Groundwater Monitoring, Mitigation, and Reporting Plan

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U.S. Highway 395
Olancha, California

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GROUNDWATER MONITORING, MITIGATION, AND REPORTING PLAN

CABIN BAR RANCH
U.S. HIGHWAY 395
OLANCHA, CALIFORNIA

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1.0 INTRODUCTION

The following Groundwater Monitoring, Mitigation, and Reporting Plan (GMMRP) was prepared by Geosyntec Consultants Inc. (Geosyntec) and Garcia and Associates on behalf of Crystal Geyser Roxane (CGR) for the proposed Cabin Bar Ranch Bottling Facility located at 610 South Highway 395 in Olancha, California (**Figure 1**). The Final Environmental Impact Report (EIR) for the project requires that CGR submit a GMMRP to Inyo County for review and project approval.[1] Guidance for preparation of the GMMRP is presented in the EIR as well as a memorandum prepared by the Inyo County Water Department dated March 13, 2013. The Inyo County Water Department was also directly consulted during the GMMRP preparation process.

As a project update, in February of 2014, CGR purchased approximately 131 acres of land and associated water rights owned by the Elton family which borders the southern boundary of the Cabin Bar Ranch (site). The land includes CGR's existing spring water bottling business. Furthermore, CGR reports that due to unexpected delays in the project, CGR has lost certain customer opportunities which has suspended the Company's near-term need to build an expansion on the Cabin Bar Ranch. Nonetheless, CGR desires to obtain the necessary approvals for groundwater extraction in order to allow the option of transporting water by pipeline from the Cabin Bar Ranch to CGR's existing spring water bottling facility. CGR has indicated that this water will serve as a redundancy and/or supplement for current operations (CGR, personal communication, March 2014). This GMMRP has been drafted to expressly include the proposed pumping for the transportation to and use of groundwater at the existing facility within the Project description. Such pumping will trigger the commencement of the monitoring program set forth hereunder.

This GMMRP is developed to describe the objectives and procedures to monitor the site before and during site water bottling operations, including: i) on-site and neighboring groundwater levels; ii) on-site and neighboring groundwater quality parameters, and iii) on-site biological habitat onsite before and during groundwater withdrawal and site water bottling operations. The GMMRP defines levels of significance for groundwater and biological impacts, and provides trigger levels where mitigation actions would be implemented. Mitigation measures are also proposed if it is determined that project

[1] PCR Services Corporation, November 2012, Final Environmental Impact Report, Crystal Geyser Roxane Cabin Bar Ranch Water Bottling Facility, Inyo County, California.

pumping on the Cabin Bar Ranch is significantly impacting neighboring groundwater supplies and groundwater dependent habitat.

The GMMRP is organized as follows:

- Section 1.0 – *Introduction*.
- Section 2.0. – *General Monitoring Objectives*. This section describes the monitoring objectives of the GMMRP, including objectives to protect neighboring groundwater well supply and water quality, as well as groundwater dependent habitat.
- Section 3.0 – *Levels of Significance*. Levels of significance or significant impacts resulting from pumping on Cabin Bar Ranch, including groundwater dependent habitat impacts are defined.
- Section 4.0. – *Hydrogeological Setting*. The geological and hydrogeological setting of the site is described, including review of the conceptual site model.
- Section 5.0. – *Groundwater Modeling Update*. Results of updated modeling simulations using the groundwater MODFLOW model are presented. The model was updated to include groundwater pumping in the Cartago area.
- Section 6.0 - *Monitoring Program and Trigger Levels for Mitigation Actions*. This section describes the groundwater well monitoring network and groundwater dependent biological habitat monitoring program. Included in this section are the monitoring parameters and the monitoring schedule. This section also describes the trigger levels for required action for groundwater levels, groundwater quality, and groundwater dependent biological habitat.
- Section 7.0. – *Action Items*. Action items are listed in this section. Action items are activities or undertakings that will be completed if trigger levels are exceeded.
- Section 8.0. – *Mitigation Measures*. This section describes the mitigation measures that would be undertaken should it be concluded that levels of significance for the project will be exceeded.
- Section 9.0 - *Reporting.* A general outline or anticipated content of the GMMRP report is presented with a proposed schedule for reporting.
- Section 10.0 - *References.* References listed.

2.0 GENERAL MONITORING OBJECTIVES

The monitoring objectives of this GMMRP were developed in general accordance with objectives listed in the County of Inyo Water Department (ICWD) memorandum letter dated March 13, 2013 and consultations with the ICWD staff. The general objectives of the GMMRP are:

1. Protect existing wells in Cartago from significant impacts due to groundwater lowering caused from pumping on the Cabin Bar Ranch.

2. Protect wells in Cartago from significant impacts due to groundwater quality degradations due to potential brine intrusion from the east arising from pumping on Cabin Bar Ranch.

3. Protect groundwater and spring dependent habitats on the Cabin Bar Ranch from significant impacts due to groundwater withdrawals.

It is recognized that as project pumping proceeds and monitoring data is collected, that a greater understanding may be gained of the shallow groundwater system at Cabin Bar Ranch. It is anticipated that based on this additional understanding, that CGR and Inyo County may modify and refine elements of this GMMRP, including monitoring locations, monitoring frequency, model recalibration, and trigger levels.

