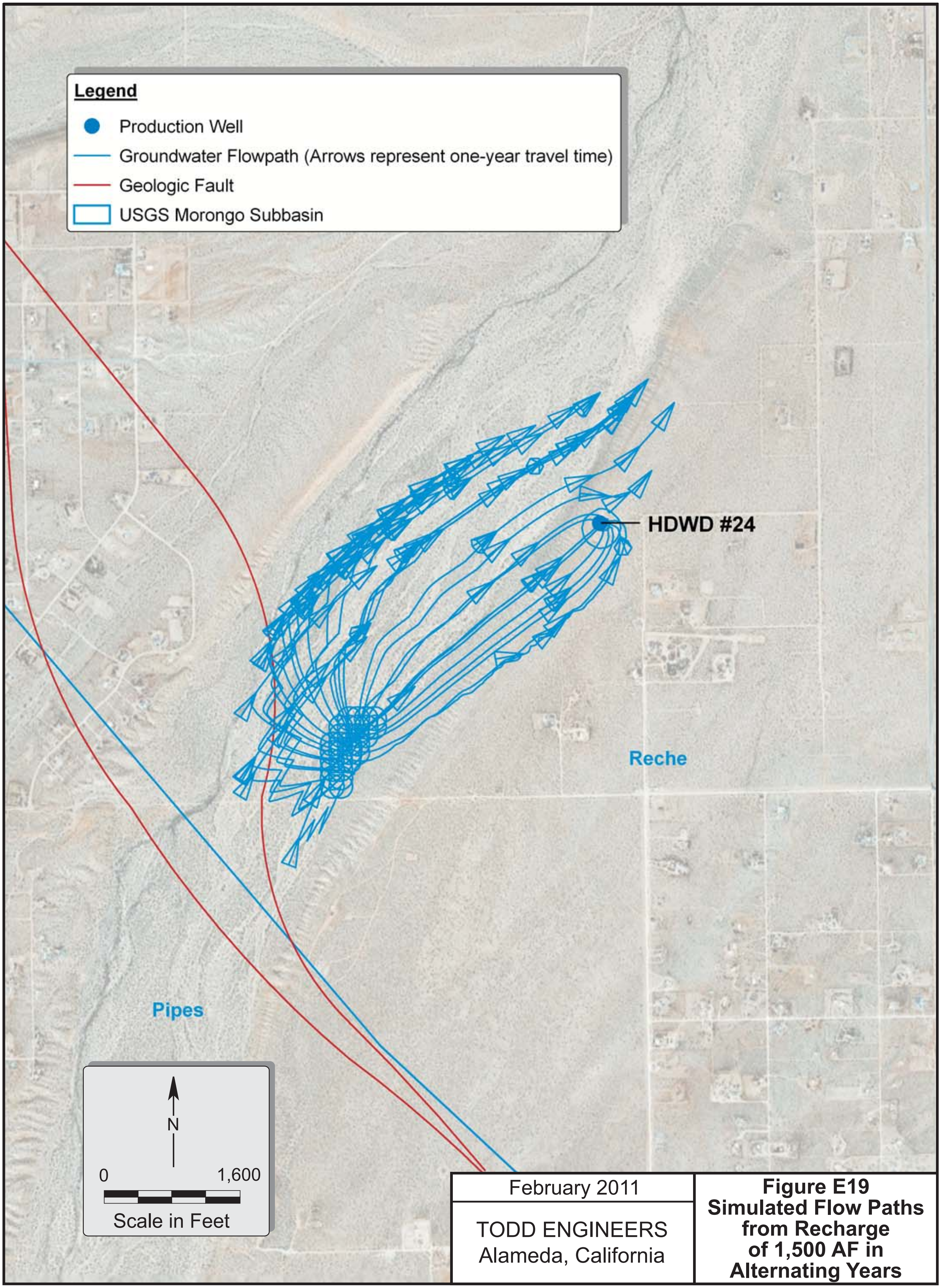


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Figure E19
Simulated Flow Paths from Recharge of 1,500 AF in Alternating Years

Charts

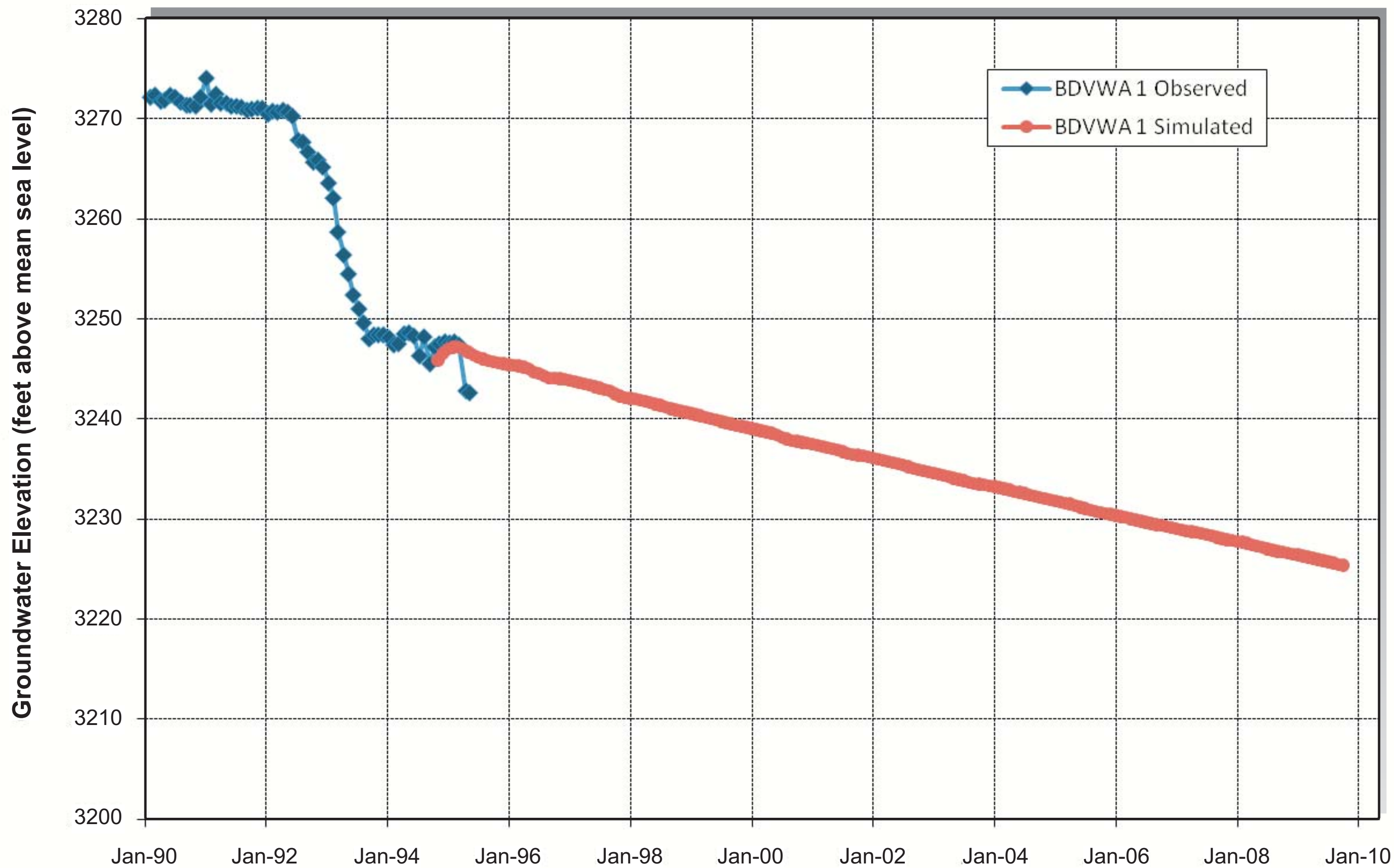

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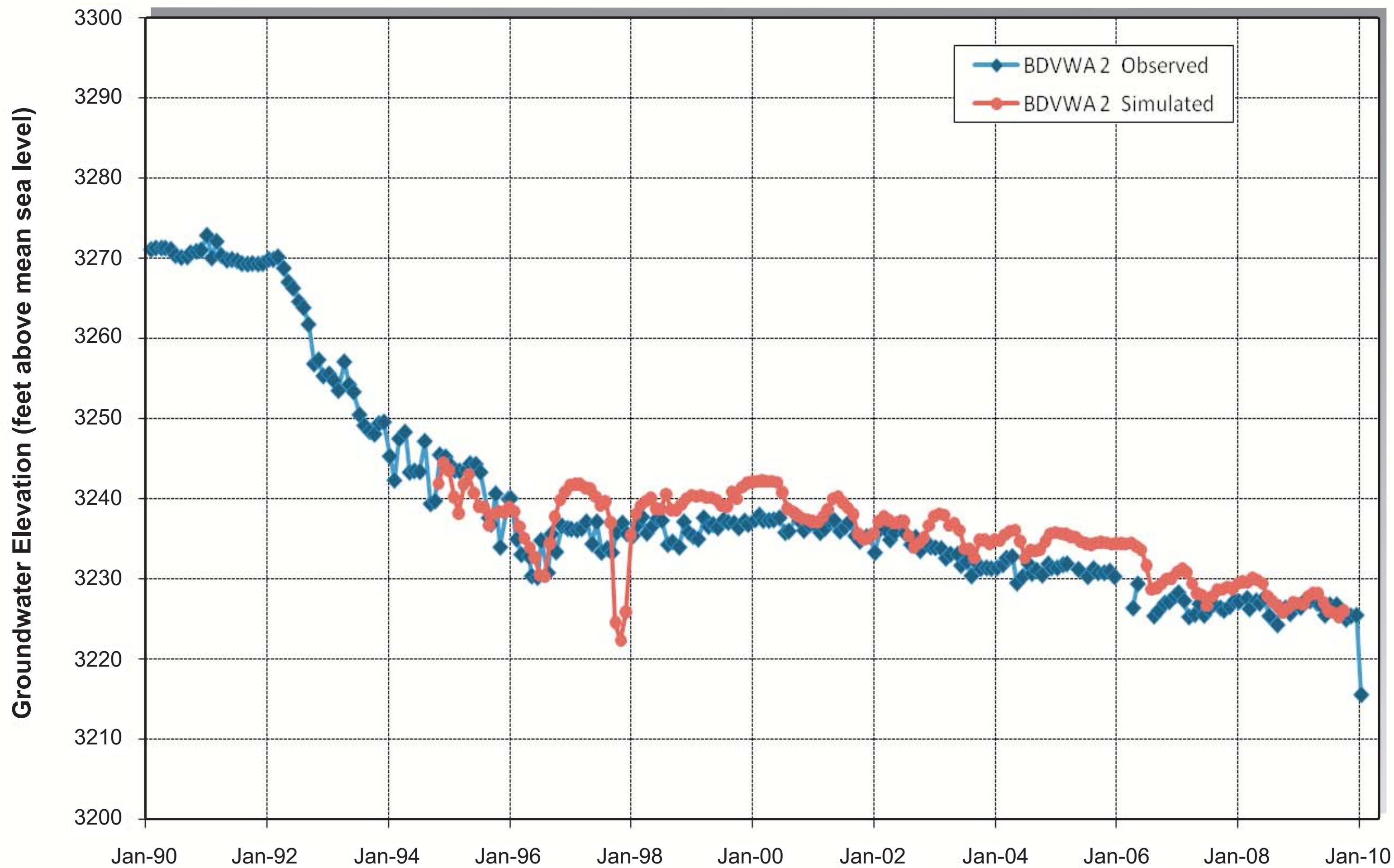
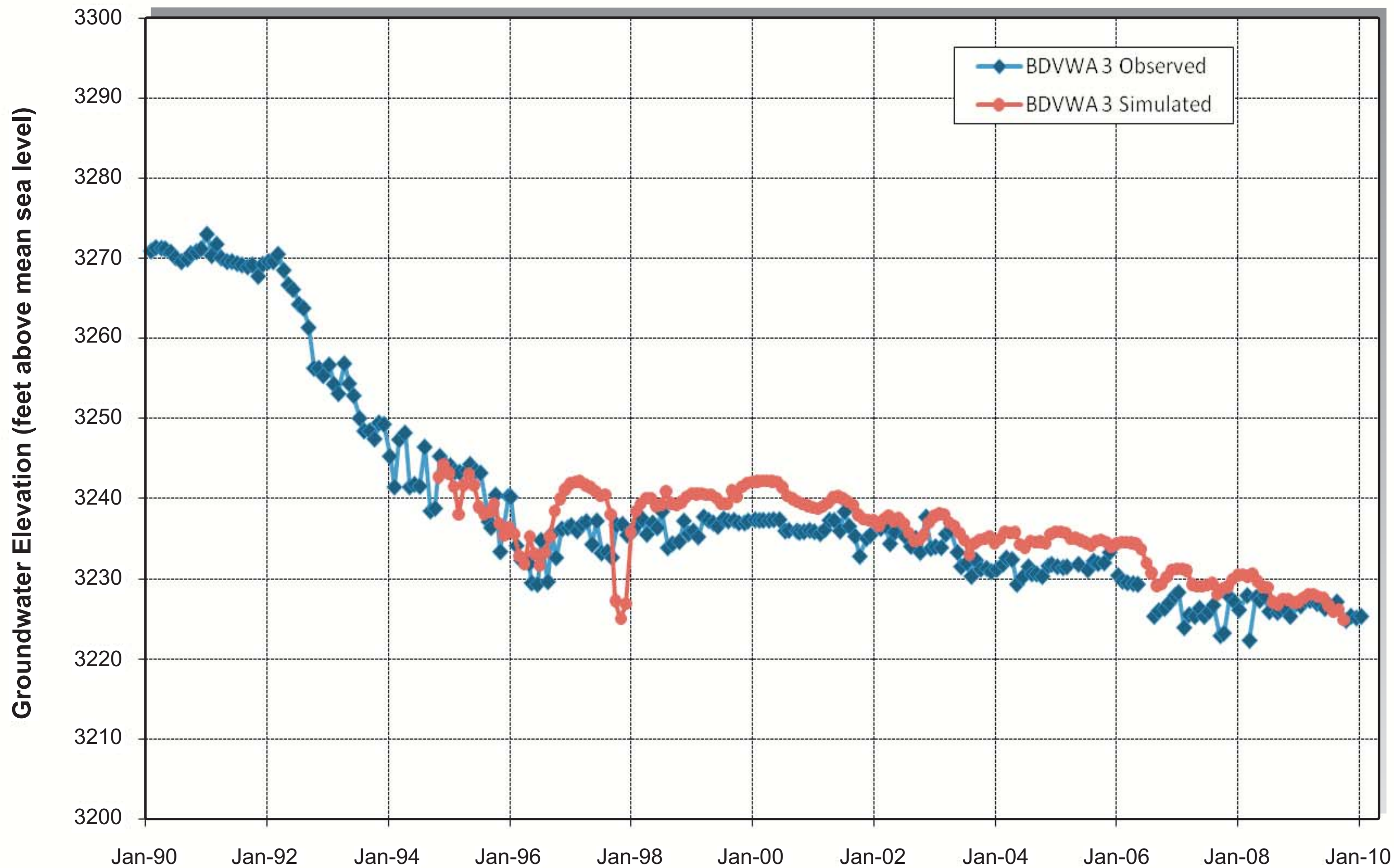
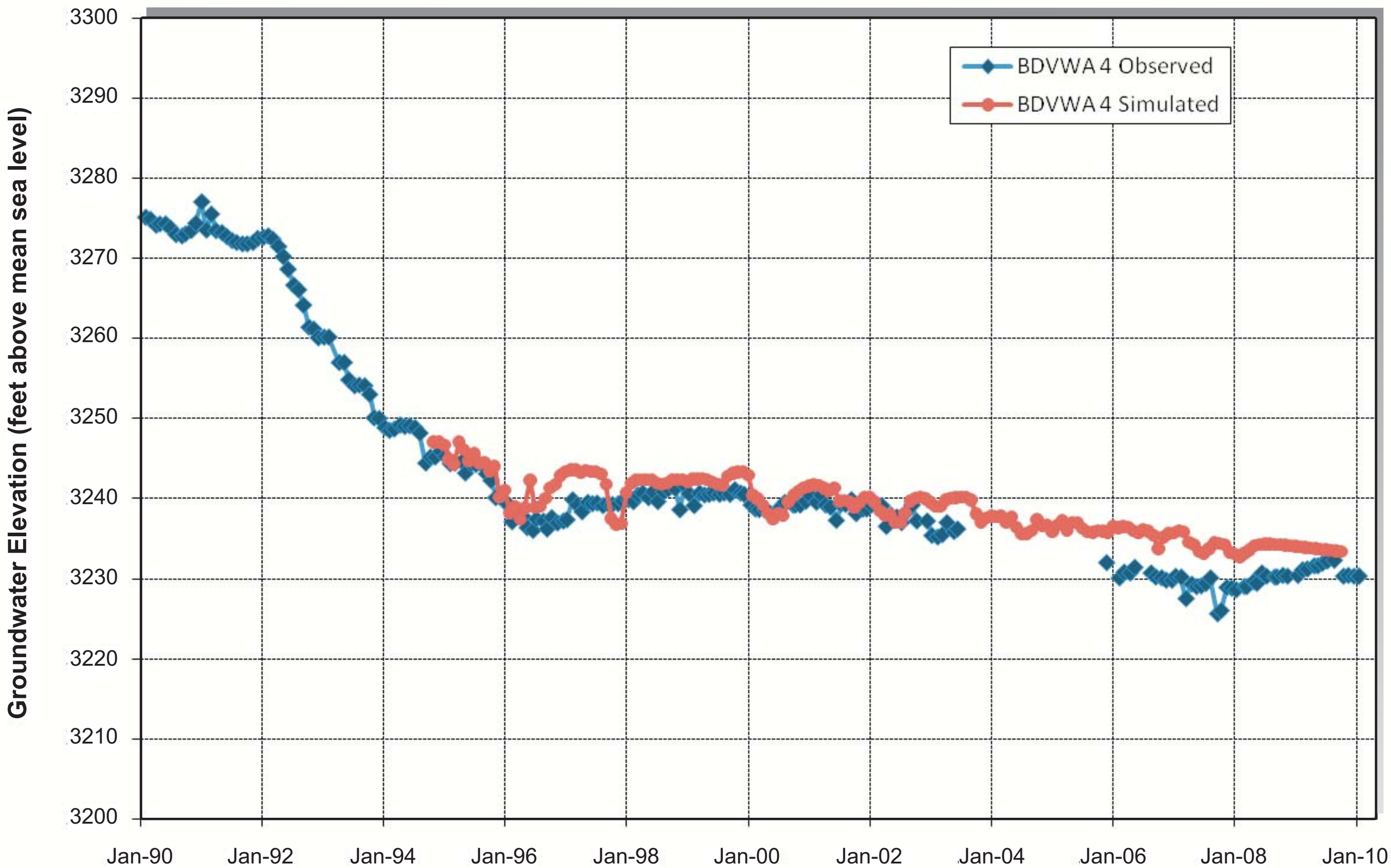
Chart E1
1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 1



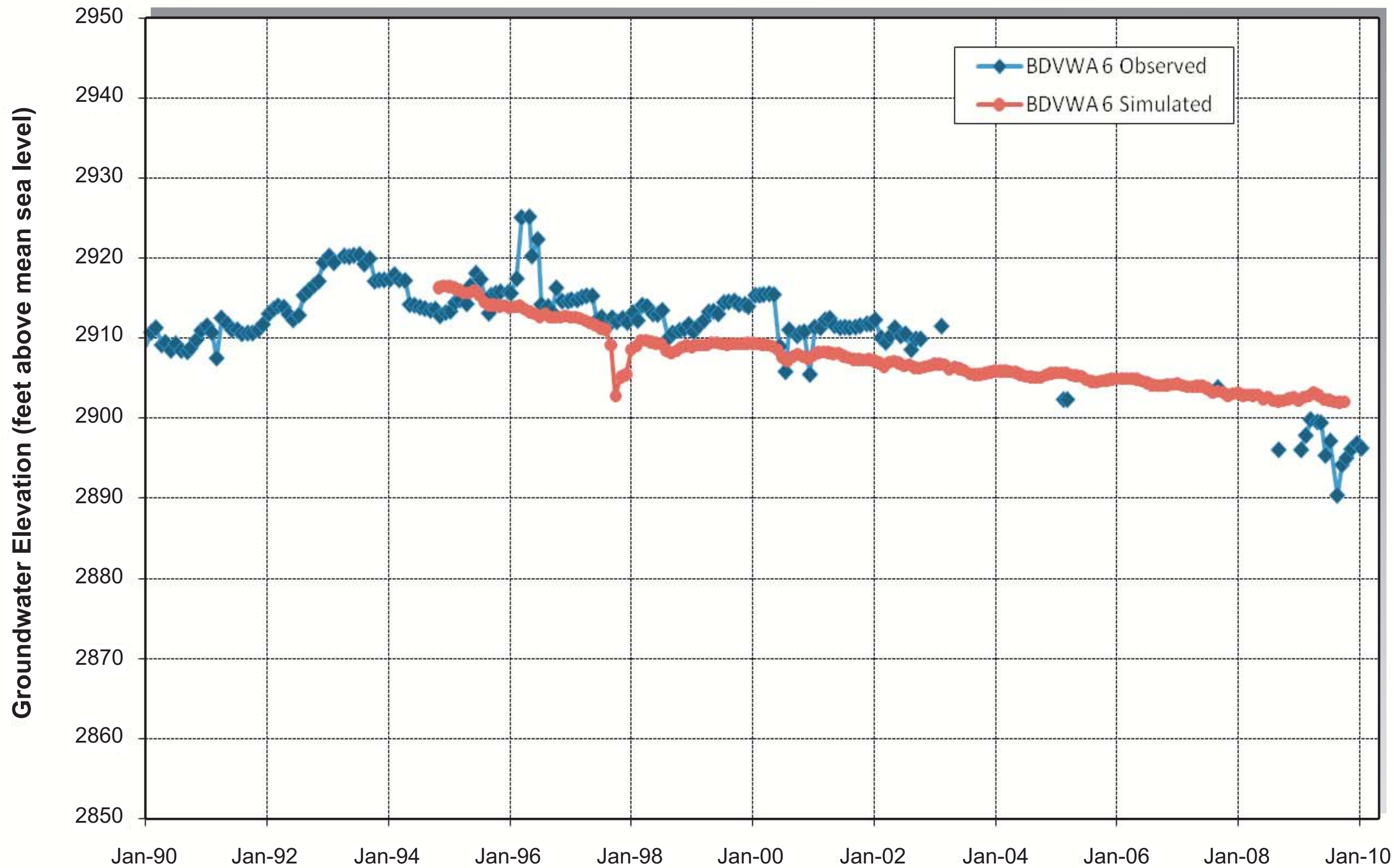
February 2011	**Chart E2**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 2**