3.0 LEVELS OF SIGNIFICANCE

Levels of significance or significant impacts resulting from pumping on Cabin Bar Ranch shall be defined as follows:

- Impacts to an existing well or wells in Cartago arising from groundwater lowering will be considered as "significant" if water levels fall below the functional water column and pressure range of existing pumps or below the tops of well screens, the production rate of the well is substantially decreased (i.e., the production rate of the well is lowered so that it cannot be used to meet existing and permitted land uses), or pumping costs are substantially increased.

- Impacts to wells in Cartago arising from groundwater quality changes will be considered as "significant" if brine intrusion from the east results in a substantial degradation of groundwater quality so that present or anticipated beneficial uses of groundwater are affected.

- Impacts to riparian and wetland habitat will be considered as "significant" if:

  (1) Average percent cover of obligate and facultative hydrophytes obtained through application of cross-section method (Section 6.0) exhibiting a decreased trend and/or a decrease of more than 20 percent of their baseline values at any time during the monitoring period.

  (2) Average percent cover along "the greenline" (Section 6.0) exhibiting a decreased trend and/or decrease of more than 20 percent of their baseline values at any time during the monitoring period.

  (3) Woody recruitment data exhibit a decreasing trend in young (<3 years old) or mature riparian woody plants and/or decrease of more than 20 percent of their baseline values at any time during the monitoring period.

- Impacts to Spring Fault Line Habitat on the Cabin Bar Ranch (i.e., main collector ditch) will be considered "significant" if dewatering of springs are such that macroinvertebrate richness[2] declines by $\geq$50% below baseline values[3].

[2] "Macroinvertebrate richness" is defined as the number of taxonomic groups present in the sample. Baseline values ranged from 7 taxon at CBS-2 to 19 taxon at CBS-9.

The Monitoring Program and Trigger Levels established to prevent significant impacts to Cartago wells, the riparian and wetland habitat on site, and Spring Fault Line Habitat are defined in Section 6.0.

[3] Baseline values were determined based on focused survey by San Marino Environmental Associates on July 29, 2013.

4.0 HYDROGEOLOGIC AND ENVIRONMENTAL SETTING

4.1 Site Setting and Description

The site, locally known as the Cabin Bar Ranch, is an irregularly-shaped property that consists of approximately 420 acres. The site is located along U.S. Highway 395 approximately 2 miles north of the town of Olancha (**Figure 1**). Adjacent to site on the north is the community of Cartago. Adjacent to the site on the south is CGR's current bottling facility.

CGR purchased the ranch site from Anheuser Busch Company in 2010. Prior to the purchase, the site was used for cattle ranching and currently has numerous existing ranching facilities, including ranch houses, corals, irrigation ditches, and a reservoir. The main ranch house is located on the northern portion of the property (**Figure 2**). The current caretaker's house, along with several old houses and barns, is located in the southern portion of the site. Livestock was generally grazed in the meadow areas located in the eastern portion of the site. The meadow area was flood irrigated by a system of irrigation ditches, including a manmade main collection ditch that is approximately 2,000 feet long and approximately 3 to 6 feet deep (James M. Montgomery [JMM], 1993). The general location of the collection ditch is shown on **Figure 2**. Currently, the main collection ditch collects water from overflow from an irrigation well, and groundwater discharging directly into the ditch from the bottom and sidewalls of the ditch (i.e., groundwater seeping into the ditch) and the lineament of springs and seeps located immediately west of the ditch. Flow from the main collection ditch into the system of smaller ditches located in the meadow area was controlled in the past by a series of gates (JMM, 1993). A large irrigation reservoir was also used for water supply on the ranch (**Figure 2**).

4.2 Environmental Setting

The Cabin Bar Ranch site supports several natural plant communities as well as developed areas covered by pavement, gravel or ornamental landscaping. These natural plant communities include dry uplands dominated by rubber rabbitbrush scrub (*Ericameria nauseosa*) and three wetland and riparian habitat types including red willow thicket, baltic rush marsh and salt grass flat. Several isolated stands of Fremont cottonwood are present near the main ranch entrance and ruderal habitat dominated by Russian thistle (*Salsola tragus*), red-stem filaree *(Erodium cicutarium)*, and red brome (*Bromus madritensis* ssp. *rubens*) is present along Highway 395 and other disturbed areas on the ranch.

Red willow thicket, a riparian habitat is present along Cartago Creek which flows eastward towards Owens Lake. Red willow thicket is also present along the spring fault line in the southern portion of the ranch. Surrounding this riparian habitat is baltic rush marsh which then transitions to salt grass flat. Salt grass flats occur as a transitional community bordering the wet baltic rush marsh east of the spring fault and the dry rubber rabbitbrush scrub on the west.

4.3 Regional and Site Hydrogeology

Hydrogeological information for the Cabin Bar Ranch project is presented in recent reports including Geosyntec Consultants' report dated February 7, 2011 entitled *Test Well Installation and Hydrogeology Report, Cabin Bar Ranch, U.S. Highway 395, Olancha, California* and in Richard Slade and Associates' report dated June 2012, *Hydrogeological Evaluation For Crystal Geyser Roxane Cabin Bar Ranch, Water Bottling Facility Project, Inyo County, California.*

Regionally, the site is located in the southern portion of the Owens Valley. Owens Lake (dry lake bed) is located east of the site, and the base of the Sierra Nevada Mountains is located 1 mile west of the site (**Figure 1)**. Highway 395, which runs north-south, crosses the western portion of the site. The Los Angeles Aqueduct is located approximately ½ mile west of the site and Cartago Creek, which is an ephemeral stream that runs east-west across the site.

Owens Valley is a graben bounded by the Sierra Nevada Frontal Fault and the Inyo Mountain Frontal fault. These faults are considered active and the offset on these faults is the cause of the dramatic relief in the Owens Valley area. The site is located on the valley floor at an elevation of approximately 3,640 feet, while Olancha peak, to the west of the site in the Sierra Nevada Mountains, stands at an elevation of over 12,000 feet. The Inyo Mountains east of the site have an elevation greater than 8,000 feet. The Sierra Nevada Mountains to the west are generally composed of Cenozoic age igneous rocks of granodiorite-granite composition, whereas the White/Inyo Mountains, to the east, consist of Pre-Cambrian to Triassic sedimentary rock locally intruded with Cenozoic granitic rocks. The valley (Owens Valley) between the two mountain ranges, also referred to as the Owens Valley Groundwater Basin (DWR, 2003), is filled with alluvium and lacustrine deposits which are generally interfingered.

The interfingered relationship of the alluvium, generally consisting of sands and gravels, and the lacustrine deposits, generally consisting of finer grained silts and clays, is well described in previous reports (JMM, 1993; Geosyntec, 2011; Richard Slade and Associates, 2012). The observed sequence of lacustrine and alluvial sediments beneath

the site is the result of deposition associated with ancient fluctuations of water levels in Owens Lake. Alluvial materials derived from the Sierra Nevada Mountains were deposited along the shoreline while fine-grained lacustrine materials were deposited in the shallow lake waters. As the elevation of the lake varied, the shoreline moved laterally, causing interfingering of the coarse alluvial materials and the fine-grained lake deposits. The lacustrine deposits generally consist of silts, clays and very fine sands, and have a relatively high organic content. A fine-grained layer encountered at a depth of approximately 80 feet across the southern portion of the site during investigative drilling by Geosyntec (2011) is interpreted to be a lacustrine deposit. The sequence of alluvium and lacustrine deposits beneath the site is at least 750 feet thick and, based on site drilling logs, the percentage of fine-grained material (lacustrine deposits) increases to the east (JMM, 1993). The sandy and gravelly alluvium is the major groundwater bearing unit in the basin and beneath the site. Site geologic cross-sections that show the general interfingering of alluvium and lacustrine deposits beneath the site and the fine-grained lacustrine layer at 80 feet below ground surface are presented in **Appendix A-Figure A1 through A3**.

A general hydrogeologic site conceptual model (SCM) was developed by Geosyntec (Geosyntec, 2011). This SCM was used to develop the groundwater flow model presented in Section 5.0. The SCM is as follows:

> Groundwater beneath the site is mostly derived from precipitation (rainfall) and snowmelt in the Sierra Nevada Mountains to the west of the Cabin Bar Ranch. The precipitation and snowmelt that runs off the mountain infiltrates the alluvium near the mountain base. Much of the groundwater recharge for the site is thought to occur along Cartago Creek and Braley Creek where surface water runs off the mountains onto the alluvial fans that border the mountain's eastern face. Surface water or runoff quickly percolates into the sandy and gravelly alluvium and moves downward to the groundwater table. Some groundwater recharge also may occur from underflow through bedrock fractures and from direct precipitation on the valley floor.
>
> Groundwater in the alluvium flows eastward, away from the Sierra Nevada Mountains and towards the central portion of the basin. Shallow groundwater beneath the site occurs under unconfined conditions; although where fine-grained layers are present, local semi-confined conditions may occur. The upper aquifer material beneath the site is referred to as the Shallow Zone. The Shallow Zone is defined herein as the saturated sand and gravel aquifer that overlies the fine-grained lacustrine layer that occurs at a depth of approximately

80 feet (**Appendix A – Figures A2 and A3**). The 80-foot fine-grained layer is considered to be an aquitard that separates the Shallow Zone from deeper sandy and gravely alluvium (i.e., deeper portion of aquifer). Based on aquifer tests performed by previous investigators, there is some hydraulic connection between the Shallow Zone and the deeper portions of the alluvial aquifer beneath the Shallow Zone. Groundwater in the deeper portions of the alluvial aquifer (i.e., below the 80-foot fine-grained layer) occurs under confined conditions.

The depth to the shallow groundwater table beneath the site gradually decreases towards the east. In the south central portion of the site shallow groundwater intersects the ground surface along an approximate line where numerous springs and seeps are observed. This line is interpreted to be associated with the presence of a fault called the Spring-line fault. The location of the fault and lineament of springs is shown on a map and cross-sections presented in **Appendix A - Figure A1**. The rise of groundwater may also be associated with the increase of fine-grained lacustrine deposits towards the east, although the linear nature of the spring locations suggests a fault. Both the Spring-line fault and/or the increase of fine-grained deposits are interpreted to impede groundwater flow which subsequently produces a rise of the groundwater table, and the observed springs and meadowlands in the central and eastern portions of the site. The source of spring water surfacing on the site is the Shallow Zone.