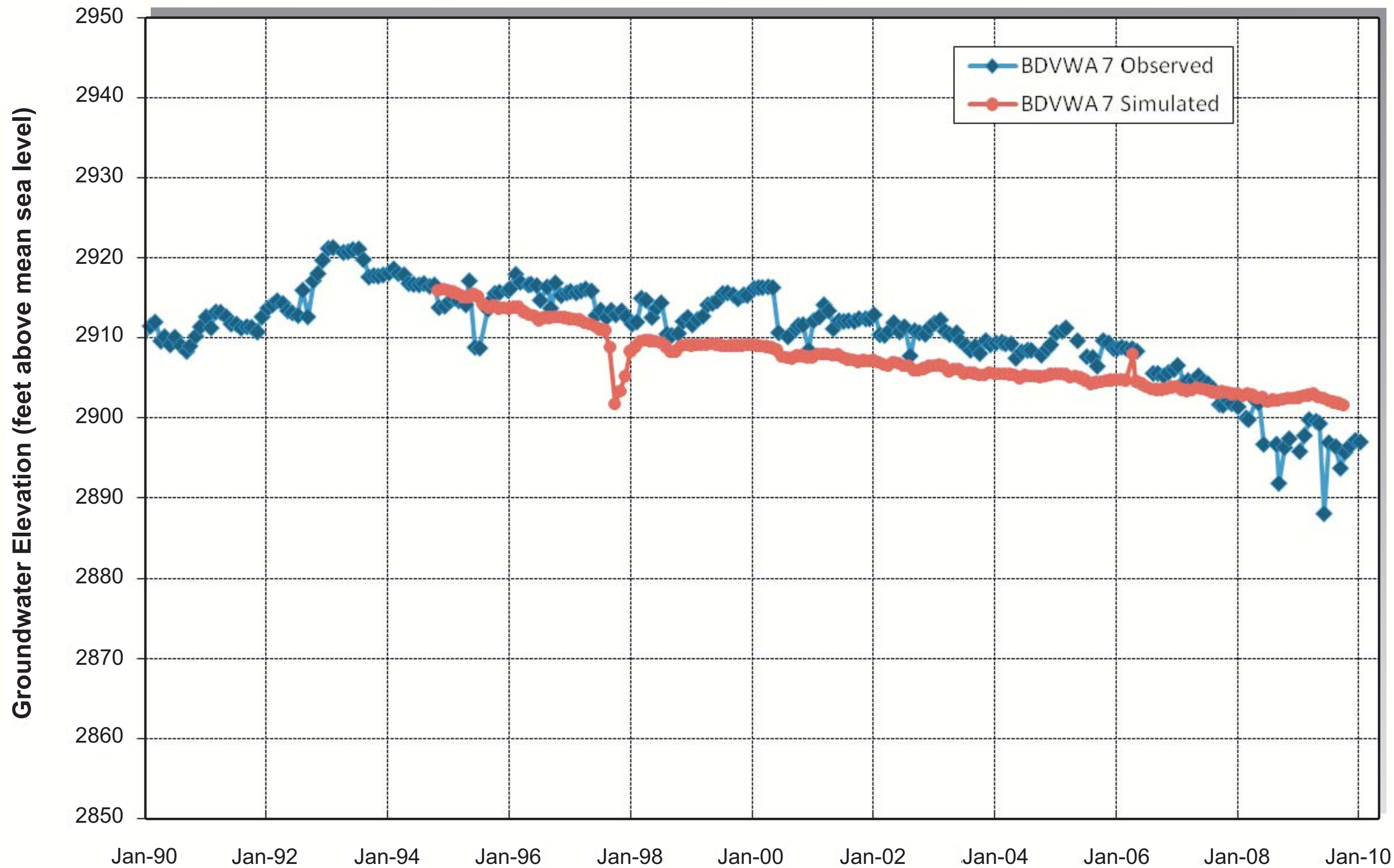
February 2011	**Chart E3**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 3**



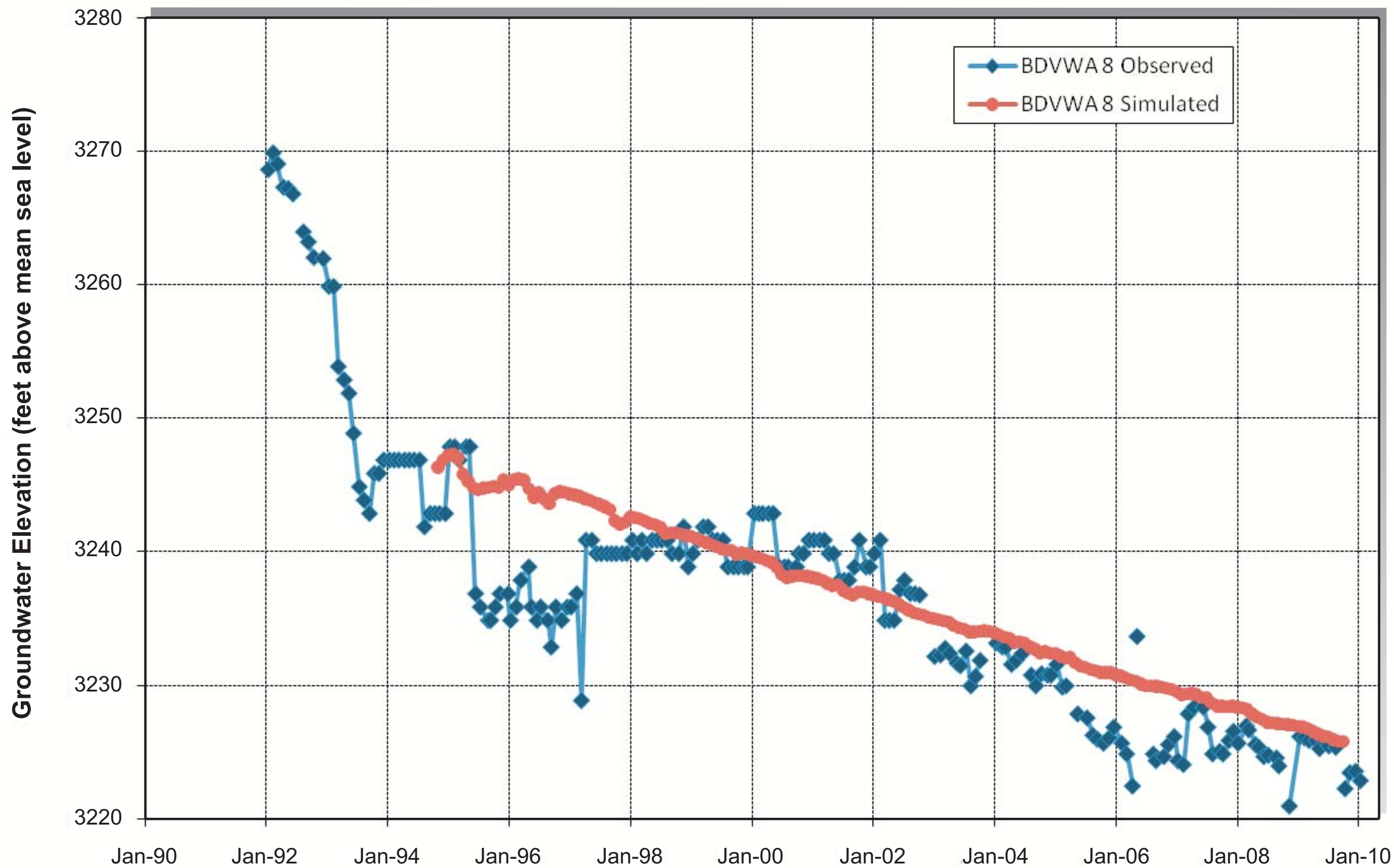
February 2011	**Chart E4** **1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 4**
TODD ENGINEERS Alameda, California	



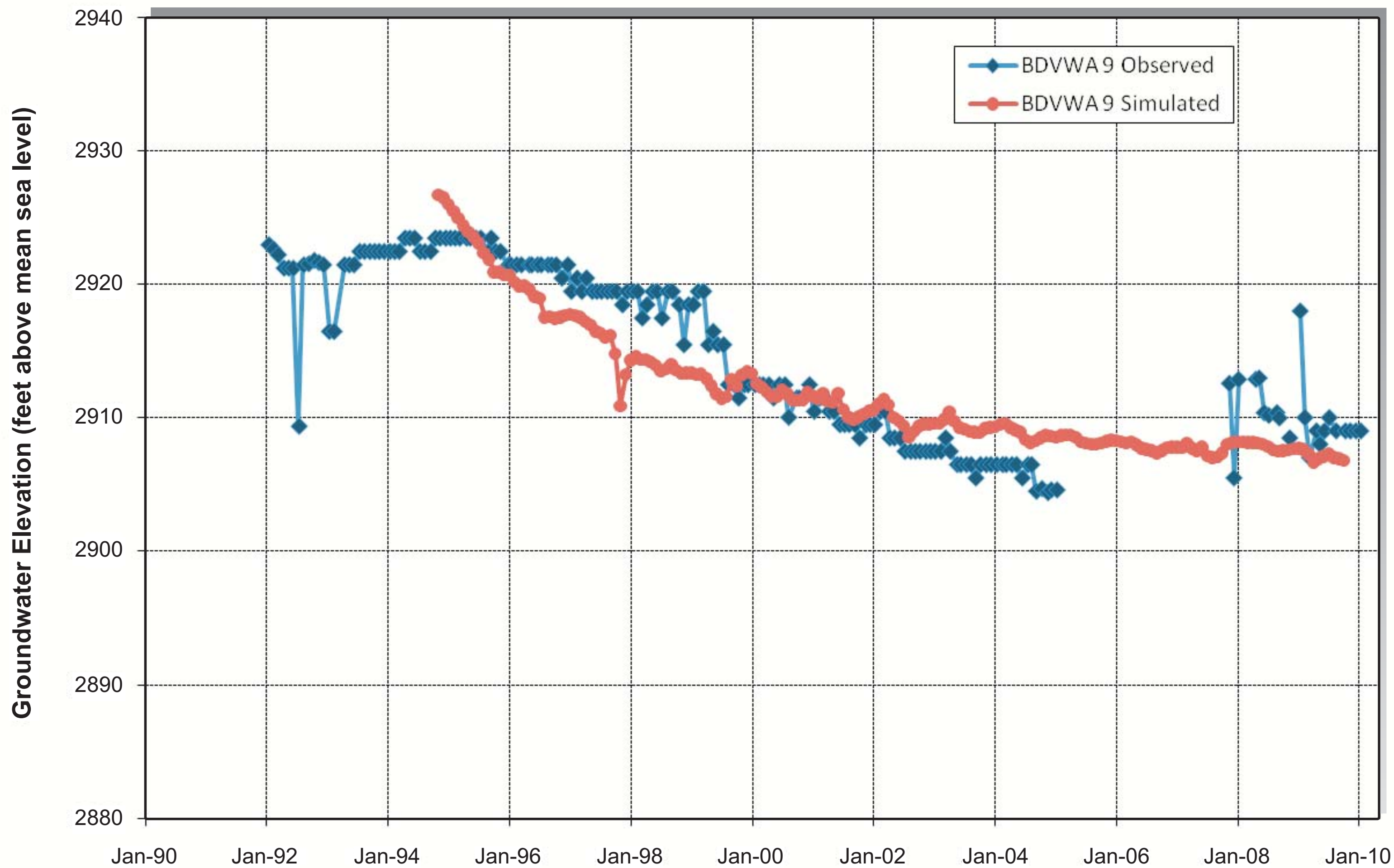
February 2011	**Chart E5**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 6**



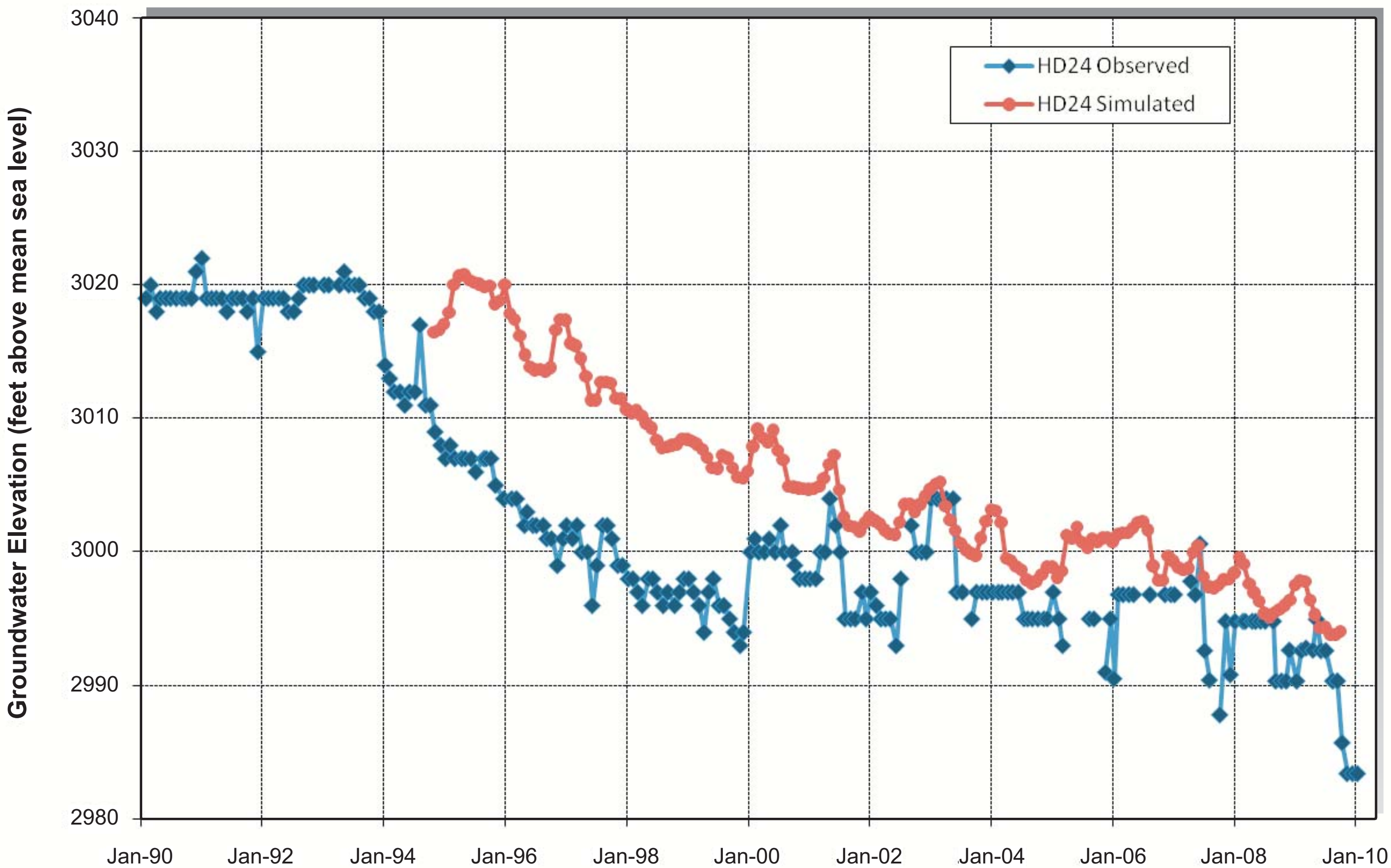
February 2011	**Chart E6**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 7**



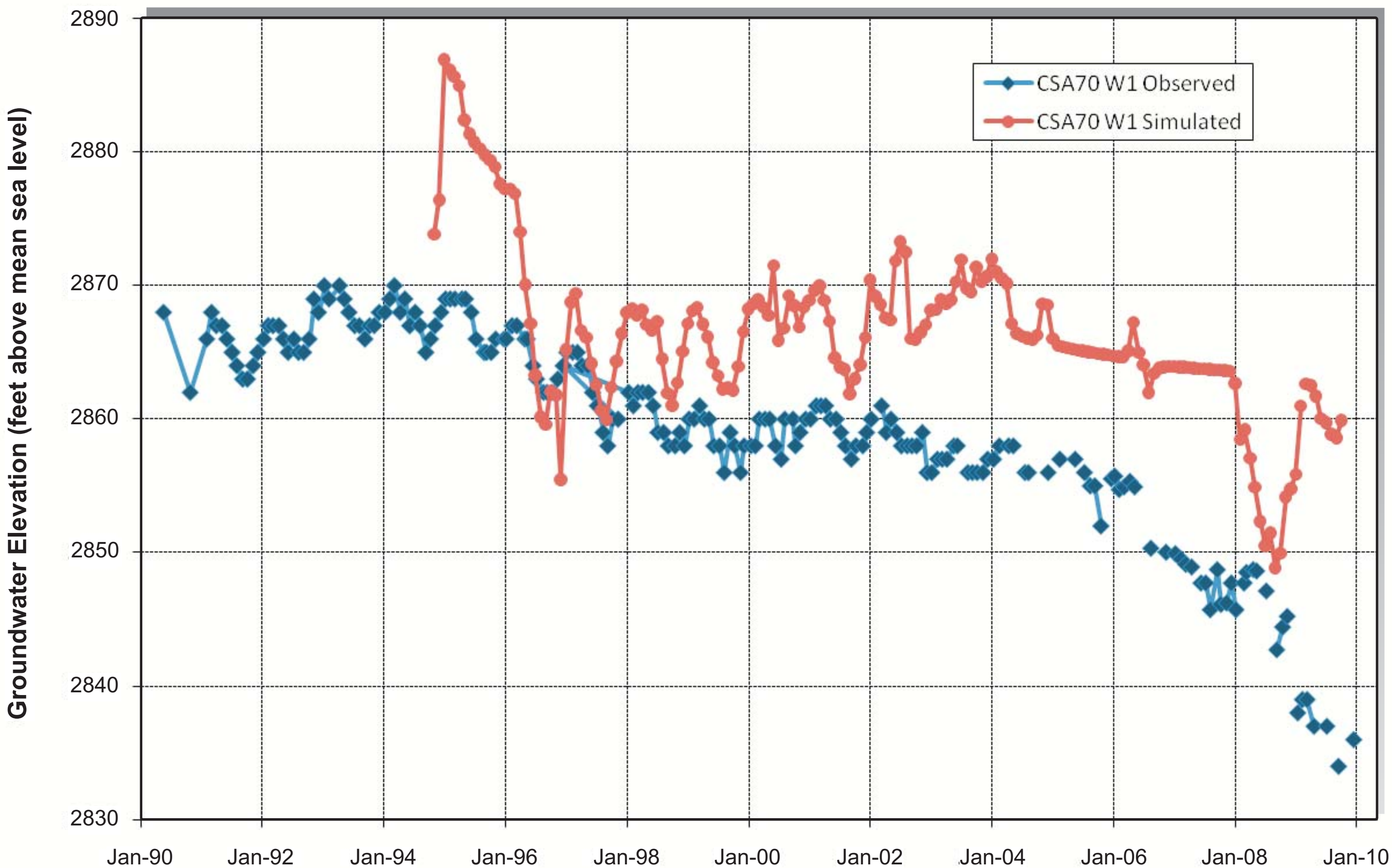
February 2011	**Chart E7**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 8**



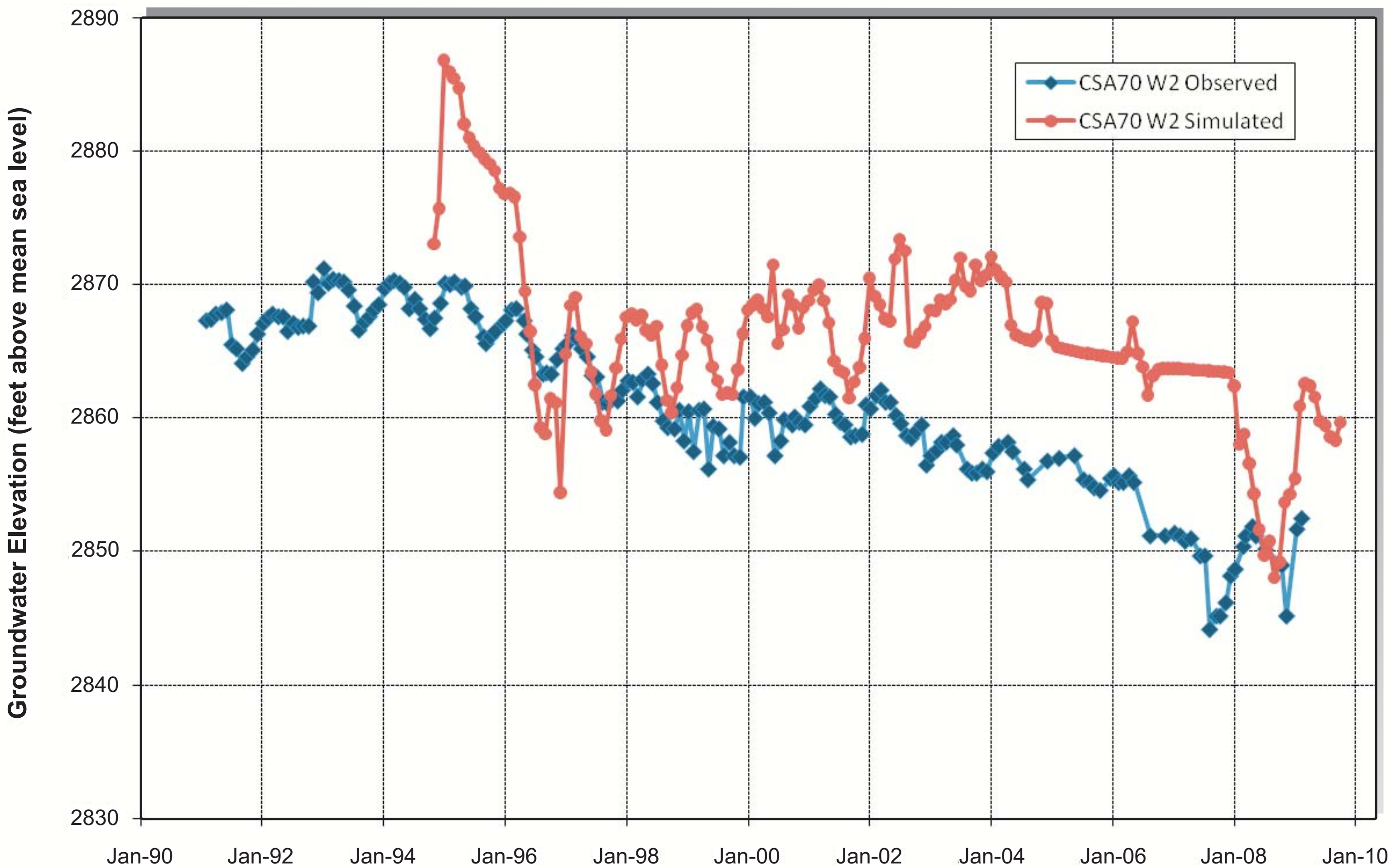
February 2011	**Chart E8**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well BDVWA 9**