4.4 Well Information

4.4.1 On-Site Well Information

The Cabin Bar Ranch has domestic water supply wells, piezometers, and production wells installed on the property. The locations of the wells and piezometer at locations on and off site are shown on **Figure 2**. Well construction information, including depth and screen intervals, for on-site wells and piezometers is summarized in tables compiled by Slade and Associates (2012) in **Appendix B.**

The old cattle ranch had four wells that were used for water supply. These wells are labeled CBR-1, CBR-2, CBR-3, and CBR-4 and were described by JMM (1993). CBR-1 is reported to be 198 feet deep and currently used to supply the main ranch house. CBR-2 is an artesian well located on the north bank of Cartago Creek and is reported to be approximately 186 feet deep. CBR-3 is a shallow 10-foot well that was installed at a former spring. It was used to water livestock. CBR-4 is a 60-foot well and presently

used for water supply at the caretaker's residence. A deep production well (PW-1) is also located on the western portion of the site (**Figure 2**). This well was installed by Anheuser Busch for a proposed large-scale water export project (JMM, 1989 and 1993).

Four deep monitoring wells, MW-1 through MW-4 and 16 shallow piezometers (P-1 through P-16) were also installed by Anheuser-Busch to monitor water levels (**Figure 2**). The monitoring wells were completed at depths ranging between 84 and 615 feet below ground surface (ft bgs). The shallow piezometers were screened in the upper portion of the aquifer beneath the site or the "Shallow Zone". The purpose of the piezometers was to monitor shallow groundwater conditions beneath the site.

Three production wells (CGR-8, CGR-9, and CGR-10) were installed in 2010 for the proposed spring water bottling operations (Geosyntec, 2011). These production wells are completed in the Shallow Zone between 68 and 73 ft bgs.

4.4.2 Off-Site Well Information

CGR currently operates a spring water bottling facility south of the site on the property formerly owned by the Elton family. CGR reports that four wells are currently used for water sources on the southern bottling facility. Two wells, CGR-2 and CGR-7 are used for spring water production and two wells, CGR-3 and CGR-4, are used for bottle rinsing and domestic purposes (**Figure 3**). The CGR wells are generally installed within the shallow production zone at depths ranging from 86 and 104 ft bgs. There are also numerous other wells, including old domestic wells and monitoring wells on the CGR southern property (CGR, personal communication, 2010). Two monitoring wells OW-7U and OW-7M are located near the northern border with the site (**Figures 2 and 3**) and will be used for GMMRP monitoring.

The Cartago Mutual Water Company (CMW) owns two wells, CMW-1 and CMW-2, located north of the northern site boundary in the town of Cartago (**Figure 3**). CMW-1 was installed to a depth of approximately to 250 or 325 feet, but apparently sand has infiltrated into the well to approximately 180 feet (Dustin Hardwick, personnel communication, 2014). CMW reports that CMW-2 is currently used to supply water to 43 residences in the town of Cartago. Based on a Driller's Well Report CMW-2 is installed to a depth of approximately 160 feet and is screened or perforated between depths of 115 to 150 feet. Current static groundwater levels in CMW-2 are reported to be at approximately 16 to 17 ft bgs and dynamic pumping levels in the well are reported to be at approximately 30 ft bgs (Dustin Hardwick, personnel communication, 2014).

There are numerous other private domestic wells located in the town of Cartago. Based on a survey conducted by CGR in which available County files were reviewed (by permission of the individual residences) and a private residence survey was completed, it is estimated that there are currently 14 active private wells in Cartago. **Figure 3** shows the location of the active domestic wells in Cartago.

Available completion depth and screen interval information for the CMW wells, Cartago private domestic wells, and CGR southern facility wells are included in a table compiled during preparation of this GMMRP (**Appendix B**).

4.5 Groundwater Levels and Water Quality Information

4.5.1 Groundwater Levels

A comprehensive discussion of groundwater levels and groundwater flow direction at the site is presented in previous studies (Geosyntec, 2011; and Slade and Associates, 2012). Groundwater levels occur near the ground surface in the eastern most piezometers, and at depths of approximately 20 feet bgs in the western piezometers.

Several groundwater potentiometric surface contour maps were created as part of Geosyntec' s study (2011). A groundwater potentiometric surface contour map for groundwater elevations measured on October 15, 2010 is presented in **Figure 4**. The contour map indicates that the shallow groundwater flow direction is eastward towards the Owens Valley dry lake bed. That is, shallow groundwater beneath the site is flowing away from the Sierra Nevada Mountains and the western portions of the bordering alluvial fans where a large amount of groundwater recharge is occurring. The average gradient across the central portion of the site is approximately 0.015.

Groundwater level data and hydrographs for wells and piezometers to be included in the GMMRP (see Section 6.0) are presented in **Appendix C**. This included information for wells OW-7U, OW-7M, P-5, P-10, P-15, and MW-3. Additional groundwater level data and hydrographs for other Cabin Bar Ranch wells and piezometers are presented in previous studies (Geosyntec 2011; and Slade & Associates 2012).

4.5.2 Groundwater Quality

Recent groundwater quality in the Shallow Zone aquifer was characterized by Geosyntec (2011). Groundwater samples were collected from CGR-8, CGR-9 and CGR-10 during aquifer testing. Results of the laboratory testing are summarized in **Appendix D**. In summary, the findings of the groundwater quality analyses for the three shallow CGR wells are:

- The total dissolved solid concentrations (TDS) ranged from 121 milligrams per liter (mg/L) to 145 mg/L. The major cations, calcium and sodium, were measured at concentrations ranging from 16.1 mg/L to 21.3 mg/L and 15.9 mg/L to 19.8 mg/L, respectively. The major anions, bicarbonate and sulfate, were measured at concentrations of 68.1 mg/L to 75.3 mg/L and 12.8 mg/L to 18.6 mg/L, respectively.
- The primary inorganic compounds detected were arsenic, barium, fluoride, and nitrate. Arsenic was reported at concentrations ranging from <0.0035 mg/L to 0.0095 mg/L, barium was reported at concentrations ranging from 0.016 mg/L to 0.020 mg/L, fluoride was reported at concentrations ranging from 0.69 mg/L to 0.74 mg/L, and nitrate was reported at concentrations ranging from <0.05 mg/L to 0.19 mg/L.
- Color, odor and turbidity were not detected, and total Coliform and E. coli were reported as absent in the three Shallow Zone wells.
- Organic compounds analyzed using EPA Method 524.2, EPA 504.1, EPA 508.1, EPA 515.3, EPA 525.2, EPA 531.1, EPA 547, EPA 548.1, EPA 549.2, EPA 549.2, EPA 1613, and EPA 314.0 were not detected above the laboratory reporting limit.

CGR also sampled production well PW-1 and domestic wells CBR-1, CBR-2, and CBR-4 in 2010 as part of due diligence process when purchasing the Cabin Bar Ranch. Analytical results are provided in **Appendix D**. PW-1 and CBR-2 are screened in the deeper zone of the aquifer or below the 80-foot clay zone, and CBR-1 straddles the Shallow Zone and the upper portion of the deeper zone (**Table 1**). TDS and sodium in these deeper screened wells were slightly higher than found in the shallower CGR wells. TDS and sodium in PW-1, CBR-1, and CBR-2 ranged from 137 mg/L to 160 mg/L and sodium ranged from 21 mg/L to 32.8 mg/L. Arsenic was also detected in the three deeper wells, concentrations ranging from 0.008 mg/L to 0.011 mg/L.

CGR has also been sampling groundwater from monitoring wells OW-7U and OW-7M since 1998/1999 (**Appendix D**). OW-7U is screened in the Shallow Zone and OW-7M is screen in the deeper portion of the aquifer. These wells are proposed to be part of the groundwater monitoring network described in Section 6.0. The most recent monitoring results indicate that TDS, sodium and arsenic in OW-7U was detected at 140 mg/L, 20 mg/L, and 0.025 mg/L, respectively. The most recent monitoring results indicate that TDS and arsenic in OW-7M was detected at 140 mg/L and 0.013 mg/L, respectively. Sodium is not reported for OW-7M.

The Cartago Mutual Water Company provided recent groundwater sampling results for their wells CMW-1 and CMW-2 (**Appendix D**). TDS, sodium and arsenic concentrations in their active well CMW-2 were reported at 140 mg/L, 13 mg/L and 0.0032 mg/L, respectively. CMW-2 is screen in the deeper zone from 115 to 150 ft bgs (**Table 2**).

4.6 Spring Information

A discussion of springs in the monitoring area is presented in Section 6.1.3.

4.7 Owens tui chub and Owens pupfish

The Owens tui chub and the Owens pupfish are both Federal and State Endangered species. Owens tui chub were discovered on the property in 1987. Twenty-one adult Owens tui chubs were salvaged from ditches and irrigation distributaries on the property in 1989-1990, and placed in the northernmost pond near the guest house. These Owens tui chubs were last observed in 2002.

On July 29, 2013, the California Department of Fish and Wildlife (CDFW) conducted a focused survey for Owens pupfish (*Cyprinodon radiosus*) and Owens tui chub (*Siphateles bicolor snyderi*) along the Spring Fault Line and Main Collector Ditch. A total of twelve traps were set overnight at three areas in the Main Collector Ditch. Based on trap results, the nature of the habitat, and physical inspection of this site, the CDFW concluded that there was no evidence of Owens tui chub and Owens pupfish (**Appendix G**).

5.0 GROUNDWATER MODELING UPDATE

Results of updated modeling simulations using the three-dimensional groundwater MODFLOW model are presented in **Appendix E**. The model was updated to include groundwater pumping in the Cartago area and further calibrated using more recent groundwater levels collected. A full description of the model, model parameters, and model calibration results is presented in **Appendix E** including **Tables E-1 through E-3** and **Figures E-1 through E-10**.