February 2011	Chart E9 1994 - 2009 Observed and Simulated Groundwater Elevations, Well HDWD 24
TODD ENGINEERS Alameda, California	



February 2011	Chart E10 1994 - 2009 Observed and Simulated Groundwater Elevations, Well CSA 1
TODD ENGINEERS Alameda, California	



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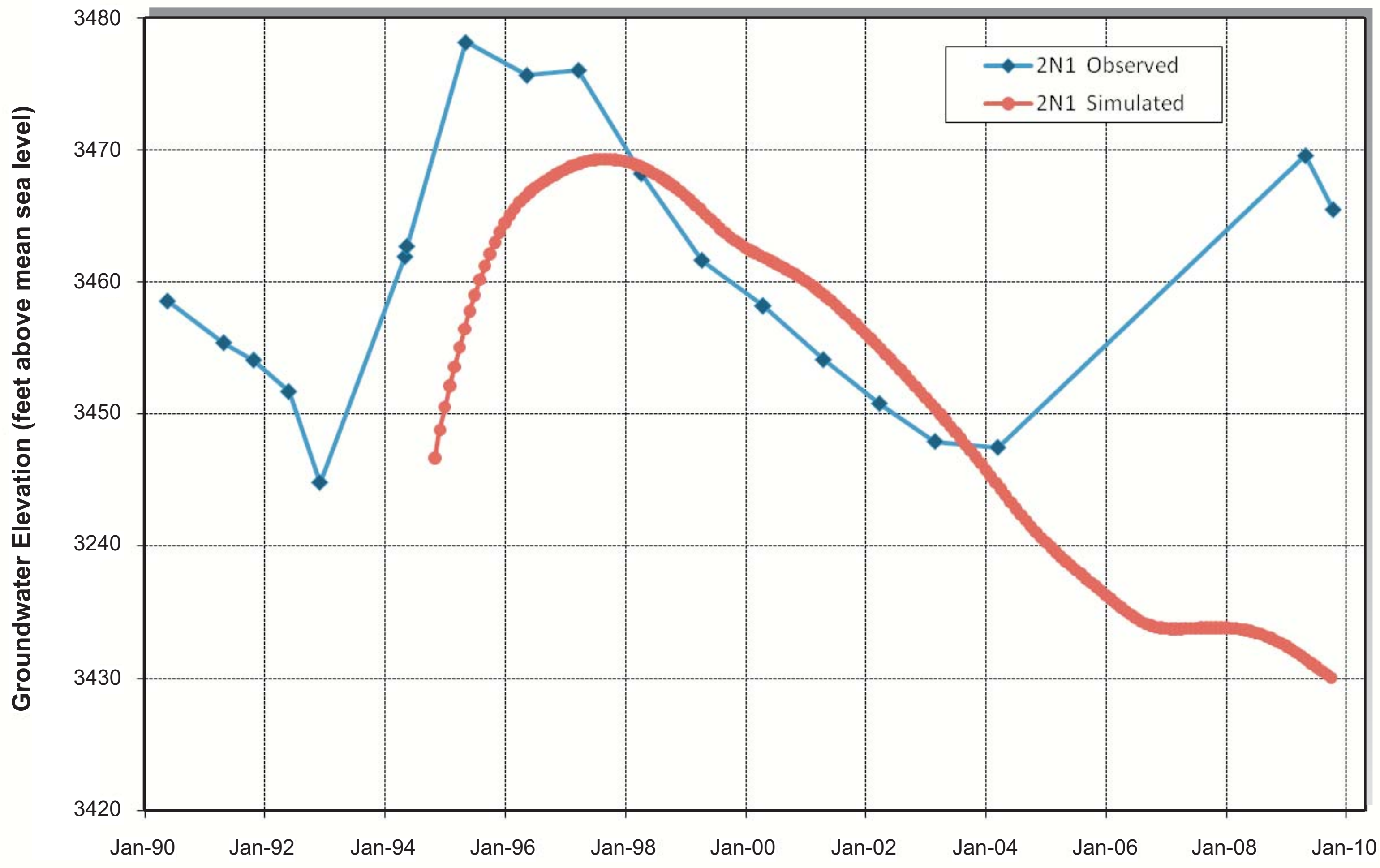
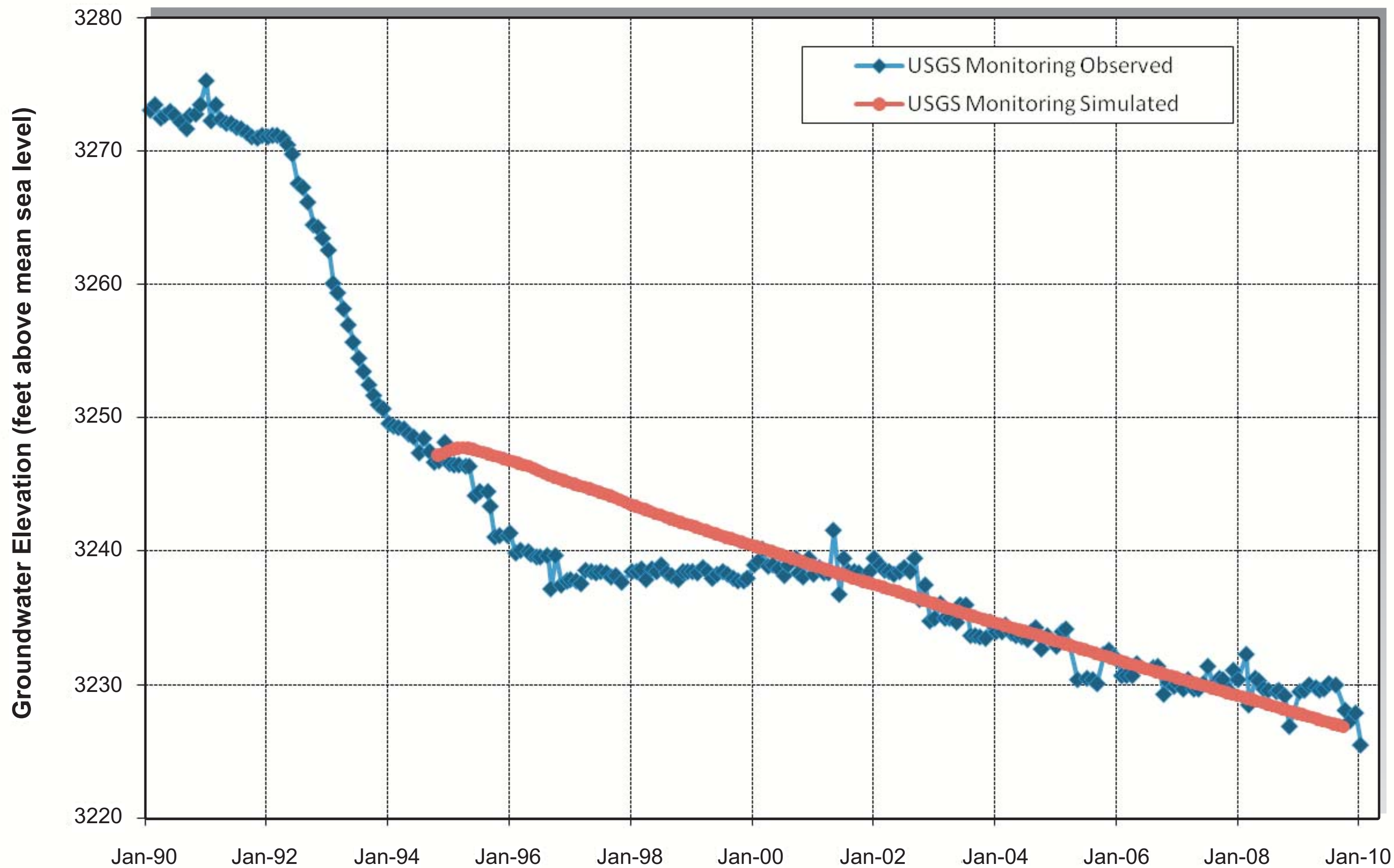
Alameda, California

Chart E11
1994 - 2009 Observed and Simulated Groundwater Elevations, Well CSA 2



February 2011	**Chart E12**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well 2N1**



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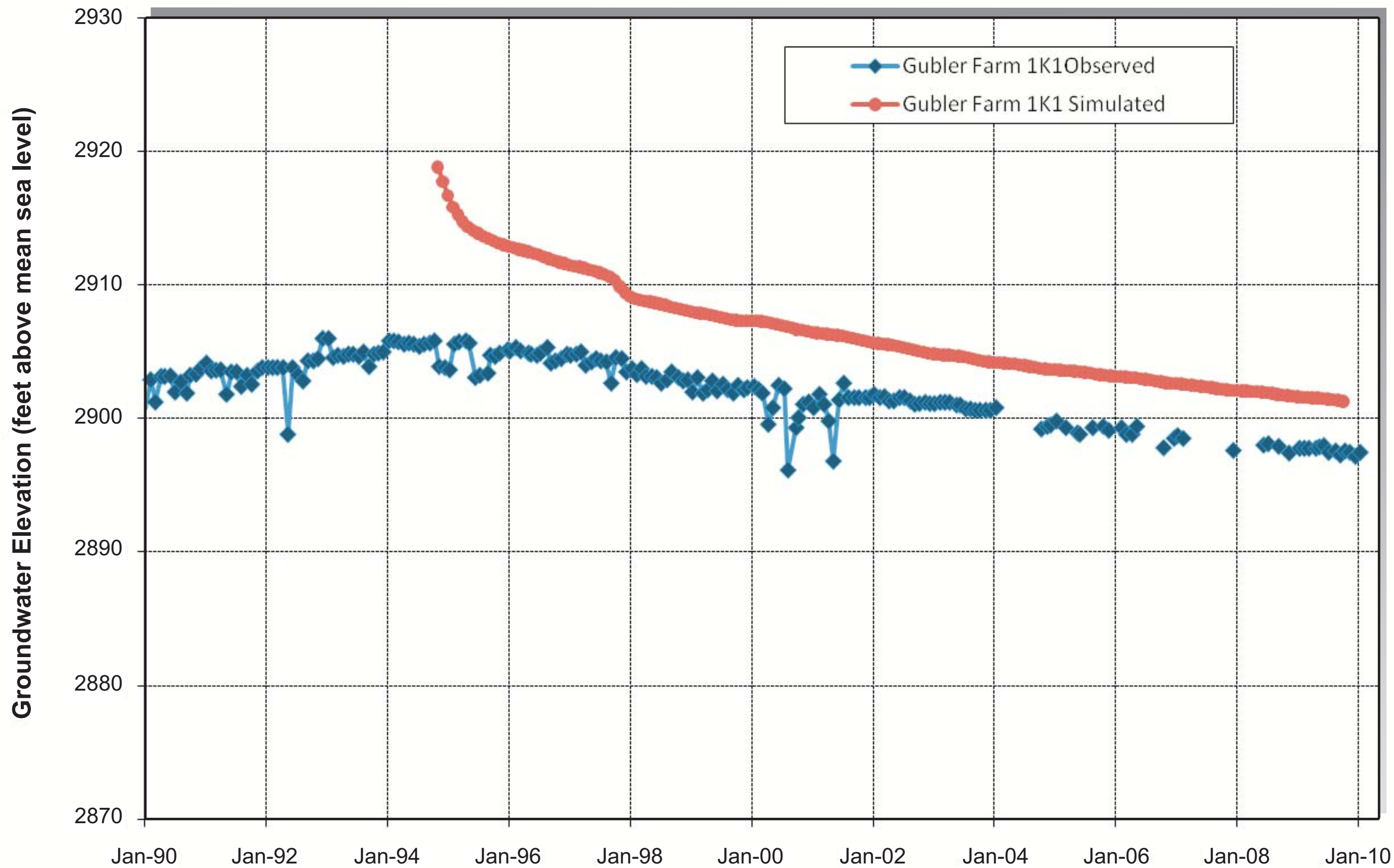
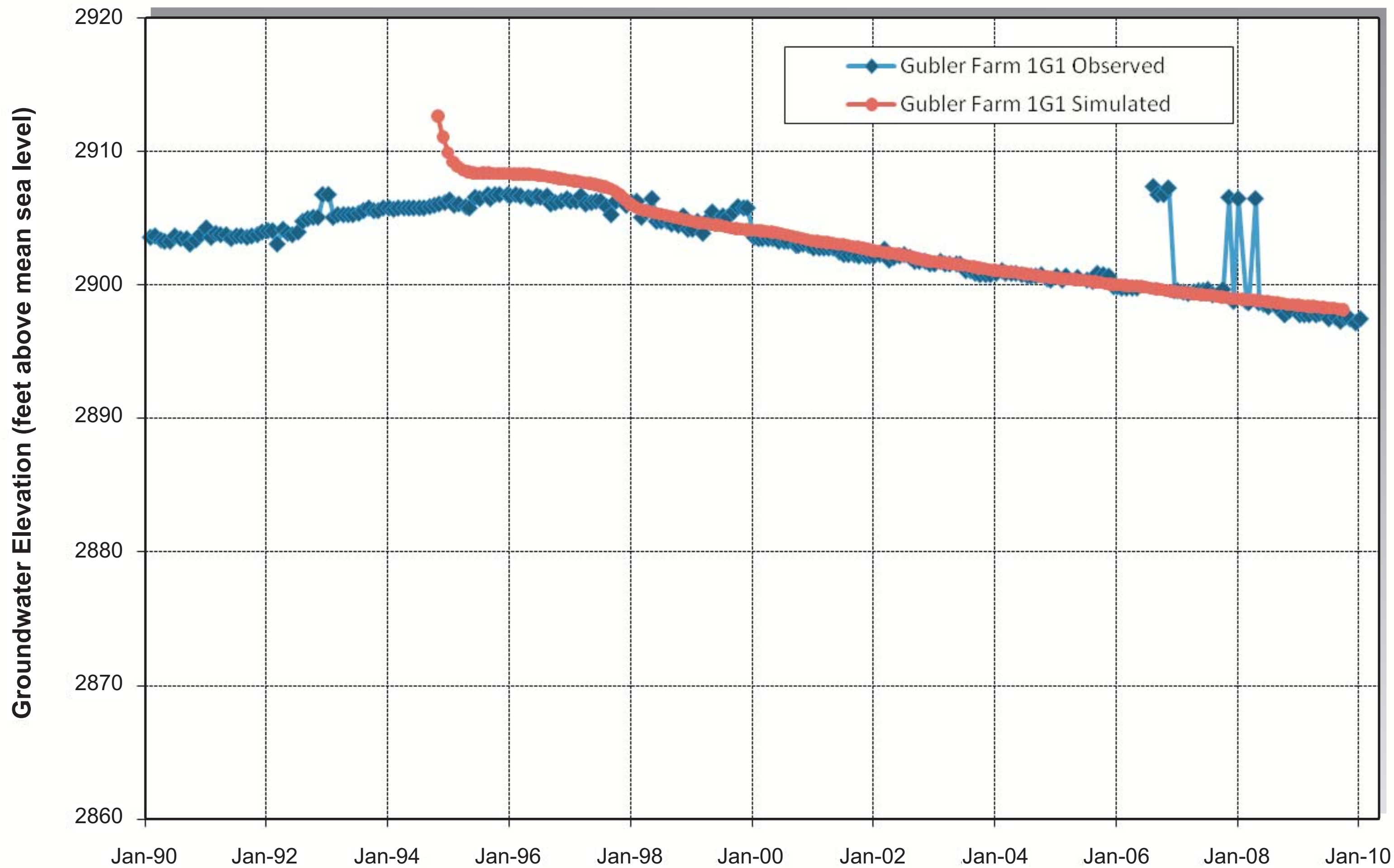
Alameda, California

Chart E13
1994 - 2009 Observed and Simulated Groundwater Elevations, Well USGS Monitoring



February 2011	**Chart E14** **1994 - 2009 Observed and Simulated Groundwater Elevations, Well Gubler 1K1**
TODD ENGINEERS Alameda, California	



February 2011	**Chart E15**
TODD ENGINEERS Alameda, California	**1994 - 2009 Observed and Simulated Groundwater Elevations, Well Gubler 1G1**

Appendix F

Water Quality Laboratory Report

Clinical Laboratory of San Bernardino, Inc.

Todd Engineers	Project: Routine	Work Order: 10I1785
2490 Mariner Square Loop, Ste 215	Sub Project: Bighorn - Desert View Water	Received: 09/24/10 16:00
Alameda CA, 94501	Project Manager: Daniel J. Craig	Reported: 10/15/10

BDVWA - MW1 **10I1785-01 (Water)** **Sample Date:** 09/23/10 14:10 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
Field Analyses									
Temperature (Field)	Field	**20.0**	°C			09/24/10	09/24/10	1040127	
General Physical Analyses									
Apparent Color	SM 2120B	**10.0**	Color Units	3.0	15	09/25/10	09/25/10	1039421	
Odor Threshold	EPA 140.1M	**1**	TON	1	3	09/25/10	09/25/10	1039421	HT-06
Turbidity	EPA 180.1	**6.4**	NTU	0.1	5	09/25/10	09/25/10	1039421	
General Chemical Analyses									
Alkalinity, Total (as CaCO3)	SM 2320 B	**190**	mg/L	5.0		09/28/10	09/28/10	1040120	
Bicarbonate (HCO3)	SM 2320 B	**230**	mg/L	5.0		09/28/10	09/28/10	1040121	
Calcium (Ca)	SM3500CaD	**49**	mg/L	1.0		09/28/10	09/28/10	1040119	
Carbonate (CO3)	SM 2320B	ND	mg/L	5.0		09/28/10	09/28/10	1040122	
Chloride (Cl)	EPA 300.0	**17**	mg/L	1.0	500	09/24/10	09/25/10	1040117	
Langelier Index at Source Tmp	SM 203	**0.11**				09/24/10	09/28/10	1040124	
Langelier Index at 60 C	SM 203	**0.81**				09/24/10	09/28/10	1040124	
Aggressive Index	SM 203	**12.06**				09/24/10	09/28/10	1040124	
Cyanide (CN)	SM4500CNF	ND	ug/L	100	150	09/27/10	09/27/10	1040037	
Specific Conductance (E.C.)	SM 2510B	**530**	umhos/cm	2.0	1600	09/28/10	09/28/10	1040115	
Fluoride (F)	EPA 300.0	**0.83**	mg/L	0.10	2	09/24/10	09/25/10	1040117	
Hardness, Total (as CaCO3)	SM 2340 C	**140**	mg/L	5.0		09/28/10	09/28/10	1040118	
Hydroxide (OH)	SM 2320B	ND	mg/L	5.0		09/28/10	09/28/10	1040128	
MBAS (LAS Mole. Wt 326.5)	SM 5540C	ND	mg/L	0.10	0.5	09/24/10	09/24/10	1039404	
Nitrate (NO3)	EPA 353.2	**2.5**	mg/L	2.0	45	09/28/10	09/28/10	1040137	HT-05
Nitrate + Nitrite (as N)	EPA 353.2	**580**	ug/L	400	10000	09/28/10	09/28/10	1040137	HT-05
Nitrite as N (NO2-N)	EPA 353.2	ND	ug/L	400	1000	09/28/10	09/28/10	1040137	HT-05
Perchlorate (ClO4)	EPA 314.0	ND	ug/L	4.0	6	09/28/10	09/28/10	1040187	
pH (Lab)	SM 4500HB	**7.7**	pH Units			09/24/10	09/24/10	1039406	
Sulfate (SO4)	EPA 300.0	**21**	mg/L	0.50	500	09/24/10	09/25/10	1040117	
Total Filterable Residue/TDS	SM 2540C	**270**	mg/L	5.0	1000	09/28/10	09/30/10	1040065	
Metals									
Aluminum (Al)	EPA 200.7	**400**	ug/L	50	200	09/28/10	09/29/10	1040156	
Antimony (Sb)	SM3113-B	ND	ug/L	6.0	6	09/29/10	09/29/10	1040211	
Arsenic (As)	SM3113-B	ND	ug/L	2.0	10	10/01/10	10/04/10	1040367	
Barium (Ba)	EPA 200.7	ND	ug/L	100	1000	09/28/10	09/29/10	1040156	
Beryllium (Be)	SM3113-B	ND	ug/L	1.0	4	09/27/10	09/27/10	1040036	
Boron (B)	EPA 200.7	**180**	ug/L	100		09/28/10	09/29/10	1040156	
Cadmium (Cd)	SM3113-B	ND	ug/L	1.0	5	09/27/10	09/27/10	1040030	
Chromium (Total Cr)	SM3113-B	ND	ug/L	10	50	09/27/10	09/27/10	1040038	
Copper (Cu)	EPA 200.7	ND	ug/L	50	1000	09/28/10	09/29/10	1040156	
Iron (Fe)	EPA 200.7	**300**	ug/L	100	300	09/28/10	09/29/10	1040156	
Lead (Pb)	SM3113-B	ND	ug/L	5.0		10/05/10	10/05/10	1041069	

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Clinical Laboratory of San Bernardino, Inc.

Todd Engineers 2490 Mariner Square Loop, Ste 215 Alameda CA, 94501	Project: Routine Sub Project: Bighorn - Desert View Water Project Manager: Daniel J. Craig	Work Order: 10I1785 Received: 09/24/10 16:00 Reported: 10/15/10

BDVWA - MW1 **10I1785-01 (Water)** **Sample Date:** 09/23/10 14:10 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
Metals									
Magnesium (Mg)	EPA 200.7	**9.3**	mg/L	1.0		09/29/10	09/29/10	1040206	
Manganese (Mn)	EPA 200.7	**220**	ug/L	20	50	09/28/10	09/29/10	1040156	
Mercury (Hg)	EPA 245.1	ND	ug/L	1.0	2	09/29/10	09/29/10	1040184	
Nickel (Ni)	SM3113-B	ND	ug/L	10	100	09/27/10	09/27/10	1040066	
Potassium (K)	EPA 200.7	**4.6**	mg/L	1.0		09/29/10	09/29/10	1040206	
Selenium (Se)	SM3113-B	ND	ug/L	5.0	50	09/29/10	09/29/10	1040188	
Silver (Ag)	SM3113-B	ND	ug/L	10	100	09/27/10	09/28/10	1040068	
Sodium (Na)	EPA 200.7	**63**	mg/L	1.0		09/29/10	09/29/10	1040206	
Thallium (Tl)	EPA 200.9	ND	ug/L	1.0	2	09/28/10	09/28/10	1040064	
Vanadium (V)	EPA 200.9	**4.2**	ug/L	3.0		09/28/10	09/29/10	1040104	
Zinc (Zn)	EPA 200.7	ND	ug/L	50	5000	09/28/10	09/29/10	1040156	
Anion / Cation Balance									
Total Anions	Calculated	**4.77**	meq/L	0.62		10/01/10	09/28/10	[CALC]	
Total Cations	Calculated	**6.07**	meq/L	0.20		10/01/10	10/01/10	[CALC]	
Radiochemistry Analyses									
Gross Alpha	EPA 900.0	**11**	pCi/L	3.0	15	09/27/10	09/29/10	1039357	
Gross Alpha Counting Error	EPA 900.0	**2.3**	pCi/L			09/27/10	09/29/10	1039357	
Gross Alpha Min Det Activity	EPA 900.0	**1.4**	pCi/L			09/27/10	09/29/10	1039357	
Gross Beta	EPA 900.0	ND	pCi/L	4.0	50	09/27/10	09/29/10	1039357	
Gross Beta Counting Error	EPA 900.0	**1.5**	pCi/L			09/27/10	09/29/10	1039357	
Gross Beta Min Det Activity	EPA 900.0	**1.3**	pCi/L			09/27/10	09/29/10	1039357	
Uranium	EPA 900.0	**14**	pCi/L	1.0	20	10/05/10	10/07/10	1041049	
Uranium Counting Error	EPA 900.0	**1.6**	pCi/L			10/05/10	10/07/10	1041049	
Uranium Min Det Activity	EPA 900.0	**0.87**	pCi/L			10/05/10	10/07/10	1041049	
Volatile Organic Analyses									
Vinyl Chloride (VC)	EPA 524.2	ND	ug/L	0.50	0.5	09/28/10	09/28/10	1040063	
Trichlorofluoromethane (FREON 11)	EPA 524.2	ND	ug/L	5.0	150	09/28/10	09/28/10	1040063	
1,1-Dichloroethylene (1,1-DCE)	EPA 524.2	ND	ug/L	0.50	6	09/28/10	09/28/10	1040063	
1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 524.2	ND	ug/L	10	1200	09/28/10	09/28/10	1040063	
Dichloromethane (Methylene Chloride)	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
trans-1,2-Dichloroethylene (t-1,2-DCE)	EPA 524.2	ND	ug/L	0.50	10	09/28/10	09/28/10	1040063	
Methyl tert-Butyl Ether	EPA 524.2	ND	ug/L	3.0	13	09/28/10	09/28/10	1040063	
1,1-Dichloroethane (1,1-DCA)	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
cis-1,2-Dichloroethylene (c-1,2-DCE)	EPA 524.2	ND	ug/L	0.50	6	09/28/10	09/28/10	1040063	
Chloroform (Trichloromethane)	EPA 524.2	ND	ug/L	1.0		09/28/10	09/28/10	1040063	
Carbon Tetrachloride	EPA 524.2	ND	ug/L	0.50	0.5	09/28/10	09/28/10	1040063	
1,1,1-Trichloroethane (1,1,1-TCA)	EPA 524.2	ND	ug/L	0.50	200	09/28/10	09/28/10	1040063	
Benzene	EPA 524.2	ND	ug/L	0.50	1	09/28/10	09/28/10	1040063	
1,2-Dichloroethane (1,2-DCA)	EPA 524.2	ND	ug/L	0.50	0.5	09/28/10	09/28/10	1040063	

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Todd Engineers	Project: Routine	Work Order: 10I1785
2490 Mariner Square Loop, Ste 215	Sub Project: Bighorn - Desert View Water	Received: 09/24/10 16:00
Alameda CA, 94501	Project Manager: Daniel J. Craig	Reported: 10/15/10

BDVWA - MW1 **10I1785-01 (Water)** **Sample Date:** 09/23/10 14:10 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
Volatile Organic Analyses									
Trichloroethylene (TCE)	EPA 524.2	**0.57**	ug/L	0.50	5	09/28/10	09/28/10	1040063	
1,2-Dichloropropane	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
Bromodichloromethane	EPA 524.2	ND	ug/L	1.0		09/28/10	09/28/10	1040063	
Toluene	EPA 524.2	ND	ug/L	0.50	150	09/28/10	09/28/10	1040063	
Tetrachloroethylene (PCE)	EPA 524.2	**3.5**	ug/L	0.50	5	09/28/10	09/28/10	1040063	
1,1,2-Trichloroethane (1,1,2-TCA)	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
Dibromochloromethane	EPA 524.2	ND	ug/L	1.0		09/28/10	09/28/10	1040063	
Monochlorobenzene (Chlorobenzene)	EPA 524.2	ND	ug/L	0.50	70	09/28/10	09/28/10	1040063	
Ethyl Benzene	EPA 524.2	ND	ug/L	0.50	300	09/28/10	09/28/10	1040063	
m,p-Xylene	EPA 524.2	ND	ug/L	1.0		09/28/10	09/28/10	1040063	
cis-1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50		09/28/10	09/28/10	1040063	
trans-1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50		09/28/10	09/28/10	1040063	
o-Xylene	EPA 524.2	ND	ug/L	0.50		09/28/10	09/28/10	1040063	
Styrene	EPA 524.2	ND	ug/L	0.50	100	09/28/10	09/28/10	1040063	
Bromoform	EPA 524.2	ND	ug/L	1.0		09/28/10	09/28/10	1040063	
1,1,2,2-Tetrachloroethane	EPA 524.2	ND	ug/L	0.50		09/28/10	09/28/10	1040063	
1,4-Dichlorobenzene (p-DCB)	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
1,2-Dichlorobenzene (o-DCB)	EPA 524.2	ND	ug/L	0.50	600	09/28/10	09/28/10	1040063	
1,2,4-Trichlorobenzene	EPA 524.2	ND	ug/L	0.50	5	09/28/10	09/28/10	1040063	
Total 1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50	0.5	09/28/10	09/28/10	1040063	
Total Trihalomethanes (TTHM)	EPA 524.2	ND	ug/L	1.0	80	09/28/10	09/28/10	1040063	
Total Xylenes (m,p & o)	EPA 524.2	ND	ug/L	0.50	1750	09/28/10	09/28/10	1040063	
Surrogate: Bromofluorobenzene	*EPA 524.2*	*97 %*				*09/28/10*	*09/28/10*	*1040063*	
Surrogate: 1,2-Dichlorobenzene-d4	*EPA 524.2*	*98 %*				*09/28/10*	*09/28/10*	*1040063*	
Volatile Organic Analyses / EPA 504									
Ethylene Dibromide (EDB)	EPA 504.1	ND	ug/L	0.019	0.05	09/28/10	09/28/10	1040056	
Dibromochloropropane (DBCP)	EPA 504.1	ND	ug/L	0.0097	0.2	09/28/10	09/28/10	1040056	
Semi-Volatile Organic Analyses									
Endrin	EPA 508.1	ND	ug/L	0.10	2	09/29/10	09/29/10	1040205	
Lindane (gamma-BHC)	EPA 508.1	ND	ug/L	0.20	0.2	09/29/10	09/29/10	1040205	
Methoxychlor	EPA 508.1	ND	ug/L	10	30	09/29/10	09/29/10	1040205	
Toxaphene	EPA 508.1	ND	ug/L	1.0	3	09/29/10	09/29/10	1040205	
Chlordane	EPA 508.1	ND	ug/L	0.10	0.1	09/29/10	09/29/10	1040205	
Heptachlor	EPA 508.1	ND	ug/L	0.010	0.01	09/29/10	09/29/10	1040205	
Heptachlor Epoxide	EPA 508.1	ND	ug/L	0.010	0.01	09/29/10	09/29/10	1040205	
Hexachlorobenzene	EPA 508.1	ND	ug/L	0.50	1	09/29/10	09/29/10	1040205	
Hexachlorocyclopentadiene	EPA 508.1	ND	ug/L	1.0	50	09/29/10	09/29/10	1040205	
Polychlorinated Biphenyls (PCBs)	EPA 508.1	ND	ug/L	0.50	0.5	09/29/10	09/29/10	1040205	
Surrogate: Dibutylchlorendate	*EPA 508.1*	*86 %*				*09/29/10*	*09/29/10*	*1040205*	
Dalapon	EPA 515.4	ND	ug/L	10	200	09/29/10	09/29/10	1040257	

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Todd Engineers 2490 Mariner Square Loop, Ste 215 Alameda CA, 94501	Project: Routine Sub Project: Bighorn - Desert View Water Project Manager: Daniel J. Craig	Work Order: 10I1785 Received: 09/24/10 16:00 Reported: 10/15/10

BDVWA - MW1 **10I1785-01 (Water)** **Sample Date:** 09/23/10 14:10 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
Semi-Volatile Organic Analyses									
2,4,5-TP (SILVEX)	EPA 515.4	ND	ug/L	1.0	50	09/29/10	09/29/10	1040257	
Bentazon (BASAGRAN)	EPA 515.4	ND	ug/L	2.0	18	09/29/10	09/29/10	1040257	
Picloram	EPA 515.4	ND	ug/L	1.0	500	09/29/10	09/29/10	1040257	
2,4-D	EPA 515.4	ND	ug/L	10	70	09/29/10	09/29/10	1040257	
Pentachlorophenol (PCP)	EPA 515.4	ND	ug/L	0.20	1	09/29/10	09/29/10	1040257	
Dinoseb (DNBP)	EPA 515.4	ND	ug/L	2.0	7	09/29/10	09/29/10	1040257	
Surrogate: 2,4-Dichlorophenylacetic acid	*EPA 515.4*	*88 %*				*09/29/10*	*09/29/10*	*1040257*	
Alachlor (ALANEX)	EPA 525.2	ND	ug/L	1.0	2	09/28/10	10/01/10	1040103	
Atrazine (AATREX)	EPA 525.2	ND	ug/L	0.50	1	09/28/10	10/01/10	1040103	
Benzo(a)pyrene	EPA 525.2	ND	ug/L	0.10	0.2	09/28/10	10/01/10	1040103	
Diethylhexylphthalate (DEHP)	EPA 525.2	ND	ug/L	3.0	4	09/28/10	10/01/10	1040103	
Di(2-ethylhexyl) adipate	EPA 525.2	ND	ug/L	5.0	400	09/28/10	10/01/10	1040103	
Molinate (ORDRAM)	EPA 525.2	ND	ug/L	2.0	20	09/28/10	10/01/10	1040103	
Simazine (PRINCEP)	EPA 525.2	ND	ug/L	1.0	4	09/28/10	10/01/10	1040103	
Thiobencarb (BOLERO)	EPA 525.2	ND	ug/L	1.0	70	09/28/10	10/01/10	1040103	
Surrogate: 1,3-dimethyl-2-nitrobenzene	*EPA 525.2*	*93 %*				*09/28/10*	*10/01/10*	*1040103*	
Surrogate: Perylene-d12	*EPA 525.2*	*118 %*				*09/28/10*	*10/01/10*	*1040103*	
Surrogate: Triphenylphosphate	*EPA 525.2*	*193 %*				*09/28/10*	*10/01/10*	*1040103*	QM-08
Oxamyl (VYDATE)	EPA 531.1	ND	ug/L	20	50	10/01/10	10/01/10	1040411	
Carbofuran (FURADAN)	EPA 531.1	ND	ug/L	5.0	18	10/01/10	10/01/10	1040411	
Glyphosate	EPA 547	ND	ug/L	25	700	10/01/10	10/01/10	1040407	

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Todd Engineers 2490 Mariner Square Loop, Ste 215 Alameda CA, 94501	Project: Routine Sub Project: Bighorn - Desert View Water Project Manager: Daniel J. Craig	Work Order: 10I1785 Received: 09/24/10 16:00 Reported: 10/15/10

BDVWA - MW2 | **10I1785-02 (Water)** | **Sample Date:** 09/24/10 12:05 | **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
General Chemical Analyses									
Alkalinity, Total (as CaCO3)	SM 2320 B	**170**	mg/L	5.0		09/28/10	09/28/10	1040120	
Bicarbonate (HCO3)	SM 2320 B	**210**	mg/L	5.0		09/28/10	09/28/10	1040121	
Calcium (Ca)	SM3500CaD	**43**	mg/L	1.0		09/28/10	09/28/10	1040119	
Carbonate (CO3)	SM 2320B	ND	mg/L	5.0		09/28/10	09/28/10	1040122	
Chloride (Cl)	EPA 300.0	**34**	mg/L	1.0	500	09/24/10	09/25/10	1040117	
Cyanide (CN)	SM4500CNF	ND	ug/L	100	150	09/27/10	09/27/10	1040037	
Specific Conductance (E.C.)	SM 2510B	**440**	umhos/cm	2.0	1600	09/28/10	09/28/10	1040115	
Fluoride (F)	EPA 300.0	**1.1**	mg/L	0.10	2	09/24/10	09/25/10	1040117	
Hardness, Total (as CaCO3)	SM 2340 C	**130**	mg/L	5.0		09/28/10	09/28/10	1040118	
Hydroxide (OH)	SM 2320B	ND	mg/L	5.0		09/28/10	09/28/10	1040128	
MBAS (LAS Mole. Wt 326.5)	SM 5540C	ND	mg/L	0.10	0.5	09/24/10	09/24/10	1039404	
Nitrate (NO3)	EPA 300.0	**2.2**	mg/L	2.0	45	09/24/10	09/25/10	1040117	
Nitrate + Nitrite (as N)	EPA 300.0	**500**	ug/L	400	10000	09/24/10	09/25/10	1040117	
Nitrite as N (NO2-N)	EPA 300.0	ND	ug/L	400	1000	09/24/10	09/25/10	1040117	
Perchlorate (ClO4)	EPA 314.0	ND	ug/L	4.0	6	09/28/10	09/28/10	1040187	
pH (Lab)	SM 4500HB	**7.9**	pH Units			09/24/10	09/24/10	1039406	
Sulfate (SO4)	EPA 300.0	**35**	mg/L	0.50	500	09/24/10	09/25/10	1040117	
Total Filterable Residue/TDS	SM 2540C	**320**	mg/L	5.0	1000	09/28/10	09/30/10	1040065	
Metals									
Aluminum (Al)	EPA 200.7	**610**	ug/L	50	200	09/28/10	09/29/10	1040156	
Antimony (Sb)	SM3113-B	ND	ug/L	6.0	6	09/29/10	09/29/10	1040211	
Arsenic (As)	SM3113-B	ND	ug/L	2.0	10	10/01/10	10/04/10	1040367	
Barium (Ba)	EPA 200.7	ND	ug/L	100	1000	09/28/10	09/29/10	1040156	
Beryllium (Be)	SM3113-B	ND	ug/L	1.0	4	09/27/10	09/27/10	1040036	
Boron (B)	EPA 200.7	**160**	ug/L	100		09/28/10	09/29/10	1040156	
Cadmium (Cd)	SM3113-B	ND	ug/L	1.0	5	09/27/10	09/27/10	1040030	
Chromium (Total Cr)	SM3113-B	ND	ug/L	10	50	09/27/10	09/27/10	1040038	
Copper (Cu)	EPA 200.7	ND	ug/L	50	1000	09/28/10	09/29/10	1040156	
Iron (Fe)	EPA 200.7	**490**	ug/L	100	300	09/28/10	09/29/10	1040156	
Lead (Pb)	SM3113-B	ND	ug/L	5.0		10/05/10	10/05/10	1041069	
Magnesium (Mg)	EPA 200.7	**8.8**	mg/L	1.0		09/29/10	09/29/10	1040206	
Manganese (Mn)	EPA 200.7	**110**	ug/L	20	50	09/28/10	09/29/10	1040156	
Mercury (Hg)	EPA 245.1	ND	ug/L	1.0	2	09/29/10	09/29/10	1040184	
Nickel (Ni)	SM3113-B	ND	ug/L	10	100	09/27/10	09/27/10	1040066	
Potassium (K)	EPA 200.7	**4.8**	mg/L	1.0		09/29/10	09/29/10	1040206	
Selenium (Se)	SM3113-B	ND	ug/L	5.0	50	09/29/10	09/29/10	1040188	
Silver (Ag)	SM3113-B	ND	ug/L	10	100	09/27/10	09/28/10	1040068	
Sodium (Na)	EPA 200.7	**45**	mg/L	1.0		09/29/10	09/29/10	1040206	
Thallium (Tl)	EPA 200.9	ND	ug/L	1.0	2	09/28/10	09/28/10	1040064	
Vanadium (V)	EPA 200.9	**3.1**	ug/L	3.0		09/28/10	09/29/10	1040104	

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Clinical Laboratory of San Bernardino, Inc.

Todd Engineers 2490 Mariner Square Loop, Ste 215 Alameda CA, 94501	Project: Routine Sub Project: Bighorn - Desert View Water Project Manager: Daniel J. Craig	Work Order: 10I1785 Received: 09/24/10 16:00 Reported: 10/15/10

BDVWA - MW2 **10I1785-02 (Water)** **Sample Date:** 09/24/10 12:05 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MCL	Prepared	Analyzed	Batch	Qualifier
Metals									
Zinc (Zn)	EPA 200.7	ND	ug/L	50	5000	09/28/10	09/29/10	1040156	
Anion / Cation Balance									
Total Anions	Calculated	**5.22**	meq/L	0.62		10/01/10	09/28/10	[CALC]	
Total Cations	Calculated	**4.95**	meq/L	0.20		10/01/10	10/01/10	[CALC]	
Radiochemistry Analyses									
Gross Alpha	EPA 900.0	**7.3**	pCi/L	3.0	15	10/01/10	10/05/10	1040352	
Gross Alpha Counting Error	EPA 900.0	**1.7**	pCi/L			10/01/10	10/05/10	1040352	
Gross Alpha Min Det Activity	EPA 900.0	**1.0**	pCi/L			10/01/10	10/05/10	1040352	

QM-08 The surrogate recovery was outside acceptance limits for this sample due to matrix interference.

HT-06 Sample was received and analyzed outside of recommended hold time.

HT-05 Analysis hold time extended to 28 days by sample acidification.

ND Analyte NOT DETECTED at or above the reporting limit

Bob Glaubig

Bob Glaubig

Laboratory Director

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Certificate of Analysis

Report Date: Monday, October 4, 2010
Received Date: Monday, September 27, 2010
Received Time: 12:30 pm
Turnaround Time: Normal

Client: Clinical Laboratory of San Bernardino, Inc.
21881 Barton Road
Grand Terrace, CA 92313

Phones: (909) 825-7693
Fax: (909) 825-7696

Attn: Bob Glaubig
Project: 10I1785

P.O. #:

Lab Sample ID: 0I27030-01 **Sample ID: BDVWA-MW1/10I1785** **Matrix:** Water
Sampled by: Client **Sampled: 09/23/10 14:10**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Endothall	ND	3.5	45	ug/l	1x1	EPA 548.1	9/27/10	9/30/10 19:12	W0I0994	
Diquat	ND	0.90	4.0	ug/l	1x1	EPA 549.2	9/27/10	9/28/10 14:49	W0I1017	

Certificate of Analysis

Quality Control Section

Diquat and Paraquat by EPA 549.2 - Quality Control

Batch W0I1017 - EPA 549.2

Blank (W0I1017-BLK1) — **Prepared: 09/27/10 Analyzed: 09/28/10 14:49**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat		ND		ug/l					

LCS (W0I1017-BS1) — **Prepared: 09/27/10 Analyzed: 09/28/10 14:49**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat		15.1		ug/l	20.0	76	54-135		

Matrix Spike (W0I1017-MS1) — **Source: 0I24025-01** — **Prepared: 09/27/10 Analyzed: 09/28/10 14:49**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	16.7		ug/l	20.0	84	52-130		

Matrix Spike Dup (W0I1017-MSD1) — **Source: 0I24025-01** — **Prepared: 09/27/10 Analyzed: 09/28/10 14:49**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Diquat	ND	16.1		ug/l	20.0	81	52-130	4	30

Endothall By EPA 548.1 - Quality Control

Batch W0I0994 - EPA 548.1

Blank (W0I0994-BLK1) — **Prepared: 09/27/10 Analyzed: 09/30/10 14:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall		ND		ug/l					

LCS (W0I0994-BS1) — **Prepared: 09/27/10 Analyzed: 09/30/10 14:19**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall		62.0		ug/l	100	62	3.5-143		

Matrix Spike (W0I0994-MS1) — **Source: 0I24032-01** — **Prepared: 09/27/10 Analyzed: 09/30/10 14:38**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall	ND	5.13		ug/l	100	5	3.5-137		

Matrix Spike Dup (W0I0994-MSD1) — **Source: 0I24032-01** — **Prepared: 09/27/10 Analyzed: 09/30/10 14:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Endothall	ND	3.45	MS-01	ug/l	100	3	3.5-137	39	30

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Brandon Gee (Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
Dil	The total dilution factor is expressed as a multiplication between the preparation dilution factor (a) and the analysis dilution factor (b) as "a x b". (a) and (b) are indicated as whole numbers with rounding up for ≥ 0.5 and off for < 0.5
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

Bob Glaubig
Clinical Lab of San Bernardino
21881 Barton Road
Grand Terrace CA 92313

Report Information:

Pace Project #: 10139161
Sample Receipt Date: 09/28/2010
Client Project #: 10I1785
Client Sub PO #: N/A
State Cert #: 01155CA

REPORT OF LABORATORY ANALYSIS FOR 2,3,7,8-TCDD

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 Drinking Water Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Colin Schuft, your Pace Project Manager.