Groundwater potentiometric surface levels (i.e., groundwater levels) were simulated for different pumping scenarios, including:

- Scenario 1: One operating production line using a total of 90 acre-feet per year (AFY) of groundwater. In the model, wells CGR-8, CGR-9 and CGR-10 were pumped at constant rate of 16.75 gallons per minute (gpm) and CGR-D (domestic well) was pumped at a constant rate of 6 gpm.
- Scenario 2: Two operating production lines using a total of 180 AFY of groundwater. In the model, wells CGR-8, CGR-9 and CGR-10 were pumped at constant rate of 33.5 gpm and CGR-D was pumped at a constant rate of 12 gpm.
- Scenario 3: Three operating production lines using a total of 270 AFY of groundwater. In the model, wells CGR-8, CGR-9 and CGR-10 were pumped at constant rate of 50.25 gpm and CGR-D was pumped at a constant rate of 19 gpm.
- Scenario 4: Four operating production lines using a total of 360 AFY of groundwater. In the model, wells CGR-8, CGR-9 and CGR-10 were pumped at constant rate of 67 gpm and CGR-D was pumped at a constant rate of 25 gpm.
- Scenario 5: Maximum groundwater use during the summer months, with a total of 200 AF of groundwater pumping over 90 days. In the model, wells CGR-8, CGR-9 and CGR-10 were pumped at constant rate of 150 gpm and CGR-D was pumped at a constant rate of 50 gpm.

Scenario 4 is a full factor build out scenario. The purpose of Scenario 5 is to simulate a high production summer season at full factory build out. It should be noted that since CGR has purchased the Elton property, new operating lines may not be built, however, the model is still suitable for simulating groundwater level responses due to pumping in the three production wells.

The results for the five pumping scenarios are summarized in **Appendix E**. **Figure E-8** and **Table E-3** show the simulated drawdown in the Shallow Zone for Scenarios 4 and 5. Groundwater levels in Scenario 4 are predicted to be approximately 0.14 ft lower in well P-10 located adjacent to the northern boundary of the site, 0.22 ft lower in well P-15 located east of the Spring-Line fault, and 0.33 ft lower in well OW-7U located on the southern boundary. Groundwater levels in Scenario 5, the high production scenario, are predicted to be approximately 0.32 ft lower in well P-10, 0.51 ft lower in well P-15, and 0.77 ft lower in well OW-7U.

Table E-3 also summarizes simulated drawdown in the Deep Zone for selected locations. For scenarios 4 and 5 groundwater levels are predicted to be 0.05 to 0.12 feet lower in the Cartago Mutual Water Supply Well CMW-2 to the north, 0.11 to 0.26 feet lower in monitoring well MW-3 to the west, and 0.12 to 0.27 feet lower in OW-7M to the south.

A comparison of **Figures E-6 (**potentiometric head contours under non-pumping conditions) and **Figure E-7 (**simulated head contours for Scenario 4 and 5) shows that little change to groundwater flow direction and gradient is expected to occur during pumping.

The model was also used to predict whether the pumping well capture zones for the highest pumping rate (Scenario 5) could cause intrusion of saline water from the east. For this analysis, the capture zones were calculated for the four pumping wells (CGR-8, CGR-9, CGR-10 and a domestic well). As shown in **Figure E-9,** the eastern stagnation points are more than 1,400 feet west from the eastern most proposed monitoring wells (OW-8US and OW-9U). Based on these capture zones, there is no expectation of production wells pulling in saline water from the east (Owens Dry Lake).

An extreme scenario was also developed to illustrate the maximum possible extent of the capture zones. This scenario does not represent a realistic pumping scenario. Maximum pumping rates are simulated at the four pumping wells by assigning a constant head boundary 2 feet above the bottom of the Shallow zone, in order to maximize the simulated drawdown. Furthermore the hydraulic flow barrier was removed to maximize the extent of the capture zones towards east. The capture zones for the four pumping wells for this extreme case are shown in **Figure E-10**. As shown in **Figure E-10**, under this extreme scenario the eastern stagnation points are more than 1,200 feet west from the eastern most monitoring wells (OW-8US and OW-9U). This extreme scenario indicates that there could be approximately 7 feet of drawdown in the OW-9U location without saline intrusion from the east occurring.

6.0 MONITORING PROGRAM AND TRIGGER LEVELS FOR MITIGATION ACTIONS

This section presents the groundwater monitoring and biological network (i.e., monitoring locations), parameters to be monitored, and an initial monitoring schedule. Trigger levels for mitigation actions are also presented.

6.1 Groundwater and Biological Monitoring Programs

6.1.1 Cartago and CGR Existing Facility Groundwater Well Monitoring

Monitoring locations are proposed to the north, east, south, and west of the proposed CGR production wells. Monitoring well program, sampling rationale, and well construction information are summarized in **Table 1**. Monitoring locations are shown on **Figure 3**. As noted in Table 1, four proposed monitoring locations (OW-8US, OW-9U, OW-10U, and OW-10M) will need to be installed after GMMRP approval. Monitoring parameters and proposed monitoring schedules are as follows:

- Groundwater levels in all site monitoring locations and in selected off-site wells (i.e., CMW-2 and PAT-1) will be continuously monitored using dataloggers and transducers (datalogger system)[4]. The datalogger systems will be installed and activated at least four months prior to the start of groundwater withdrawal for production to characterize pre-project conditions and assess functionality of the monitoring system. The datalogger systems will be set to collected and electronically store water levels on a daily basis. In addition, groundwater levels will also be manually measured with an electric water level indicator on a monthly basis for a minimum of two years. At the time the manual measurements are collected, groundwater level data will be collected or downloaded from the dataloggers at each monitoring location. Groundwater levels may continue to be monitored for the lifetime of the project; however, after two years of daily and monthly measurements, the monitoring team[5] will make recommendations to Inyo County Water Department for subsequent monitoring frequency and data collection. It is anticipated that quarterly or semi-annual groundwater level monitoring would be conducted after two years. The Inyo County Water Department shall have

[4] Permission to install the datalogger systems in off-site wells will need to be obtained from the well owners.
[5] Geosyntec and TEAM Engineering of Bishop, California.

ultimate authority in this decision. Detailed groundwater level measurement procedures are provided in **Appendix F**.