Report Summary:

This report contains results of one drinking water sample analyzed to determine 2,3,7,8-TCDD content. This sample was analyzed according to Method 1613 by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

This report has been reviewed by:

October 12, 2010
Nate Habte, Project Manager
(612) 607-6407
(612) 607-6444 (fax)
natnael.habte@pacelabs.com

ACCREDITED IN ACCORDANCE WITH nelac

Report of Laboratory Analysis

The results relate only to the samples included in this report.

Report Prepared Date:

October 12, 2010

Pace Analytical™

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN000642010
Arkansas	88-0680	New Jersey (N	MN002
California	01155CA	New Mexico	MN00064
Colorado	MN00064	New York (NEL	11647
Connecticut	PH-0256	North Carolina	27700
EPA Region 5	WD-15J	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Ohio VAP	CL101
Georgia (DNR)	959	Oklahoma	D9922
Guam	09-019r	Oregon (ELAP)	MN200001-005
Hawaii	SLD	Oregon (OREL	MN200001-005
Idaho	MN00064	Pennsylvania	68-00563
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennesee	2818
Iowa	368	Tennessee	02818
Kansas	E-10167	Texas	T104704192-08
Kentucky	90062	Utah (NELAP)	PAM
Louisiana	LA0900016	Virginia	00251
Maine	2007029	Washington	C755
Maryland	322	West Virginia	9952C
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q
Mississippi	MN00064		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

1127

SUBCONTRACT ORDER

Clinical Laboratory of San Bernardino

10I1785

10139161

SENDING LABORATORY:

Clinical Laboratory of San Bernardino
21881 Barton Road
Grand Terrace, CA 92313
Phone: 909.825.7693
Fax: 909.825.7696
Project Manager: Bob Glaubig

RECEIVING LABORATORY:

Pace Analytical
1700 Elm St
Minneapolis, MN 55414
Phone :(612) 607-1700
Fax: (612) 607-6444

Please email results to Project Manager: Bob Glaubig

[ ] benart@clinical-lab.com [✓] glaubig@clinical-lab.com [ ] kavousy@clinical-lab.com [ ] styles@clinical-lab.com

Please California EDT transfer those samples with PS codes provided [ ] Yes [✓] No

Turn Around Time [✓] 10 Days [ ] 5 Days [ ] Other __ Days

Subcontract Comments: Drinking Water
2,3,7,8 TCDD Only

Analysis	Due	Comments
Sample ID: BDVWA - MW1 / 10I1785-01	**Water** **Sampled:09/23/10 14:10 PS Code:**	001
1613 Dioxins	10/06/10 17:00	
Containers Supplied:		
1 L Amber Glass Na2S2O 1 L Amber Glass Na2S2O		

Released By	Date / Time	Received By	Date / Time
Bob Glaubig	09/27/10 07:40	Tom Jones	9-27-2010 1111
		[illegible]	9-28-10 1012

T= 4.6 °C

Sample Condition Upon Receipt

Pace Analytical

Client Name: Clinical Lab S.B. **Project #** 10139161

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other ______

Optional
Proj. Due Date:
Proj. Name:

Tracking #: 7939 5161 6453

Custody Seal on Cooler/Box Present: ☐ yes ☒ no **Seals intact:** ☐ yes ☒ no

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other ______ **Temp Blank:** Yes ____ No X

Thermometer Used 80344042 or 179425 **Type of Ice:** Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 4.6°C **Biological Tissue is Frozen:** Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: DD 9-28-10

				Comments:
Chain of Custody Present:	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☒Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☒Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☐Yes	☒No	☐N/A	4.
Samples Arrived within Hold Time:	☒Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes	☒No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☒No	☐N/A	7.
Sufficient Volume:	☒Yes	☐No	☐N/A	8.
Correct Containers Used:	☒Yes	☐No	☐N/A	9.
-Pace Containers Used:	☐Yes	☒No	☐N/A	
Containers Intact:	☒Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☒N/A	11.
Sample Labels match COC:	☒Yes	☐No	☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked. Noncompliance are noted in 13.	☐Yes	☐No	☒N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ HCl Samp #
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes	☐No	☒N/A	
Exceptions: VOA,Coliform, TOC, Oil and Grease, WI-DRO (water	☐Yes	☒No		Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes	☐No	☒N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☒N/A	15.
Trip Blank Present:	☐Yes	☒No	☐N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased):______				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: ______ Date/Time: ______

Comments/ Resolution: ______

Project Manager Review: [signature] **Date:** 09/28/10

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical™

Pace AnalyticalServices, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612-607-6444

Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B

Sample ID...........10I1785-01
Client.................. Clinical Lab of San Bernardino
Lab Sample ID.....10139161001

Date Collected.....09/23/2010
Date Received......09/28/2010
Date Extracted.....09/30/2010

	Sample 10I1785-01	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
RL	5.0 pg/L	5.0 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	105%	108%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			2.9%	
IS Recovery	**78%**	85%	87%	85%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**77%**	84%	87%	86%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	R101002A_10	R101002A_05	R101002A_03	R101002A_04
Analysis Date	10/02/2010	10/02/2010	10/02/2010	10/02/2010
Analysis Time	12:06	07:31	06:23	06:57
Analyst	CVS	CVS	CVS	CVS
Volume	0.905L	1.019L	1.008L	0.995L
Dilution	NA	NA	NA	NA
ICAL Date	08/28/2010	08/28/2010	08/28/2010	08/28/2010
CCAL Filename	R101002A_02	R101002A_02	R101002A_02	R101002A_02

! = Outside the Control Limits
ND = Not Detected
RL = Reporting Limit
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD-$^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD-$^{37}Cl_4$]

Analyst: Chuck Sueper

Project No.............10139161

October 14, 2010

Clinical Lab of San Bernardino
P.O. Box 329
San Bernardino, CA 92402

Lab ID : SP 1010046
Customer : 2-1747

Laboratory Report

Introduction: This report package contains total of 4 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(1 page)	: Results for each sample submitted.
Quality Control	(1 page)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
BDVWA-MW1 / 10I1785-01	09/23/2010	09/30/2010	SP 1010046-001	DW

Sampling and Receipt Information: The sample was received, prepared and analyzed within the method specified holding times. All samples arrived on ice. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Radio QC

903.0	10/07/2010:212657 All analysis quality controls are within established criteria.
	10/05/2010:210355 All preparation quality controls are within established criteria.
905.0	10/07/2010:212656 All analysis quality controls are within established criteria.
	10/06/2010:210424 All preparation quality controls are within established criteria, except: The following note applies to Total Strontium: 410 Relative Percent Difference (RPD) not within Maximum Allowable Value (MAV). Data was accepted based on the LCS or CCV recovery.
906.0	10/12/2010:212886 All analysis quality controls are within established criteria.
	10/11/2010:210579 All preparation quality controls are within established criteria.
Ra - 05	10/10/2010:212880 All analysis quality controls are within established criteria.

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
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FAX: 805/525-4172
CA NELAP Certification No. 01110CA

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2500 Stagecoach Road
Stockton, CA 95215
TEL: 209/942-0182
FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

October 14, 2010	Lab ID	: SP 1010046
Clinical Lab of San Bernardino	Customer	: 2-1747

Radio QC

Ra - 05	10/09/2010:210383 All preparation quality controls are within established criteria.

Certification:: I certify that this data package is in compliance with NELAC standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S. Title: Laboratory Director Date: 2010-10-14

October 14, 2010

Clinical Lab of San Bernardino
P.O. Box 329
San Bernardino, CA 92402

Lab ID : SP 1010046-001
Customer ID : 2-1747

Sampled On : September 23, 2010-14:10
Sampled By : Not Available
Received On : September 30, 2010-16:15
Matrix : Drinking Water

Description : BDVWA-MW1 / 10I1785-01
Project : 10I1785

Sample Result - Radio

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Radio Chemistry P:1'5								
Strontium 90	1.33 ± 0.747	1.06	pCi/L	8	905.0	10/06/10:210424	905.0	10/07/10:212656
Total Alpha Radium (226)	0.000 ± 0.340	0.549	pCi/L	3	903.0	10/05/10:210355	903.0	10/07/10:212657
Tritium	0.000 ± 222	386	pCi/L	20000	906.0	10/11/10:210579	906.0	10/12/10:212886
Ra 228	0.000 ± 0.653	0.279	pCi/L	2	Ra - 05	10/09/10:210383	Ra - 05	10/10/10:212880

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (P) Plastic Preservatives: HNO3 pH < 2

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.
MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).
AV = (Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following
If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:
Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L
Uranium is less than or equal to 20 pCi/L
Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.

Corporate Offices & Laboratory
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Chico, CA 95926
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FAX: 559/734-8435

October 14, 2010
Clinical Lab of San Bernardino

Lab ID : SP 1010046
Customer : 2-1747

Quality Control - Radio

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Radio								
Alpha	903.0	10/07/2010:212657	CCV	cpm	10320	39.0 %	37 - 46	
			CCB	cpm		0.100	0.15	
Total Alpha Radium (226)	903.0	10/05/2010:210355	RgBlk	pCi/L		0.17	2	
			LCS	pCi/L	18.17	57.7 %	52-89	
			BS	pCi/L	18.17	49.6 %	43-92	
			BSD	pCi/L	18.17	48.4 %	43-92	
			BSRPD	pCi/L	18.17	2.3%	≤35.5	
Beta	905.0	10/07/2010:212656	CCV	cpm	10790	87.4 %	82 - 100	
			CCB	cpm		0.2200	0.56	
Total Strontium	905.0	10/06/2010:210424	RgBlk	pCi/L		0.17	2	
			LRS	pCi/L	19.76	122 %	53-133	
			BS	pCi/L	19.75	119 %	75-125	
			BSD	pCi/L	19.75	96.8 %	75-125	
			BSRPD	pCi/L	19.75	20.2%	≤20	410
Tritium	906.0	10/11/2010:210579	Blank	pCi/L		-220	<1000	
			LCS	pCi/L	1995	83.3 %	75-125	
			BS	pCi/L	1995	94.3 %	75-125	
			BSD	pCi/L	1995	99.2 %	75-125	
			BSRPD	pCi/L	1995	5.7%	≤25	
	906.0	10/12/2010:212886	CCV	pCi/L	41880	95.5 %	90-110	
			CCB	pCi/L		-57	500	
Beta	Ra - 05	10/10/2010:212880	CCV	cpm	10780	88.2 %	81 - 99	
			CCB	cpm		0.3800	0.59	
Ra 228	Ra - 05	10/09/2010:210383	RgBlk	pCi/L		-0.11	3	
			LRS	pCi/L	75.70	52.4 %	27-59	
			BS	pCi/L	75.70	94.3 %	75-125	
			BSD	pCi/L	75.70	97.5 %	75-125	
			BSRPD	pCi/L	75.70	3.3%	≤25	

Definition

CCV	: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
CCB	: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
Blank	: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
RgBlk	: Method Reagent Blank - Prepared to correct for any reagent contributions to sample result.
LCS	: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
BS	: Blank Spikes - A blank is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
BSD	: Blank Spike Duplicate of BS/BSD pair - A blank duplicate is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
BSRPD	: BS/BSD Relative Percent Difference (RPD) - The BS relative percent difference is an indication of precision for the preparation and analysis.
ND	: Non-detect - Result was below the DQO listed for the analyte.
DQO	: Data Quality Objective - This is the criteria against which the quality control data is compared.

Explanation

410	: Relative Percent Difference (RPD) not within Maximum Allowable Value (MAV). Data was accepted based on the LCS or CCV recovery.

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: 805/392-2000
FAX: 805/525-4172
CA NELAP Certification No. 01110CA

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Stockton, CA 95215
TEL: 209/942-0182
FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
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CA ELAP Certification No. 2670

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TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

SUBCONTRACT ORDER

Clinical Laboratory of San Bernardino

10I1785

10I1046

SENDING LABORATORY:

Clinical Laboratory of San Bernardino
21881 Barton Road
Grand Terrace, CA 92313
Phone: 909.825.7693
Fax: 909.825.7696
Project Manager: Bob Glaubig

RECEIVING LABORATORY:

FGL Environmental
853 Corporation St
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172

Please email results to Project Manager: Bob Glaubig

[ ] benart@clinical-lab.com [✓] glaubig@clinical-lab.com [ ] kavousy@clinical-lab.com [ ] styles@clinical-lab.com

Please California EDT transfer those samples with PS codes provided [ ] Yes [✓] No

Turn Around Time [ ] 10 Days [ ] 5 Days [ ] Other __ Days

Subcontract Comments:

Analysis	**Due**	**Comments**
Sample ID: BDVWA - MW1 / 10I1785-01	**Water**	**Sampled:09/23/10 14:10 PS Code:**
Tritium EPA 906.0	10/06/10 17:00	
Strontium 90 EPA 905.0	10/06/10 17:00	
Radium 228 EPA Ra-05	10/06/10 17:00	
Radium 226 EPA 903.1	10/06/10 17:00	

Containers Supplied:

1/2 Gallon Plastic (A) 1/2 Gallon Plastic (B) 1/2 Gallon Plastic (C) 250mL Amber Glass (I)

Bob Glaubig	09/30/10 07:15	[signature]	9/30/10 1250
Released By	Date / Time	Received By	Date / Time
[signature]	9/30/10 1615	[signature]	9/30/10 1615
Released By	Date / Time	Received By	Date / Time

/07

Santa Paula - Condition Upon Receipt (Attach to COC)

pt:
of ice chests/packages received: 1
OTC if received over the counter unpackaged.

2. Were samples received in a chilled condition? Temps: RC / ___ / ___ / ___ / ___
Acceptable is 2° to 6° C. Also acceptable is received on ice (ROI) for the same day of sampling or received at room temperature (RRT) if sampled within one hour of receipt. Client contact for temperature failures must be documented below. If many packages are received at one time check for tests/H.T.'s/rushes/Bacti's to prioritize further review. Please notify Microbiology personnel immediately of bacti samples received.

3. Do the number of bottles received agree with the COC? Yes No N/A
4. Were samples received intact? (i.e. no broken bottles, leaks etc.) Yes No
5. Were sample custody seals intact? N/A Yes No

Sign and date the COC, obtain LIMS sample numbers, select methods/tests and print labels.

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable? Yes No
2. Did bottle labels correspond with the client's ID's? Yes No
3. Were all bottles requiring sample preservation properly preserved? Yes No N/A FGL
4. VOAs checked for Headspace? Yes No N/A
5. Were all analyses within holding times at time of receipt? ~~Yes~~ No
6. Have rush or project due dates been checked and accepted? ~~N/A~~ Yes No

Attach labels to the containers and include a copy of the COC for lab delivery.

Sample Receipt, Login and Verification completed by (initials): cla

Discrepancy Documentation:
Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted:________________ Phone Number:________________
Initiated By:________________ Date:________________
Problem:

Resolution:

2. Person Contacted:________________ Phone Number:________________
Initiated By:________________ Date:________________
Problem:

Resolution:

Clinical Lab of San Bernardino
SP 1010046

LA Testing

520 Mission Street South Pasadena, CA 91030

Phone: (323) 254-9960 Fax: (323) 254-9982 Web: http://www.latesting.com Email:pasadenalab@latesting.com

Attn: **Bob Glaubig**
Clinical Labs
21881 Barton Road
Grand Terrace, CA 92313

Fax: (909) 825-7696 Phone: (909) 825-7693

Project: 10I1785

EMSL Order: 321013201
Customer ID: 32CLIN51
Customer PO:
EMSL Project ID:
Received: 9/27/2010
Analyzed: 10/01/2010

Test Report: Determination of Asbestos Structures >10µm in Drinking Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm²)	Area Analyzed (mm²)	ASBESTOS Asbestos Types	Fibers Detected	Analytical Sensitivity MFL (million fibers per liter)	Concentration MFL (million fibers per liter)	Confidence Limits MFL (million fibers per liter)
BDVWA-MW1/10I1785-0' 321013201-0001	9/28/2010 01:05 PM	100	1288	0.0695	None Detected	ND	0.19	<0.19	0.00 - 0.68

Samples received out of 48 hour hold time. UV Ozonated.

Initial report from: 10/01/2010 18:00:02

Analyst(s)
Sherrie Ahmad (1)

Any questions please contact Jerry Drapala.

321013201

SUBCONTRACT ORDER

Clinical Laboratory of San Bernardino

10I1785

SENDING LABORATORY:

Clinical Laboratory of San Bernardino
21881 Barton Road
Grand Terrace, CA 92313
Phone: 909.825.7693
Fax: 909.825.7696
Project Manager: Bob Glaubig

RECEIVING LABORATORY:

LA Testing
520 Mission Street
South Pasadena, CA 91030
Phone :(323) 254-9960
Fax: (323) 254-9982

Please email results to Project Manager: Bob Glaubig

[ ] benart@clinical-lab.com [✓] glaubig@clinical-lab.com [ ] kavousy@clinical-lab.com [ ] styles@clinical-lab.com

Please California EDT transfer those samples with PS codes provided [ ] Yes [✓] No

Turn Around Time [ ] 10 Days [✓] 5 Days [ ] Other __ Days

Subcontract Comments: Extra charge for old samples is authorized

Analysis	Due	Comments
Sample ID: BDVWA - MW1 / 10I1785-01	**Water**	**Sampled:09/23/10 14:10 PS Code:**
Asbestos EPA 100.2	10/06/10 17:00	Drinking Water
Containers Supplied:		
1 Quart Plastic (D)		

Released By	Date / Time	Received By	Date / Time
Bob Glaubig	09/27/10 07:40	[illegible]	9/27/10 830
[illegible]	9/27/10 1010	[illegible] (WF)	9/27/10 10:10am

Clinical Laboratory of San Bernardino, Inc. — Chain of Custody

10I1785

Client	Todd Engineers
Address	
System No.	
Phone No.	FAX No.
Project Name	Bighorn - Desert View Water
Sampled By	
Comments	Contact: Daniel J. Craig

Client Job No.

Destination Laboratory
[X] Clinical Laboratory
[ ] Other:

Date	Time	Sample Identification	Matrix	No.	Pres.	Dioxin	Diquat	Endothall	Glyphosate	Carbamate Pesticides	DEHP / DEHA / PAH / Triazine	Chlorinated Herbicides	Chlorinated Pesticides	EDB / DBCP	Volatile Organics	Asbestos	Gross Alpha/Beta/Uranium	Inorganic Chemcial / Gen Phys	General Mineral / Corrosivity	Turn Around Time
9/23/10	1410	BDVWA - MW1	Water	23		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9/24/10	1205	BDVWA - MW2	Water	3													X	X	X	
						2 - EPA 1613 amber glass	1 - EPA 549 amber plastic	1 - EPA 548 amber glass	1 - EPA 547 amber glass	1 - EPA 531 amber glass	2 - EPA 525 amber glass	1 - EPA 515 amber glass	1 - EPA 508 amber glass	2 - 40 ml EPA 504 vials	2 - 40 ml EPA 524 vials	1 - quart plastic	1 - 1/2 gallon plastic	1 - pint plastic / phys glass	1 - 1/2 gallon plastic	

General Mineral Panel, Inorganic Chemical Panel, Gross Alpha only

Also Analyze:
- Radium 226 - 1/2 Gallon
- Radium 228 - 1/2 Gallon
- Strontium 90 - 1/2 Gallon
- Tritium - 250 ml Amber Glass

MW-1 ONLY

Preservatives: (1) $Na_2S_2O_3$ (2) H_2SO_4/HCl (3) Cold (4)

All turn around times are expressed as working days / Not all analyses can be processed as rush

Relinquished By (Sign)	Print Name / Company	Date / Time	Received By (Sign)	Print Name / Company
[signature]	Dina Martino / KW for Todd Eng.	9/24/10 1600	[signature]	K. Kuglin / CLSB

Rec'd at Lab By:

Rec'd Date / Time:

Comments: 2°C

Shipped Via [ ] Fed X [ ] Golden State [ ] UPS [ ] Client [ ] Other

Page 1 of 1

Note: Filter Inorganic Chemicals

Appendix G

Regulatory Permits and Permit Applications

DEPARTMENT OF PUBLIC WORKS

FLOOD CONTROL • SOLID WASTE MGMT • SURVEYOR • TRANSPORTATION

COUNTY OF SAN BERNARDINO

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-8104
Fax (909) 387-8130

GRANVILLE M. "BOW" BOWMAN, P.E., P.L.S.
Director of Public Works

July 27, 2010

Addressee: Bighorn Desert View Water Agency
622 S. Jemez Trail
Yucca Valley, CA 92284

File: 6-000/2.04

Attention: Marina D. West, PG
General Manager

Activity: Proposed construction of an infiltration basin to percolate water into the Reche Groundwater Basin

Facility: None

Location: East of State Highway 247 and south of Reche Road

City/Community: Unincorporated area of San Bernardino County

The District is in receipt of your letter dated July 14, 2010, advising the District of the Water Agency's proposed construction of an infiltration basin at the above noted location within an unincorporated area of San Bernardino County.

Please be advised the District has no facilities or right-of-way in this area that could be impacted by your proposed construction of an infiltration basin. Therefore, a permit from the District will not be required, and the District has no further comments to offer regarding this matter.