- Proposed water quality monitoring parameters will include general minerals (i.e., major anions and cations), physical constituents (temperature, turbidity, pH, and odor), and trace metals (Title 22 priority pollutants list). The primary focus of this monitoring program is to determine whether brine groundwater intrusion has impacted Cartago and CGR existing wells from the east. Electrical conductivity information will be collected on a daily basis using sensors installed with the datalogging systems (the data will be initially downloaded from the dataloggers on a monthly basis with the water level measurements). Groundwater quality samples will be collected in selected wells and piezometers, including two water wells in Cartago (CMW-2 and PAT-1), on a quarterly basis for the first year of monitoring and then on a semi-annual basis for the second year of monitoring **(Table 1)**. At least two rounds of groundwater sampling in Shallow Zone wells should be completed before groundwater withdrawal for production. After completing two years of water quality sampling, the monitoring team will make recommendations to the Inyo County Water Department for subsequent monitoring frequency and data collection. The Inyo County Water Department shall have ultimate authority in this decision. Detailed groundwater sampling procedures are provided in **Appendix F**.

6.1.2 Cabin Bar Ranch Riparian and Wetland Habitat Monitoring

Groundwater dependent vegetation monitoring will be performed at four transect locations (A, B, C and D) shown in **Figure 5.** Monitoring will be conducted as follows:

- All four transects are located along the Spring Fault Line within riparian habitat dominated by red willow (*Salix laevigata*). Two of these transects (Transects A and B) are located in close proximity to the Cabin Bar Ranch production wells (CBR-8, CBR-9, and CBR-10) and two transects (Transect C and D) are located at the southern end of the spring fault Spring Fault Line approximately one kilometer south of CGR-8, the southernmost pumping well. The location of transects A and B are intended to be most sensitive to any changes in groundwater that might affect groundwater dependent vegetation; whereas, transects C and D are intended to be sufficiently far enough away from the pumping wells that they will be in an area where groundwater depth is not affected by the project pumping activity. Therefore, transects C and D will provide a baseline assessment of vegetation condition that reflects

climatic variation only.[6] Transects A and B are assumed to be affected by both climatic variation, as well as possible variation due to groundwater pumping.

- Each transect is 60 meters (m) long and will be marked with rebar monuments at each end. Each of these transects will be sampled with a meter square quadrat at 10 m intervals for a total of seven sampling points (0, 10, 20, 30, 40, 50, 60). Quadrat samples will be placed so that the transect tape line bisects the quadrat.
- Within each quadrat, all plant species will be recorded along with percent cover. These data will be summarized for each transect to determine a mean percent cover for each species documented. This sampling will be conducted during August 2014 to determine baseline conditions. If the groundwater drawdown exceeds the established threshold, these transects will be resampled during the same month in the subsequent year in which the groundwater drawdown threshold was triggered. Data from the current year's sample will be compared to the baseline condition to determine whether the trigger level has been met.

Shallow groundwater levels in two shallow piezometers located in the vegetation monitoring areas discussed above will be monitored continuously, using datalogger systems, and manually (on a monthly basis) for two years. PZ-15 will be monitored in the northern transect area and a shallow piezometer SS-1 will be monitored in the southern transect area for control purposes (Figure 5). Both piezometers monitor the top portion of the Shallow Zone. Historical groundwater level data for PZ-15 is presented in Appendix C. This groundwater monitoring program will focus primarily on determining possible impacts to groundwater dependent vegetation from any lowering of the groundwater levels. Groundwater levels in off-site wells may continue to be monitored for the lifetime of the project; however after two years of monitoring, the biological monitoring team will make recommendations to Inyo County Water Department for subsequent monitoring frequency and data collection. The Inyo County Water Department shall have ultimate authority in this decision.

[6] Some pumping occurs near Transects C and D in well CGR-3, but the pumping volume is limited. CGR-3 is used for domestic purposes and rinsing bottles.

6.1.3 Spring Fault Line Habitat Monitoring Program

As part of the project's monitoring program, the habitat associated with the Cabin Bar Ranch Spring Fault Line (CBS-2, CBS-4, CBS-6 and CBS-9) will be monitored to determine if there are any direct impacts due to groundwater pumping (**Figure 5**). These springs were considered as representative of the groundwater and spring flow along the spring fault line area. Specifically, data from the spring survey conducted on July 29-30, 2013 at the Spring Fault Line will be used as a baseline (**Appendix G**). During this baseline survey, vegetation and aquatic organisms along with physical habitat conditions were identified at each of the four representative springs and two additional springs located within the survey area. Vegetation data included a qualitative description of species present, percent cover and vegetation structure. Aquatic organism sampling focused on benthic macroinvertbrates. Benthic macroinvertebrate samples were collected at the four spring locations using a D net with a 500 micron mesh bag. Twenty stabs or sweeps were taken with this net and a composite sample was collected from each spring, elutriated, fixed in 95% ethanol and identified by a qualified taxonomist. In addition, physical habitat of each spring was photographed and recorded, including measurements for the water depth and channel width.