If you have any questions regarding the above, please contact the undersigned at (909) 387-7995.

Sincerely,

GRANT C. MANN, P.E.
Permit Engineer
San Bernardino County
Department of Public Works

GCM:MM:jh
cc: Kevin Blakeslee
BighornDesertViewNoImpact-07272010

RECEIVED
JUL 29 2010
By M. C.

DEPARTMENT OF PUBLIC WORKS

FLOOD CONTROL • LAND DEVELOPMENT & CONSTRUCTION
SOLID WASTE MANAGEMENT • SURVEYOR • TRANSPORTATION

COUNTY OF SAN BERNARDINO

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-8104
Fax (909) 387-8130

GRANVILLE M. "BOW" BOWMAN, P.E., P.L.S.
Director of Public Works

July 30, 2010

T10001812

BIGHORN-DESERT VIEW WATER AGENCY
622 S. JEMEZ TRAIL
YUCCA VALLEY, CA. 92284-1440

Re: Application for an Excavation Permit, to construct a water pipeline along Winters Road from Warren vista Ave to Valley Vista Ave in the Yucca Valley area.

Gentlemen:

In reply to your request of an Excavation Permit, consider this the County Department of Public Works letter of non-objection for your proposed encroachment within public right-of-way at the above noted location, for the purpose of installing a water pipeline.

The proposed work lies within the right of way of Winters Road which is not included within the Maintained System. The County Department of Public Works does not issue permit requirements in this case. We strongly recommend, however, all construction be in a workmanlike manner consistent with currently accepted practices. This letter is issued in order to advise you of County rights within the right-of-way should the County Department of Public Works desire to perform work there in the future.

This letter of non-objection is valid only to the extent of County Department of Public Works interest. It shall be your responsibility to obtain permits required by other interested agencies.

You may be required to remove or relocate the facility at your own cost should the improvement need to be widened or reconstructed or for any other reason as determined by the County Department of Public Works. The removal and/or relocation of said improvements shall be accomplished at no expense to San Bernardino County Department of Public Works.

This letter is non-transferable and will expire if work has not started within one year from the date of this letter. Once the work has started, it shall be completed within sixty (60) days.

If you have any questions regarding the above, please contact the undersigned at (909) 387-8046.

Sincerely,

Grant C. Mann, R.C.E., Permit Engineer

AUG 09 2010

Office Trans San Bernardino County

ORIGINAL

2258257

, CA 7/20 20 10

RECEIVED FROM Bighorn-Desert View Water Agency $ 60.00

Sixty and 00/100 DOLLARS

Court Case Name vs.

NATURE OF FEES		
Permit	60	—
☐ CASH ☑ CHECK ☐ MONEY ORDER	60	—

Case No. SAATRATRA 8335

Charlene Watson

(SIGNATURE)

Fiscal Asst

(TITLE)

01-188A-123 Rev. 8/00 10326 7/16/10 FR: Rick Lucas

Bighorn-Desert View Water Agency

Board of Directors
Terry Burkhart, President
J. Larry Coulombe, Vice President
Michael McBride, Director
David Larson, Director
Martha Oswalt, Director

Agency Office
622 S. Jemez Trail
Yucca Valley, CA 92284-1440

760/364-2315 Phone
760/364-3412 Fax

Marina D West, P.G., General Manager
Joanne L Keiter, Board Secretary

A Public Agency

www.bdvwa.org

July 14, 2010

Mr. Erwin Fogerson, Chief
San Bernardino County Public Works Department
Transportation Operations Division
Transportation Permit Section
825 East Third Street
San Bernardino, CA 92415

Subject: "No Objection Permit"
Reche Groundwater Basin Recharge Project

Dear Mr. Fogerson:

The Bighorn-Desert View Water Agency (BDVWA) wishes to implement a Reche Groundwater Basin Recharge Project located in San Bernardino County, California. One of the requirements of this project is the construction of an infiltration basin to percolate water into the Reche Groundwater Basin. The project proposed to be located on Bureau of Land Management (BLM) lands in the Pipes Wash located at Township 2 North, Range 5 East, Section 24, San Bernardino Base & Meridian. (T2N, R5E, S.B.B.& M.). As part of the construction of this infiltration basin, the BDVWA will need to construct a pipeline along the northern right of way of Winters Road from Warren Vista Avenue to Pipes Wash. Note: Winters road is also known as Tracy Blvd. Figure 1 shows the location of the proposed pipeline construction.

In discussion between Mr. Rick Lucas and Raymond E. Ouellette with Kennedy/Jenks Consultants, Mr. Lucas indicated that the road identified as Winters Road is a "non-paved dedicated road" between Warren Vista Avenue up to the junction with Valley Vista Avenue. The portion identified as Tracy Blvd from Valley Vista Avenue west to Pipes Wash is not dedicated. Since this portion of the pipeline construction is not in a County Dedicated Road, it is our understanding that a "no objection permit" is required from the County. The BDVWA requests that a "no objection permit" be issued for this Right-of-Way work in this portion of the road.

Because we feel the project qualifies for a "no objection permit" and a formal encroachment permit is not necessary, we have not included detailed engineering plans with this submittal. However, a check in the amount of $60.00 for processing is enclosed. If you have any questions about this request, please contact me at 760-364-2315.

Very truly yours,

Marina D. West, PG

General Manager

Enclosure

cc: Kennedy/Jenks Consultants, Ventura, CA.

Path: Z:\Projects\Desert_Valley_Water_Agency\Events\20100318_BLM\20100524_Parcel_Owner.mxd

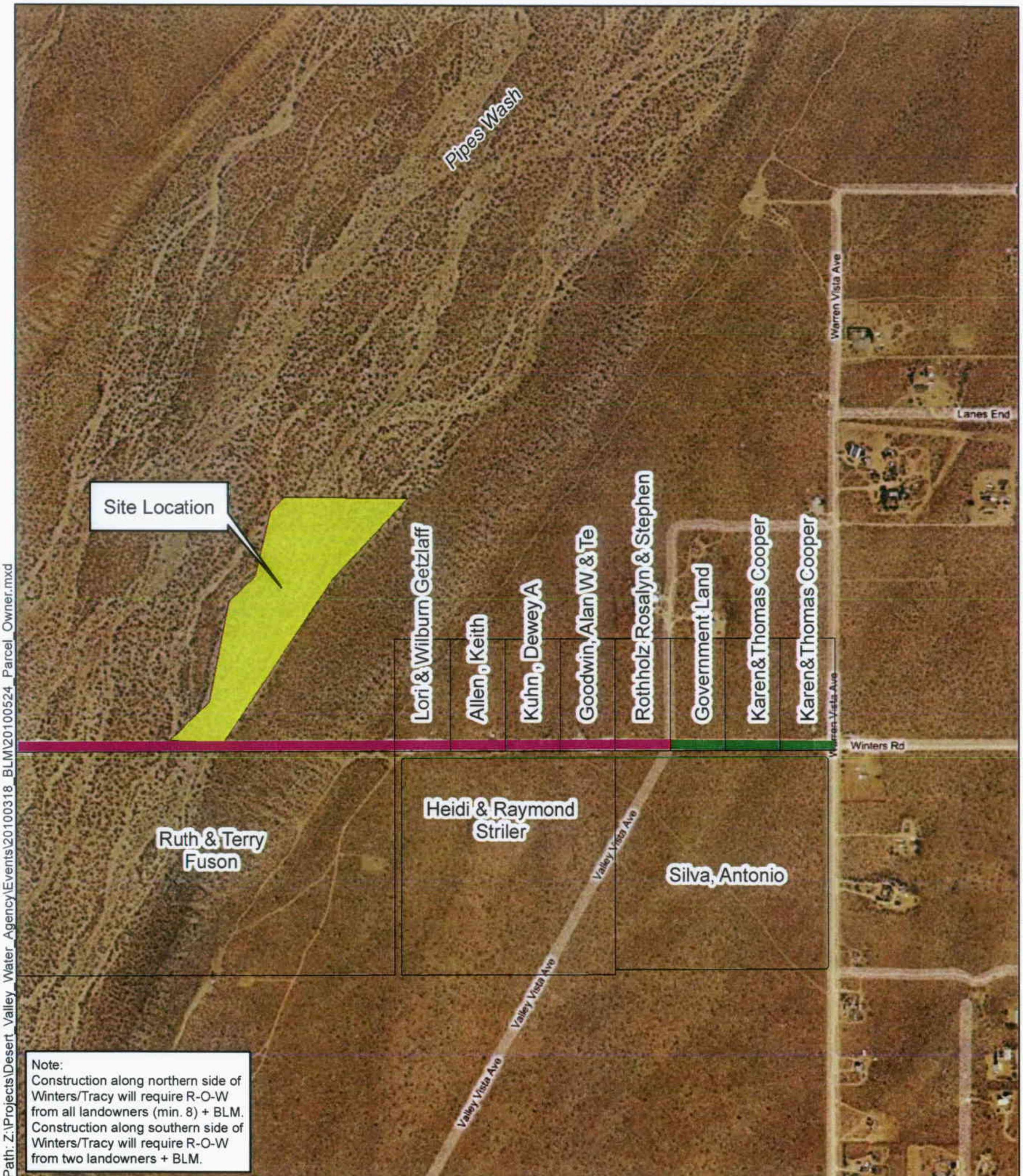


Image Source:(c)2009 Microsoft Corporation
Source: Bureau of Land Managment

Legend

- Non-Paved Dedicated Road
- Non-Paved Non-Dedicated Road
- Proposed Spreading Basin

N

0 500 1,000

Scale: Feet

Kennedy/Jenks Consultants

Bighorn-Desert View Water Agency
San Bernardino County, California

Present Owner Information

0989068*00
May 2010

Figure 1

Bighorn-Desert View Water Agency

Board of Directors
Terry Burkhart, President
J. Larry Coulombe, Vice President
Michael McBride, Director
David Larson, Director
Martha Oswalt, Director

Agency Office
622 S. Jemez Trail
Yucca Valley, CA 92284-1440

760/364-2315 Phone
760/364-3412 Fax

Marina D West, P.G., General Manager
Joanne L Keiter, Board Secretary

A Public Agency

www.bdvwa.org

July 14, 2010

Mr. Erwin Fogerson, Chief
San Bernardino County Public Works Department
Transportation Operations Division
Transportation Permit Section
825 East Third Street
San Bernardino, CA 92415

Subject: "No Objection Permit"
Reche Groundwater Basin Recharge Project

Dear Mr. Fogerson:

The Bighorn-Desert View Water Agency (BDVWA) wishes to implement a Reche Groundwater Basin Recharge Project located in San Bernardino County, California. One of the requirements of this project is the construction of an infiltration basin to percolate water into the Reche Groundwater Basin. The project proposed to be located on Bureau of Land Management (BLM) lands in the Pipes Wash located at Township 2 North, Range 5 East, Section 24, San Bernardino Base & Meridian. (T2N, R5E, S.B.B.& M.). As part of the construction of this infiltration basin, the BDVWA will need to construct a pipeline along the northern right of way of Winters Road from Warren Vista Avenue to Pipes Wash. Note: Winters road is also known as Tracy Blvd. Figure 1 shows the location of the proposed pipeline construction.

In discussion between Mr. Rick Lucas and Raymond E. Ouellette with Kennedy/Jenks Consultants, Mr. Lucas indicated that the road identified as Winters Road is a "non-paved dedicated road" between Warren Vista Avenue up to the junction with Valley Vista Avenue. The portion identified as Tracy Blvd from Valley Vista Avenue west to Pipes Wash is not dedicated. Since this portion of the pipeline construction is not in a County Dedicated Road, it is our understanding that a "no objection permit" is required from the County. The BDVWA requests that a "no objection permit" be issued for this Right-of-Way work in this portion of the road.

Because we feel the project qualifies for a "no objection permit" and a formal encroachment permit is not necessary, we have not included detailed engineering plans with this submittal. However, a check in the amount of $60.00 for processing is enclosed. If you have any questions about this request, please contact me at 760-364-2315.

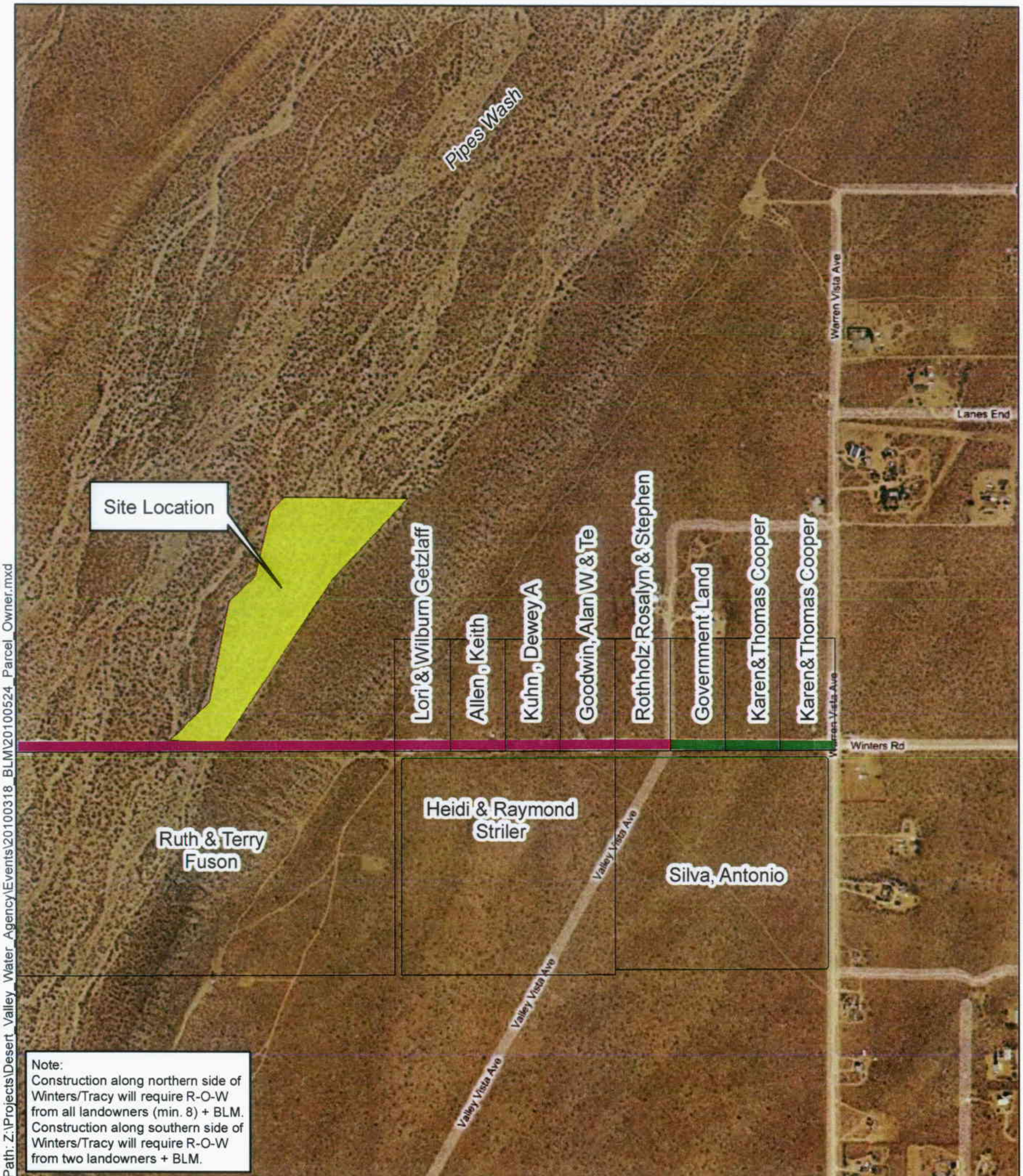
Very truly yours,

Marina D. West, PG

General Manager

Enclosure

cc: Kennedy/Jenks Consultants, Ventura, CA.



Path: Z:\Projects\Desert_Valley_Water_Agency\Events\20100318_BLM\20100524_Parcel_Owner.mxd

Image Source:(c)2009 Microsoft Corporation
Source: Bureau of Land Managment

Legend

- Non-Paved Dedicated Road
- Non-Paved Non-Dedicated Road
- Proposed Spreading Basin

N

0 500 1,000
Scale: Feet

Kennedy/Jenks Consultants

Bighorn-Desert View Water Agency
San Bernardino County, California

Present Owner Information

0989068*00
May 2010

Figure 1

Bighorn-Desert View Water Agency

Board of Directors
Terry Burkhart, President
J. Larry Coulombe, Vice President
Michael McBride, Director
David Larson, Director
Martha Oswalt, Director

Agency Office
622 S. Jemez Trail
Yucca Valley, CA 92284-1440

760/364-2315 Phone
760/364-3412 Fax

Marina D West, P.G., General Manager
Joanne L Keiter, Board Secretary

A Public Agency

www.bdvwa.org

July 14, 2010

Mr. Kevin Blakeslee, Deputy Chief
San Bernardino County Public Works Department
Transportation Operations Division
Flood Control Section
825 East Third Street
San Bernardino, CA 92415

Subject: "Right of Way" Permit
Reche Groundwater Basin Recharge Project

Dear Mr. Blakeslee:

The Bighorn-Desert View Water Agency (BDVWA) wishes to implement a Ames/Reche Groundwater Basin Recharge Project located in San Bernardino County, California. One of the requirements of this project is the construction of an infiltration basin to percolate water into the Reche Groundwater Basin. The project proposed to be located on Bureau of Land Management (BLM) lands in the Pipes Wash located at Township 2 North, Range 5 East, Section 24, San Bernardino Base & Meridian. (T2N, R5E, S.B.B.& M.). As part of the construction of this infiltration basin, the BDVWA will need to construct the infiltration basin within the Pipes Wash.

In discussions between Mr. Tom Williams, Cindy Beck and Raymond E. Ouellette with Kennedy/Jenks Consultants, it was indicated that a "Right of Way" permit for this activity would not be required. We have enclosed three figures which identify the location of the proposed project and would like written confirmation that a "Right-of-Way" permit is not required for us to proceed.

If you have any questions about this project, please call me at 760-364-2315.

Very truly yours,

Marina D. West, PG

General Manager

Enclosure

cc: Kennedy/Jenks Consultants, Ventura, CA.

FOR DEPARTMENT USE ONLY				
Date Received	Amount Received	Amount Due	Date Complete	Notification No.
	$	$		

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Name	Marina D. West, General Manager		
Business/Agency	Bighorn Desert View Water Agency		
Street Address	622 S. Jemez Trail		
City, State, Zip	Yucca Valley, CA 92284-1440		
Telephone	(760) 364-2315	Fax	
Email	bdvwa2@mindspring.com		

2. CONTACT PERSON (*Complete only if different from applicant*)

Name	same as above		
Street Address			
City, State, Zip			
Telephone		Fax	
Email			

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name	Bureau of Land Management Palm Springs South Coast Field Office		
Street Address	1201 Bird Center Drive		
City, State, Zip	Palm Springs, California 92262		
Telephone	(760) 833-7100	Fax	(760) 833-7199
Email			

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	Ames/Reche Groundwater Storage
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years*)

C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (*year*)	Ending (*year*)	Start Date (*month/day*)	End Date (*month/day*)	

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.		
A.	☐ Standard *(Most construction projects, excluding the categories listed below)*	
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*)	*Mine I.D. Number:* ______
C.	☐ Timber Harvesting (*Attachment B*)	THP *Number:* ______
D.	☑ Water Diversion/Extraction/Impoundment (*Attachment C*)	*SWRCB Number:* Water from Mojave Water Agency
E.	☐ Routine Maintenance (*Attachment D*)	
F.	☐ DFG Fisheries Restoration Grant Program (FRGP)	*FRGP Contract Number:* ______
G.	☐ Master	
H.	☐ Master Timber Harvesting	

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: The Department may not process this notification until the correct fee has been received.***

	A. Project	B. Project Cost	C. Project Fee
1	Ames/Reche Groundwater Storage	$30,000.00	$750.00
2			
3			
4			
5			
		D. Base Fee *(if applicable)*	
		E. TOTAL FEE ENCLOSED	$750.00

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant: ______ Notification Number: ______ Date: ______

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

☑ No ☐ Yes (*Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.*)

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.

(*Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway*)

Located within the Pipes Wash northwest of the intersection of Winters Road and Warren Vista Avenue. Site is within the unincorporated community of Flamingo Heights in south San Bernardino County near the town of Yucca Valley. See Exhibit 1 attached for map.

Driving directions:

From 29 Palms Highway (62) turn north onto Old Woman Springs Road (247). Turn right on Buena Vista Drive. Turn left on Warren Vista Avenue. Turn left on Winters Road. Four wheel drive vehicle required to access Pipes Wash down an undeveloped dirt road. Site will be on right beginning at the base of slope.

☐ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	Pipes Wash
C. What water body is the river, stream, or lake tributary to?	None
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	San Bernardino

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Yucca Valley North	2 North	5 East	24	NE

☐ *Continued on additional page(s)*

K. Meridian (*check one*) ☐ Humboldt ☐ Mt. Diablo ☑ San Bernardino

L. Assessor's Parcel Number(s)

062922201 and 062921121

☐ *Continued on additional page(s)*

M. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes)*

Latitude/Longitude	*Latitude:* 116 24 57.93 W		*Longitude:* 34 14 21.55 N	
	☑ Degrees/Minutes/Seconds		☐ Decimal Degrees	☐ Decimal Minutes
UTM	*Easting:*	*Northing:*		☐ Zone 10 ☐ Zone 11
Datum used for Latitude/Longitude or UTM		☐ NAD 27		☑ NAD 83 or WGS 84

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☐	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	☐	☐	☐
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	☐	☐	☐
Channel clearing/vegetation management	☐	☐	☐
Culvert	☐	☐	☐
Debris basin	☐	☐	☐
Dam	☐	☐	☐
Diversion structure – weir or pump intake	☐	☐	☐
Filling of wetland, river, stream, or lake	☐	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☐	☐	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☐	☐	☐
Sediment removal – pond, stream, or marina	☐	☐	☐
Storm drain outfall structure	☐	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing : Horizontal Directional Drilling	☐	☐	☐
Jack/bore	☐	☐	☐
Open trench	☐	☐	☐
Other *(specify)*: Spreading Grounds & Monitoring Wells	☑	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

This project includes construction of approximately 15 acres of spreading grounds within the Pipes Wash for storage and recovery of imported State Water Project water by Bighorn Desert View Water Agency to help increase the reliability of the overall water supply in the region. Construction activities will include the following: 1. Minor grading and vegetation removal for creation of small earthen berms to minimize surface runoff (and evaporation) and maximize infiltration through the floor of the spreading grounds to the underlying groundwater table. 2. Construction of a small concrete outlet and diffusion structure from the SWP feed pipeline into the spreading grounds (structure will be approximately 8.5 feet long by 5 feet wide, by 2 feet tall). 3. Construction of two or three monitoring wells northeast of spreading grounds (within the Pipes Wash).

Exhibit 3 attached show the preferred location of the spreading grounds in red. However, pre-design testing will be done to determine the best location for the spreading ground boundaries, so a 39 acre area is shown in yellow to indicate possible alternative locations of the spreading grounds.

Photographs are included on page 26 of the MND attached.

☐ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

a. One to two personnel for execution of on-site mitigation monitoring program (an expected output from CEQA/NEPA)
b. Up to two personnel
c. Up to four light-duty four-wheel drive vehicles
d. One JD D4 Track dozer
e. One paddlewheel scraper

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☐ Yes ☑ No (*Skip to box 11*)
D. Will the proposed project require work in the wetted portion of the channel?	☐ Yes (*Enclose a plan to divert water around work site*) ☑ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

Per the Draft MND for this project, impacts of this project to the riparian habitat are less than significant. A raparian vegetation mitigation and monitoring plan for disturbed riparian vegetation will be developed and the project will comply with all applicable provisions of the San Bernardino County Development Code Section 88.01.06 which addresses Desert Native Plant Protection.

☐ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No

Vegetation Type	Temporary Impact	Permanent Impact
Protected plant species within spreading ground area listed on add'l pgs	Linear feet: unknown Total area: ______	Linear feet: unknown Total area: ______
	Linear feet: ______ Total area: ______	Linear feet: ______ Total area: ______

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)
None	0	

☐ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes (*List each species and/or describe the habitat below*) ☐ No ☐ Unknown

See attached

☐ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

CEQA Initial Study and Draft Mitigated Negative Declaration for Water Infrastructure Restoration Program ... (May 2010)

☐ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☑ Yes (*Enclose the biological study*) ☐ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

☑ Yes (*Enclose the hydrological study*) ☐ No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

All water/sediment discharges during and after construction will fall under the requirements of an approved discharge permit from the Colorado River Regional Water Quality Control Board (Region 7). These requirements will minimize impacts to the Pipes Wash.

☐ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

Mitigation measures and local ordinances will be followed per the Draft MND to minimize impacts to wildlife and plant resources within the project area. Note that this is a dry wash so no impacts to fish will occur.

☐ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

Mitigation measures as described in the MND will be followed.

☐ *Continued on additional page(s)*

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A. Colorado River Basin Regional Water Quality Control Board (See Attached) ☑ Applied ☐ Issued

B. US Fish and Wildlife Service (See Attached) ☑ Applied ☐ Issued

C. US Army Corp of Engineers (See Attached) ☑ Applied ☐ Issued

D. Unknown whether ☐ local, ☐ state, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☐ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?

☑ Yes (*Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each*)

☐ No (*Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared*)

☐ Notice of Exemption	☑ Mitigated Negative Declaration	☐ NEPA document (*type*):
☐ Initial Study	☐ Environmental Impact Report	☐ CESA document (*type*):
☐ Negative Declaration	☐ Notice of Determination (*Enclose*)	☐ ESA document (*type*):
☐ THP/ NTMP	☐ Mitigation, Monitoring, Reporting Plan	

B. State Clearinghouse Number (*if applicable*)			
C. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes D, E, and F*)	☐ No (*Skip to box 14.G*)	
D. CEQA Lead Agency	Bighorn Desert View Water Agency		
E. Contact Person	Marina D. West, General Manager	F. Telephone Number	(760) 364-2315

G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.

The Ames/Reche Groundwater Storage Project is part of the larger Water Infrastructure Restoration Plan as described in the draft MND. The larger project includes water studies and plans, data collection, and information analysis tools and water system improvements. The draft MND only analyzes the groundwater storage and recovery program and the pipeline installation/replacement project.

☐ *Continued on additional page(s)*

H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?

☑ Yes (*Enclose proof of payment*) ☐ No (*Briefly explain below the reason a filing fee has not been paid*)

Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.

15. SITE INSPECTION

Check one box only.

☐ In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.

☑ I request the Department to first contact (*insert name*) Marina West at (*insert telephone number*) (760) 364-2315 to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☑ Yes (Please enclose the information via digital media with the completed notification form)

☐ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

Marina Ott

Signature of Applicant or Applicant's Authorized Representative

07/16/10

Date

Marina D. West

Print Name

FOR DEPARTMENT USE ONLY				
Date Received	Amount Received	Amount Due	Date Complete	Notification No.
	$	$		

STATE OF CALIFORNIA

DEPARTMENT OF FISH AND GAME

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Name	Marina D. West, General Manager		
Business/Agency	Bighorn Desert View Water Agency		
Street Address	622 S. Jemez Trail		
City, State, Zip	Yucca Valley, CA 92284-1440		
Telephone	(760) 364-2315	Fax	
Email	bdvwa2@mindspring.com		

2. CONTACT PERSON (*Complete only if different from applicant*)

Name	same as above		
Street Address			
City, State, Zip			
Telephone		Fax	
Email			

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name	Bureau of Land Management Palm Springs South Coast Field Office		
Street Address	1201 Bird Center Drive		
City, State, Zip	Palm Springs, California 92262		
Telephone	(760) 833-7100	Fax	(760) 833-7199
Email			

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	Ames/Reche Groundwater Storage
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years)*

C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (*year*)	Ending (*year*)	Start Date (*month/day*)	End Date (*month/day*)	

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.	
A.	☐ Standard *(Most construction projects, excluding the categories listed below)*
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*) *Mine I.D. Number:* ______
C.	☐ Timber Harvesting (*Attachment B*) THP *Number:* ______
D.	☑ Water Diversion/Extraction/Impoundment (*Attachment C*) *SWRCB Number:* ______
E.	☐ Routine Maintenance (*Attachment D*)
F.	☐ DFG Fisheries Restoration Grant Program (FRGP) *FRGP Contract Number:* ______
G.	☐ Master
H.	☐ Master Timber Harvesting

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: The Department may not process this notification until the correct fee has been received.***

	A. Project	B. Project Cost	C. Project Fee
1	Ames/Reche Groundwater Storage		
2			
3			
4			
5			
		D. Base Fee *(if applicable)*	
		E. TOTAL FEE ENCLOSED	

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant: ______ Notification Number: ______ Date: ______

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

☑ No ☐ Yes (*Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.*)

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.

(*Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway*)

Located within the Pipes Wash northwest of the intersection of Winters Road and Warren Vista Avenue. Site is within the unincorporated community of Flamingo Heights in south San Bernardino County near the town of Yucca Valley. See Exhibit 1 attached for map.

Driving directions:

From 29 Palms Highway (62) turn north onto Old Woman Springs Road (247). Turn right on Buena Vista Drive. Turn left on Warren Vista Avenue. Turn left on Winters Road. Site will be on right.

☐ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	Pipes Wash
C. What water body is the river, stream, or lake tributary to?	None
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	San Bernardino

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Yucca Valley North	2 North	5 East	24	NE

☐ *Continued on additional page(s)*

K. Meridian (*check one*) ☐ Humboldt ☐ Mt. Diablo ☑ San Bernardino

L. Assessor's Parcel Number(s)

062922201 and 062921121

☐ *Continued on additional page(s)*

M. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes*)

Latitude/Longitude	*Latitude:*	116 24 57.93 W	*Longitude:*	34 14 21.55 N
	☑ Degrees/Minutes/Seconds	☐ Decimal Degrees	☐ Decimal Minutes	
UTM	*Easting:*	*Northing:*	☐ Zone 10 ☐ Zone 11	
Datum used for Latitude/Longitude or UTM	☐ NAD 27	☑ NAD 83 or WGS 84		

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☐	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	☐	☐	☐
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	☐	☐	☐
Channel clearing/vegetation management	☐	☐	☐
Culvert	☐	☐	☐
Debris basin	☐	☐	☐
Dam	☐	☐	☐
Diversion structure – weir or pump intake	☐	☐	☐
Filling of wetland, river, stream, or lake	☐	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☐	☐	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☐	☐	☐
Sediment removal – pond, stream, or marina	☐	☐	☐
Storm drain outfall structure	☐	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing : Horizontal Directional Drilling	☐	☐	☐
Jack/bore	☐	☐	☐
Open trench	☐	☐	☐
Other *(specify)*: Spreading Grounds & Monitoring Wells	☑	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

This project includes construction of approximately 15 acres of spreading grounds within the Pipes Wash for storage and recovery of imported State Water Project water by Bighorn Desert View Water Agency to help increase the reliability of the overall water supply in the region. Construction activities will include the following: 1. Minor grading and vegetation removal for creation of small earthen berms to minimize surface runoff (and evaporation) and maximize infiltration through the floor of the spreading grounds to the underlying groundwater table. 2. Construction of a small concrete outlet and diffusion structure from the SWP feed pipeline into the spreading grounds (structure will be approximately 8.5 feet long by 5 feet wide, by 2 feet tall). 3. Installation of fencing around the spreading grounds for site/public safety. 4. Construction of two or three monitoring wells northeast of spreading grounds (within the Pipes Wash).

Exhibit 3 attached show the preferred location of the spreading grounds in red. However, pre-design testing will be done to determine the best location for the spreading ground boundaries, so a 39 acre area is shown in yellow to indicate possible alternative locations of the spreading grounds.

Photographs are included on page 26 of the MND attached.

☐ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

1 - Forklift, 1 - Loader, 1 - Excavator, 1- Water Tank

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☐ Yes ☑ No (*Skip to box 11*)
D. Will the proposed project require work in the wetted portion of the channel?	☐ Yes (*Enclose a plan to divert water around work site*) ☑ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

Per the Draft MND for this project, impacts of this project to the riparian habitat are less than significant. A raparian vegetation mitigation and monitoring plan for disturbed riparian vegetation will be developed and the project will comply with all applicable provisions of the San Bernardino County Development Code Section 88.01.06 which addresses Desert Native Plant Protection.

☐ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No

Vegetation Type	Temporary Impact	Permanent Impact
Protected plant species within spreading ground area listed on add'l pgs	Linear feet: unknown Total area:	Linear feet: unknown Total area:
	Linear feet: Total area:	Linear feet: Total area:

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)
None	0	

☐ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes *(List each species and/or describe the habitat below)* ☐ No ☐ Unknown

See attached

☐ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

CEQA Initial Study and Draft Mitigated Negative Declaration for Water Infrastructure Restoration Program ... (May 2010)

☐ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☑ Yes (*Enclose the biological study*) ☐ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

☑ Yes (*Enclose the hydrological study*) ☐ No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

All water/sediment discharges during and after construction will fall under the requirements of an approved discharge permit from the Colorado River Regional Water Quality Control Board (Region 7). These requirements will minimize impacts to the Pipes Wash.

☐ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

Mitigation measures and local ordinances will be followed per the Draft MND to minimize impacts to wildlife and plant resources within the project area. Note that this is a dry wash so no impacts to fish will occur.

☐ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

Mitigation measures as described in the MND will be followed.

☐ *Continued on additional page(s)*

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A. Colorado River Basin Regional Water Quality Control Board (See Attached) ☑ Applied ☐ Issued

B. US Fish and Wildlife Service (See Attached) ☑ Applied ☐ Issued

C. US Army Corp of Engineers (See Attached) ☑ Applied ☐ Issued

D. Unknown whether ☐ local, ☐ state, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☐ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?

☑ Yes (*Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each*)

☐ No (*Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared*)

☐ Notice of Exemption	☑ Mitigated Negative Declaration	☐ NEPA document (*type*): ________
☐ Initial Study	☐ Environmental Impact Report	☐ CESA document (*type*): ________
☐ Negative Declaration	☐ Notice of Determination *(Enclose)*	☐ ESA document (*type*): ________
☐ THP/ NTMP	☐ Mitigation, Monitoring, Reporting Plan	

B. State Clearinghouse Number (*if applicable*)			
C. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes D, E, and F*)	☐ No (*Skip to box 14.G*)	
D. CEQA Lead Agency	Bighorn Desert View Water Agency		
E. Contact Person	Marina D. West, General Manager	F. Telephone Number	(760) 364-2315

G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.

The Ames/Reche Groundwater Storage Project is part of the larger Water Infrastructure Restoration Plan as described in the draft MND. The larger project includes water studies and plans, data collection, and information analysis tools and water system improvements. The draft MND only analyzes the groundwater storage and recovery program and the pipeline installation/replacement project.

☐ *Continued on additional page(s)*

H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?

☐ Yes (*Enclose proof of payment*) ☑ No (*Briefly explain below the reason a filing fee has not been paid)*

Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.

15. SITE INSPECTION

Check one box only.

☐ In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.

☑ I request the Department to first contact (*insert name*) ________________________ at (*insert telephone number*) ________________________ to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☑ Yes (Please enclose the information via digital media with the completed notification form)

☐ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

____ __________________________

Signature of Applicant or Applicant's Authorized Representative   Date

Marina D. West

Print Name

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Applicant Name: Bighorn Desert View Water Agency

Project Name: Ames/Reche Groundwater Storage

ATTACHMENT C

Water Diversion Questionnaire

I. DIVERSION OR OBSTRUCTION

Please provide the additional information below ***if*** the project is directly related to any diversion, obstruction, extraction, or impoundment of the natural flow of a river, stream, or lake. If you have a current or expired Lake or Streambed Alteration Agreement (LSAA) for some activity related to your project, provide the LSAA number in your project description below.

A. Attach plans of any diversion or water storage structure or facility that will be constructed or if no structures or facilities will be constructed, photographs of the project site, including any existing facilities or structures.

B. Please complete the water use table below. For diversion rate, use gallons per day (gpd) if rate is less than 0.025 cubic foot per second (cfs) (approximately 16,000 gallons per day).

SEASON OF DIVERSION		PURPOSE OF USE	DIVERSION RATE (cfs or gpm)	AMOUNT USED (acre feet)	
BEGINNING DATE (Mo. & Day)	ENDING DATE (Mo. & Day)			FROM STORAGE	BY DIVERSION
		Marina D. West, General Mar	Bighorn Desert View Water A	622 S. Jemez Trail	Yucca Valley, CA 9
(760) 364-2315		bdvwa2@mindspring.com	same as above		
			Bureau of Land Managemen	1201 Bird Center Drive	Palm Springs, Cal
(760) 833-7100	(760) 833-7199		Ames/Reche Groundwate		

C. *A*ttach a topographic map that is labeled to show the following:
1. Source of the water
2. Points of diversion
3. Areas of use
4. Storage areas

D. Specify the maximum instantaneous rate of withdrawal (using proposed equipment) in cubic feet per second (cfs) or gallons per minute (gpm): ___________________.

E. Check each box below that applies to the project water rights and attach supporting documents.

- ☐ Riparian. *Attach the most recent statement of riparian rights filed with the State Water Resources Control Board (SWRCB).*
- ☐ Diversion for immediate use
- ☐ Diversion to storage (for less than 30 days)

☐ Appropriative

- ☐ Pre-1914
- ☐ Post-1914. *Attach a copy of the applicant's water right application, permit, or license filed with or issued by the SWRCB.*
- ☑ Diversion for immediate use. *Attach a copy of the applicant's water right application, permit, or license filed with or issued by the SWRCB.*
- ☐ Diversion to storage. *Attach a copy of the applicant's water right application, permit, or license filed with or issued by the SWRCB.*
- ☐ Small domestic or livestock stockpond use. *Attach a copy of the applicant's registration of water use form filed with the SWRCB.* (See Water Code section 1228 *et seq.*)

☐ Purchased or contracted water. *Attach a copy of the applicant's contract or letter from the applicant's water provider.*

☐ Other. *Describe below or attach separate page*.

____
____
____
____.

F. Approximate lowest level of flow in the river, stream, or lake at the point of diversion during the proposed season of diversion in gpm or cfs: ____.

G. Other information. After the Department reviews the project description, and based on the project's location and potential impacts to fish and wildlife resources, the Department will determine if additional information is needed to complete the notification. Such information could include more site-specific information to ensure that the terms and conditions in the Lake or Streambed Alteration Agreement issued to the applicant will be adequate to protect the fish and wildlife resources the diversion or obstruction could adversely affect. Site-specific information could include specific studies based on the season of diversion, the location of the diversion relative to other diversions in the watershed, the method of diversion, and the quantity of water to be diverted, such as the following:

1. *Water Availability Analysis* to determine if the water can be diverted without causing substantial adverse effects on downstream fish and wildlife resources. Water availability analyses are based on a comparison of flows without any diversions (unimpaired flows) and flows available when all known diversions are “subtracted” (impaired flows). The protocol for water availability analyses is available on request.

2. *Instream Flow Study* to determine the minimum bypass flows needed and maximum rates of withdrawal possible to provide adequate depths and velocities to protect habitat for all life stages of aquatic resources. The study plan, which must be prepared by a qualified fisheries biologist and approved by the Department, will determine the effects of the proposed diversion on flow depth and velocity.

3. *Water Quality Study* to assess the effects of the proposed water diversion or impoundment on water temperature and water quality at and downstream from the point of diversion.

II. PERMANENT OR TEMPORARY RESERVOIR

Please provide the information below ***if*** the project includes the construction of a reservoir, whether permanent or temporary, and/or the filling of a reservoir by diverting or obstructing the flow of a river, stream, or lake.

A. Proposed use of the stored water: ____.

B. Construction plans for the reservoir and dam. (*Attach plans*)

C. A complete description of the reservoir and dam, including the methods and materials that will be used to construct the reservoir and dam and the following dimensions certified by a licensed professional: the width, length, depth, and total surface area of the reservoir pool; the volume of water in acre-feet that will be stored in the reservoir; and the height and length of the dam.

D. The amount of riparian land that will be inundated (i.e., upstream from the dam): _____________.

E. Where vehicles will enter and exit the project site during construction and for maintenance purposes after construction. *(Attach map)*

F. The maximum distance of the disturbance that will occur upstream and downstream during construction: ____.

G. The methods that will be employed to ensure that the flow is maintained below the dam at all times when water is being diverted into the reservoir. __________________________________

____

____

____.

H. Specify the time period when the area below the dam becomes dry, if at all. ________________.

I. The methods that will be employed to ensure that adult and juvenile fish will be able to pass over or around the dam. ____

____

____

____.

J. If a fish ladder is necessary to enable adult and juvenile fish to pass over or around the dam, provide construction plans and an operation plan for the fish ladder. *(Enclose, if applicable)*

K. The methods that will be employed to monitor and maintain water quality (including temperature) within the reservoir. ____

____

____

____.

III. TEMPORARY RESERVOIR

Please provide the information below ***if*** the project includes the construction of a temporary reservoir only within the stream zone.

A. Date of dam installation:____.

B. Date of dam removal:____.

C. Amount of time it will take to construct the dam: ______________________________.

D. Amount of time it will take to remove the dam: ______________________________.

E. Methods to ensure that the reservoir pool will be drained in a manner that does not strand or otherwise harm fish: Located within the Pipes Wash northwest of the intersection of Winters Road and Warren

____

Pipes Wash

None.

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Applicant Name: ____

Project Title: ____

ATTACHMENT D

Routine Maintenance

If the applicant is notifying the Department to obtain an agreement for routine maintenance activities, Section I must be completed and the information and documents described in Sections II and III must be submitted with the notification.

I. REGULARLY RE-OCCURRING MAINTENANCE ACTIVITIES

These are generally activities designed to maintain channel capacity. Check each box that applies:

- ☐ Sediment removal:
  - ☑ In and around bridges, culverts, storm drain outlets, and/or water diversion inlets
  - ☐ Stream channel bottom
  - ☐ Pond or lake
  - ☐ Marina basin
  - ☐ Other: ____.
- ☐ Clearing trash and debris
- ☐ Removing fallen trees
- ☑ Removing dead (not dormant) trees and shrubs
- ☐ Vegetation:
  - ☐ Limbing and/or trimming of branches and tree limbs
  - ☐ Vegetation removal under high power lines
  - ☐ Mowing levee slopes and stream banks
  - ☐ Mowing within stream and floodway channels
  - ☐ Removing emergent (e.g., bulrush and cattails) or other near water vegetation with:
    - ☐ hand tools
    - ☐ mechanical vegetation cutters and shredders
    - ☐ heavy equipment (soil disturbance)
    - ☐ chemicals

- ☐ Removing vegetation from the ***upper half*** of the bank with:
  - ☐ hand tools
  - ☐ mechanical vegetation cutters or shredders
  - ☐ heavy equipment (soil disturbance)
  - ☐ chemicals
- ☐ Removing vegetation from the ***lower half*** of bank with:
  - ☐ hand tools
  - ☐ mechanical vegetation cutters or shredders
  - ☑ heavy equipment (soil disturbance)
  - ☐ chemicals
- ☐ Removing vegetation within the channel with:
  - ☐ hand tools
  - ☐ mechanical vegetation cutters and shredders
  - ☐ heavy equipment (soil disturbance)
  - ☐ chemicals
- ☐ Removing invasive, non-native plants with:
  - ☐ hand tools
  - ☐ mechanical vegetation cutters and shredders
  - ☐ heavy equipment (soil disturbance)
  - ☐ chemicals
- ☐ Other: ____.

☐ Debris and brush pile burning

☐ Burning levees

☐ Minor erosion repair:

- ☐ Repair at existing erosion control sites
- ☐ New erosion repair

☐ Revegetation with local, native plant species

- ☐ Chemical application:
  - ☐ Herbicides
  - ☐ Rodenticides
  - ☐ Insecticides
- ☐ Minor bridge work:
  - ☐ Reinforcing pilings
  - ☐ Reinforcing aprons
  - ☐ Bridge painting (access and falsework)

  Materials to be used for reinforcement: ____.

- ☐ Other: ____.
- ☐ Other: ____.
- ☐ Other: ____.

II. MAP OR MAPBOOK

Maps must be of sufficient detail to assist in locating maintenance sites and should include the following:

A. The applicant's jurisdictional boundaries
B. All watercourses within the jurisdictional boundaries where maintenance will occur
C. A key to identify each watercourse and the maintenance activities and location (e.g., bridges, water control diversions, and large scale maintenance) of those activities that are likely to occur

III. SPECIAL STATUS SPECIES LOCATIONS

A drawing, diagram, or map that shows the applicant's jurisdictional boundaries and the locations within that area where special status species are known to exist.

LAKE OR STREAMBED ALTERATION FEE SCHEDULE

The Department may refuse to process a notification or a request for an extension or amendment until the department receives the proper fee or fees.

STANDARD AGREEMENT

Any agreement other than an agreement for gravel, rock, or sand extraction, an agreement for timber harvesting, an agreement for routine maintenance, a master agreement, or a master agreement for timber operations.

Fee:
If the term of the agreement is 5 years or less.

For each project the agreement covers:

$200 if the project costs less than $5,000.
$250 if the project costs from $5,000 to less than $10,000.
$500 if the project costs from $10,000 to less than $25,000.
$750 if the project costs from $25,000 to less than $100,000.
$1,100 if the project costs from $100,000 to less than $200,000.
$1,500 if the project costs from $200,000 to less than $350,000.
$2,250 if the project costs from $350,000 to less than $500,000.
$4,000 if the project costs $500,000 or more.

Project cost means the cost to complete each project for which notification is required.

As a general rule, a notification for a standard agreement should identify only one project. If an entity chooses to identify more than one project in a single notification, the department may require the entity to separately notify the department for one or more of the projects included in the original notification based on their type or location.

If the notification includes more than one project, the fee shall be calculated by adding the separate fees for each project. For example, if a notification identifies three projects, one of which will cost less than $5,000 to complete, one of which will cost $7,500 to complete, and one of which will cost $17,500 to complete, the fee for the first project would be $200, the fee for the second project would be $250, and the fee for the third project would be $500. Hence, the total fee the entity would need to submit with the notification that identifies those three projects would be $950.

An entity may not obtain a standard agreement for any project identified in the notification that qualifies for an agreement for gravel, rock, or sand extraction, an agreement for timber harvesting, an agreement for routine maintenance, a master agreement, or a master agreement for timber operations unless the department agrees otherwise.

Fee submittal: If the entity requests an agreement with a term of 5 years or less, the fee specified in the category for agreements with a term of 5 years or less must be submitted with the notification.

If the entity requests an agreement with a term longer than 5 years (Standard Long-term Agreement) the fee specified must be submitted with the notification.

STANDARD LONG-TERM AGREEMENT

Any agreement other than an agreement for gravel, rock, or sand extraction, an agreement for timber harvesting, an agreement for routine maintenance, a master agreement, or a master agreement for timber operations.

Fee:
If the term of the agreement is longer than 5 years.

$2,400 base fee, plus

For each project the agreement covers:

$200 if the project costs less than $5,000.
$250 if the project costs from $5,000 to less than $10,000.
$500 if the project costs from $10,000 to less than $25,000.
$750 if the project costs from $25,000 to less than $100,000.
$1,100 if the project costs from $100,000 to less than $200,000.
$1,500 if the project costs from $200,000 to less than $350,000.
$2,250 if the project costs from $350,000 to less than $500,000.
$4,000 if the project costs $500,000 or more.

Project cost means the cost to complete each project for which notification is required.

As a general rule, a notification for a standard agreement should identify only one project. If an entity chooses to identify more than one project in a single notification, the department may require the entity to separately notify the department for one or more of the projects included in the original notification based on their type or location.

If the notification includes more than one project, the fee shall be calculated by adding the separate fees for each project. For example, if a notification identifies three projects, one of which will cost less than $5,000 to complete, one of which will cost $7,500 to complete, and one of which will cost $17,500 to complete, the fee for the first project would be $200, the fee for the second project would be $250, and the fee for the third project would be $500. Hence, the total fee the entity would need to submit with the notification that identifies those three projects would be $950.

An entity may not obtain a standard agreement for any project identified in the notification that qualifies for an agreement for gravel, rock, or sand extraction, an agreement for timber harvesting, an agreement for routine maintenance, a master agreement, or a master agreement for timber operations unless the department agrees otherwise.

Fee submittal: If the entity requests an agreement with a term of 5 years or less, the fee specified in the category for agreements with a term of 5 years or less must be submitted with the notification.

If the entity requests an agreement with a term longer than 5 years, the fee specified must be submitted with the notification.

SAND, ROCK AND GRAVEL EXTRACTION AGREEMENT

Any agreement for commercial or non-commercial mining or extraction of gravel, sand, rock, or other aggregate material.

Fee:
If the term of the agreement is <u>5 years or less:</u>

$500 if the annual extraction volume is less than 500 cubic yards.
$1,000 if the annual extraction volume is 500 to less than 1,000 cubic yards.
$2,500 if the annual extraction volume is 1,000 to less than 5,000 cubic yards.
$5,000 if the annual extraction volume is 5,000 or more cubic yards.

Fee:
If the term of the agreement is <u>longer than 5 years:</u>

$10,000 base fee, plus
$1,000 annual fee

Fee submittal: If the entity requests an agreement with a term of 5 years or less, the fee specified in paragraph (1) must be submitted with the notification.

If the entity requests an agreement with a term longer than 5 years, the base fee specified in paragraph (2) must be submitted with the notification.

TIMBER HARVESTING OPERATION AGREEMENT

An agreement of five years or less that covers one or more projects that are included in a timber harvesting plan approved by the California Department of Forestry and Fire Protection.

Fee:
$1,200 base fee, plus
$100 for each project the agreement covers, and

Fee submittal: The fee specified must be submitted with the notification.

MASTER TIMBER HARVESTING OPERATION AGREEMENT

An agreement with a term of greater than five years that covers timber operations on timberland that are not exclusively projects to extract gravel, sand, or rock; not exclusively projects that are included in a timber harvesting plan approved by the California Department of Forestry and Fire Protection; or not exclusively routine maintenance projects that the entity will need to complete separately at different time periods during the term of the agreement; and describes a procedure the entity must follow for construction, maintenance, or other projects the agreement covers.

Fee:
$7,500 base fee, plus
$100 for each project the agreement covers, and
$1,000 annual fee

Fee submittal: The base fee specified at a minimum must be submitted with the notification. The balance of all fees due must be paid prior to the issuance of the agreement.

Note: If an entity chooses to identify more than one project in a single notification, the total fee may exceed $5,000 regardless of the term of the agreement.

ROUTINE MAINTENANCE AGREEMENT

An agreement that covers only multiple routine maintenance projects that the entity will complete at different time periods during the term of the agreement; and describes a procedure the entity must follow for any maintenance projects the agreement covers.

Fee:
If the <u>term of the agreement is 5 years or less:</u>

$1,200 base fee, plus
$100 for each maintenance project completed per calendar year.

Fee:
If the <u>term of the agreement is longer than 5 years:</u>

$2,400 base fee, plus
$100 for each maintenance project completed per calendar year.

Fee submittal: If the entity requests an agreement with a term of 5 years or longer then 5 years, the base fee at a minimum must be submitted with the notification. The balance of all fees due must be paid prior to the issuance of the agreement.

MASTER AGREEMENT

An agreement with a term of greater than five years that covers multiple projects that are not exclusively projects to extract gravel, sand, or rock; not exclusively projects that are included in a timber harvesting plan approved by the California Department of Forestry and Fire Protection; or not exclusively routine maintenance projects that the entity will need to complete separately at different time periods during the term of the agreement; and describes a procedure the entity must follow for construction, maintenance, or other projects the agreement covers.

Fee:
$30,000 base fee, plus:
$250 for each project the agreement covers, and
$2,500 annual fee

Fee submittal: The base fee specified in paragraph (1) at a minimum must be submitted with the notification. The balance of all fees due must be paid prior to the issuance of the agreement.

An example of a project for which the department would issue a master agreement is a large-scale development proposal comprised of multiple projects for which specific, detailed design plans have not been prepared at the time of the original notification. The master agreement will specify a process the department and entity will follow before each project begins and may identify various measures the entity will be required to incorporate as part of each project in order to protect fish and wildlife resources.

8 June 2010

Memorandum

To: State of California Department of Fish and Game

From: Bighorn Desert View Water Agency

Subject: Notification of Lake or Streambed Alteration – Supplemental Information
K/J ProjectNumber

Additional text for Item 11-B

Protected plant species that exist within the spreading ground project area include:

Hedgehog cactus (Echinocereus enelmannii)
Beavertail cactus (Opuntia basilaris)
Silver cholla (Oputina echinocarpa)
Pencil cholla (Opuntia ramosissima)
Bear cactus (Opuntia ursine)
Catclaw acacia (Acacia greggii)
Joshua tree (Yucca brevifolia)

The impact to each species cannot be quantified until a final site location is chosen.

Additional text for Item 11-C

Protected animal species found within the 39 acre spreading ground project area include:

Desert tortoise (Gopherus agassizii) – Note that according to the Draft MND for this project, as long as the spreading grounds are constructed during the winter and in the southern portion of the study area, impacts on the desert tortoise could be avoided.

Burrowing Owl (Athene cunicularia) – Three burrows were found within the survey area and all are located outside of the boundaries of the 15-acre spreading basin preferred site. As long as the preferred site is used no mitigation measures are required.

Le Conte's thrasher (Toxostoma lecontei) – Impacts will be mitigated by scheduling the construction between late August to late January to avoid breeding and nesting birds and minimizing the amount of disturbed LeConte's thrasher habitat.

Additional text for Item 13

Permits known to be required for the spreading basin are as follows:

Colorado River Basin Regional Water Quality Control Board Region 7 (RWQCB) - For construction existing discharge permits may be able to be used. This is being evaluated and the correct permit will be applied for concurrently with this permit application. A permit will be also be required for the permanent facility but the type of permit will depend on future discussions with the RWQCB.

US Fish and Wildlife Service - Once the project is approved US Fish and Wildlife Service will require a formal request for the presence of Endangered and Threatened species within the project area.

US Army Corps of Engineers (ACOE) - Project is being submitted to ACOE to determine if the Pipes Wash is within ACOE "Jurisdictional Waters" or if it is "isolated waters". If it is the former a 404 Permit will be required from the ACOE.

Image Source:(c)2009 Microsoft Corporation

Path: Z:\Projects\Bighorn-Desert View\Events\20100607_Figures\Exhibit1.mxd

Legend

★ Proposed Spreading Basin

N

0 1 2

Miles

Kennedy/Jenks Consultants

Bighorn-Desert View Water Agency
San Bernardino County, California

Project Location Map

K/J 0989068*00
June 2010

Exhibit 1

Bighorn-Desert View Water Agency

CEQA Initial Study and
Draft Mitigated Negative Declaration
for

Water Infrastructure Restoration Program: AMES/RECHE GROUNDWATER STORAGE and RECOVERY PROGRAM; and PIPELINE INSTALLATION/REPLACEMENT PROJECT

May 2010

Prepared by:
Bighorn Desert View Water Agency
622 S. Jemez Trail
Yucca Valley, CA 92284-1440

Assisted by:
Candida Neal, AICP
A Land Use and Environmental Planning Consulting Firm
P.O. Box 1978
Claremont, CA 91711

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

A. Facility:

Name: Bighorn-Desert View Water Agency			
Address: 622 S. Jemez Trail			
City: Yucca Valley,	County: San Bernardinc	State: CA	Zip Code: 92284-1440
Contact Person: Marina D. West		Telephone Number: (760) 364-2315	

B. Facility Owner:

Name: Same as above			Owner Type (Check One): 1. ☐ Individual 2. ☐ Corporation
Address:			3. ☑ Governmental Agency 4. ☐ Partnership
City:	State:	Zip Code:	5. ☐ Other: ________
Contact Person:		Telephone Number:	Federal Tax ID:

C. Facility Operator (The agency or business, not the person):

Name: Same as above			Operator Type (Check One): 1. ☐ Individual 2. ☐ Corporation
Address:			3. ☑ Governmental Agency 4. ☐ Partnership
City:	State:	Zip Code:	5. ☐ Other: ________
Contact Person:		Telephone Number:	

D. Owner of the Land:

Name: Bureau of Land Management			Owner Type (Check One): 1. ☐ Individual 2. ☐ Corporation
Address: 1201 Bird Center Drive			3. ☑ Governmental Agency 4. ☐ Partnership
City: Palm Springs	State: CA	Zip Code: 92262	5. ☐ Other: ________
Contact Person:		Telephone Number:	

E. Address Where Legal Notice May Be Served:

Address: 622 S. Jemez Trail		
City: Yucca Valley,	State: CA	Zip Code: 92284
Contact Person: Marina D. West		Telephone Number: (760) 364-2315

F. Billing Address:

Address: same as A.		
City:	State:	Zip Code:
Contact Person:		Telephone Number:

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☐ **A. WASTE DISCHARGE TO LAND** ☑ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

☐ Domestic/Municipal Wastewater Treatment and Disposal	☐ Animal Waste Solids	☐ Animal or Aquacultural Wastewater
☐ Cooling Water	☐ Land Treatment Unit	☐ Biosolids/Residual
☐ Mining	☐ Dredge Material Disposal	☐ Hazardous Waste (see instructions)
☐ Waste Pile	☐ Surface Impoundment	☐ Landfill (see instructions)
☐ Wastewater Reclamation	☐ Industrial Process Wastewater	☐ Storm Water

☑ Other, please describe: State Water Project Water to Surface Impoundment

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	**2. Latitude**	**3. Longitude**
Facility: 062922201 and	**Facility:** 116 24 57W	**Facility:** 34 14 21N
Discharge Point: 062921121	**Discharge Point:**	**Discharge Point:**

IV. REASON FOR FILING

☑ New Discharge or Facility	☐ Changes in Ownership/Operator (see instructions)
☐ Change in Design or Operation	☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
☐ Change in Quantity/Type of Discharge	☐ Other:

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: Bighorn-Desert View Water Agency

Has a public agency determined that the proposed project is exempt from CEQA? ☐ **Yes** ☑ **No**

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency:

Has a "Notice of Determination" been filed under CEQA? ☑ **Yes** ☐ **No**

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ **EIR** ☑ **Negative Declaration**

Expected CEQA Completion Date: Adopted 6/16/2010

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

See enclosed Forms 1, 2D and 2E and attachments

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: Marina D. West **Title:** General Manager

Signature: ______________ **Date:** ______________

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

Please print or type in the unshaded areas only. Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S		T/A	C
F			D
1	2 13	14	15

LABEL ITEMS	
I. EPA I.D. NUMBER	PLEASE PLACE LABEL IN THIS SPACE
III. FACILITY NAME	
V. FACILITY MAILING ADDRESS	
VI. FACILITY LOCATION	

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)	16	X 17	18	B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)	19	X 20	21
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	22	X 23	24	D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)	X 25	26	X 27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	28	X 29	30	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	31	X 32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34	X 35	36	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	37	X 38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	40	X 41	42	J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	43	X 44	45

III. NAME OF FACILITY

C 1 SKIP (15, 16 – 29, 30–69): Bighorn Desert View Water Agency

IV. FACILITY CONTACT

	A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
C 2	Ames/Reche Groundwater Storage	
15	16 – 45	46 – 48, 49 – 51, 52- 55

V. FACILTY MAILING ADDRESS

	A. STREET OR P.O. BOX
C 3	
15	16 – 45

	B. CITY OR TOWN	C. STATE	D. ZIP CODE
C 4	Marina D. West, General Manager	Bighc	622 S. Jem
15	16 – 40	41 42	47 – 51

VI. FACILITY LOCATION

	A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER
C 5	Yucca Valley, CA 92284-1440
15	16 – 45

B. COUNTY NAME
(760) 364-2315
46 – 70

	C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
C 6		bdvwε	same as ab	
15	16 – 40	41 42	47 – 51	52 -54

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
C 7 (15, 16 - 19)	(specify)	C 7 (15, 16 - 19)	(specify)

C. THIRD		D. FOURTH	
C 7 Bureau (15, 16 - 19)	(specify) 1201 Bird Center Drive	C 7 Palm S (15, 16 - 19)	(specify) (760) 833-7100

VIII. OPERATOR INFORMATION

A. NAME	B. Is the name listed in Item VIII-A also the owner?
C 8 (15, 16 – 55) (760) 833-7199	☑ YES ☐ NO (66)

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box: if "Other," specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

(56) *(specify)*

D. PHONE *(area code & no.)*
C A (15, 6 - 18, 19 - 21, 22 - 26)

E. STREET OR P.O. BOX (26 – 55)

F. CITY OR TOWN	G. STATE	H. ZIP CODE	IX. INDIAN LAND
C B (15, 16 – 40)	(41 – 42)	(47 - 51)	Is the facility located on Indian lands? ☐ YES ☐ NO (52)

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
C 9 T N I (15, 16, 17, 18 – 30) none	C 9 T P I (15, 16, 17, 18 – 30)	

B. UIC (Underground Injection of Fluids)	E. OTHER (specify)	
C 9 T U I (15, 16, 17, 18 – 30) none	C 9 T I (15, 16, 17, 18 – 30) Ames/Reche Groundwater Sto	(specify)

C. RCRA (Hazardous Wastes)	E. OTHER (specify)	
C 9 T R I (15, 16, 17, 18 – 30) none	C 9 T I (15, 16, 17, 18 – 30)	(specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED

COMMENTS FOR OFFICIAL USE ONLY

C C (15, 16 – 55)

Form Approved. OMB No. 2040-0086. Approval expires 8-31-98.

Please print or type in the unshaded areas only	EPA I.D. NUMBER (*copy from Item 1 of Form 1*) Bighorn Desert View Water Agency	

Form **2D** NPDES EPA

New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

Outfall Number (*list*)	Latitude			Longitude			Receiving Water (*name*)
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	

II. Discharge Date (When do you expect to begin discharging?)

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (*List*)	2. Average Flow *(Include Units)*	3. Treatment *(Description or List codes from Table 2D-1)*

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

☑ YES (*complete the following table*) ☐ NO (*go to Section IV*)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (*specify average*)	b. Months Per Year (*specify average*)	a. Maximum Daily Flow Rate (*in mgd*)	b. Maximum Total Volume (*specify with units*)	c. Duration (*in days*)
	Bureau of La	1201 Bird Ce	Palm Springs	(760) 833-71	(760) 833-71

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	A. Quantity Per Day	B. Units Of Measure	c. Operation, Product, Material, etc. (*specify*)
	Ames/Reche Gro		

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*) none	Outfall Number

V. Effluent Characteristics

A and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*
Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☑ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (*type or print*)	B. Phone No.
C. Signature	D. Date Signed

Please print or type in the unshaded areas only.	EPA ID Number *(copy from Item 1 of Form 1)*	Form Approved. OMB No. 2040-0086. Approval expires 5-31-92.

FORM 2E NPDES

EPA Facilities Which Do Not Discharge Process Wastewater

I. RECEIVING WATERS

For this outfall, list the latitude and longitude, and name of the receiving water(s).

Outfall Number *(list)*	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Receiving Water *(name)*
1	116	24	57	34	14	21	Pipes Wash

II. DISCHARGE DATE *(If a new discharger, the date you expect to begin discharging)*

III. TYPE OF WASTE

A. Check the box(es) indicating the general type(s) of wastes discharged.

☐ Sanitary Wastes ☐ Restaurant or Cafeteria Wastes ☐ Noncontact Cooling Water ☑ Other Nonprocess Wastewater *(Identify)*

B. If any cooling water additives are used, list them here. Briefly describe their composition if this information is available.

None. No cooling water.

IV. EFFLUENT CHARACTERISTICS

A. Existing Sources — Provide measurements for the parameters listed in the left-hand column below, unless waived by the permitting authority *(see instructions)*.

B. New Dischargers — Provide estimates for the parameters listed in the left-hand column below, unless waived by the permitting authority. Instead of the number of measurements taken, provide the source of estimated values *(see instructions)*.

Pollutant or Parameter	(1) Maximum Daily Value *(include units)*		(2) Average Daily Value *(last year)* *(include units)*		(3) Number of Measurements Taken *(last year)*	(or) (4) Source of Estimate *(if new discharger)*
	Mass	Concentration	Mass	Concentration		
Biochemical Oxygen Demand (BOD)						
Total Suspended Solids (TSS)						
Fecal Coliform *(if believed present or if sanitary waste is discharged)*						
Total Residual Chlorine *(if chlorine is used)*						
Oil and Grease						
*Chemical oxygen demand (COD)						
*Total organic carbon (TOC)		3.9 mg/l		2.5 mg/l	21.00	DWR SWP dat
Ammonia *(as N)*						
Discharge Flow	Value					
pH *(give range)*	Value 8.1 to 8.5					
Temperature *(Winter)*	°C		°C			
Temperature *(Summer)*	°C		°C			

*If noncontact cooling water is discharged

V. Except for leaks or spills, will the discharge described in this form be intermittent or seasonal? If yes, briefly describe the frequency of flow and duration.	☑ Yes ☐ No

This discharge will occur to take State Water Project water delivered through the Morongo Basin Pipeline to increase the reliability of the water supply in the region by placing this water into recharge basins. The availability of State Water Project water will be dependent on water consumption in general and therefore may not always be available for use as a recharge source.

VI. TREATMENT SYSTEM *(Describe briefly any treatment system(s) used or to be used)*

The State Water Project water will not be treated before placement into the recharge basins. This water already meets or exceeds state drinking water requirements as indicated in the attached drinking water monthly analyses for the period January 2008 through September 2009. (Appendix 6 attached)

VII. OTHER INFORMATION *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations. Attach additional sheets, if necessary.

More detail about the Water Infrastructure Restoration Program can be found in Appendix 6 of the CEQA Initial Study and Draft Mitigated Negative Declaration for the Ames/Reche Groundwater Storage and Recovery Program; and Pipeline Installation/Replacement Project(Appendix 6 attached).

VIII. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title	B. Phone No. *(area code & no.)*
Marina D. West, General Manager	(760) 364-2315
C. Signature	D. Date Signed

Todd Engineers

Alameda, California