These same data will be collected annually for the first three years of the project following groundwater withdrawals, and again during year six to determine if significant direct impacts are observed. For the purpose of this assessment, direct impacts will be evaluated in a qualitative manner using best professional judgment by a qualified biologist.

6.2 Trigger Levels

In the event that any trigger level described below is exceeded, CGR or its consultant will notify the Inyo County Water Department within 30 days.

6.2.1 Groundwater Level and Quality Triggers

Groundwater Level Triggers

Groundwater level triggers were developed, with the specific objectives listed in Section 2.0, based on groundwater MODFLOW modeling results and the professional judgment of Geosyntec and/or Garcia and Associates. Groundwater triggers will be defined as a total lowering of water levels below a groundwater level baseline for each designated monitoring location. The groundwater level baseline for each well is defined as the lowest historical water level measured in the well preceding start-up of pumping for the project. **Table 1** presents proposed triggers, current groundwater level

baselines, and the most recent available groundwater levels. Proposed groundwater level triggers levels are also summarized below with predicted model drawdowns for the Shallow Zone:

Monitoring Location	Well Network	Predicted Model Scenario 5 Drawdown in Shallow Zone (feet)	Groundwater Level Triggers (feet below baseline)
Northern	P-10, OW-10U, & OW-10D	0.32	6
Western	P-5 & MW-3	0.87	--
Southern	OW-7U & OW-7M	0.77	10
Eastern	OW-9U	0.33	7

The groundwater levels triggers for the northern and southern monitoring locations (6 feet and 10 feet, respectively) are approximately an order of magnitude larger than the long-term drawdown predicted by the MODFLOW model at these locations (see Section 5.0). The proposed groundwater levels triggers take into consideration that several feet of groundwater level fluctuation has been observed in Cabin Bar Ranch wells in the past. The groundwater level trigger for the area east of the Spring Line fault (7 feet) was derived by MODFLOW simulations that show brine intrusion could not occur at this magnitude of drawdown at the eastern OW-9U location.

As noted in **Table 1**, the purpose of northern monitoring location (wells P-10, OW-10U and OW-10D) is to provide sentinel monitoring or an early warning system for the off-site wells located in Cartago, including the Cartago Mutual Water Well CMW-2. Based on all available hydrogeologic information and recent MODFLOW modeling results (**Appendix E**), any project induced groundwater level drawdown in off-site Cartago wells should not exceed drawdown in the northern monitoring location. Consequently, the proposed groundwater level trigger of 6 feet for the northern monitoring location should protect against significant impacts from occurring in properly constructed and maintained wells, including CMW-2 which has a reported dynamic pumping water level of approximately 30 feet bgs and a reported top of screen at a depth of 115 feet bgs (i.e., ~80 to 85 feet of available water column).

For the purposes of groundwater level monitoring, action levels will equal the trigger levels. That is, if groundwater level triggers are exceeded at any one location, then action items listed in Section 7.0 will be implemented.

Groundwater Quality Triggers

Preliminary groundwater level triggers were developed to safeguard against the potential for significantly degrading the groundwater quality in the vicinity of the Cabin Bar Ranch. Preliminary groundwater quality trigger levels for the northern and southern monitoring locations were developed based on selected primary MCLs, EPA Advisory Recommendations, and dissolved solid concentrations reported beneath Owens Lake. Triggers were developed for sodium (Na), alkalinity, total dissolved solids (TDS), barium (Ba), arsenic (As), and chloride (Cl), as these constituents are reported at relatively high concentrations in Los Angeles Department Water and Power (LADWP) monitoring wells DWP-7 T910/T90 located east of Cartago on the Owens Dry Lake Bed, or are a particular constituent of concern (e.g., As), or judged to be relatively mobile (e.g., Cl).

For the purposes of groundwater quality monitoring, action items in Section 7.0 will be completed if an upward statistically significant trend in one of the above water quality parameters indicates that a trigger level will be reached within a three (3)-year period from the last data point collected. Extrapolations and statistically significant trends will be established using standard statistical analysis, such as linear regression and Mann-Kendall analysis (other statistical methodology may be utilized). A statistically significant trend will be assumed to have a 95% confidence level. If groundwater quality triggers are exceeded at any one location, then the actions items listed in Section 7.0 will be implemented.

The following wells and monitoring wells are proposed for northern groundwater quality monitoring locations: CMW-2, OW-10U, OW-10D, and PAT-1. Preliminary groundwater quality trigger levels for these northern monitoring locations and wells in the Cartago area are presented in **Table 2**. For comparison, reported concentrations of the trigger level parameters in well CMW-2 and in LADWP monitoring wells DWP-7 T910/T90 are also presented in **Table 2**. Final groundwater quality triggers for the northern locations will be finalized based on two groundwater quality monitoring events, completed within three months of each other and before project pumping is initiated.

Shallow monitoring well OW-7U is proposed for a southern groundwater quality monitoring location. Proposed groundwater quality trigger levels for the southern

location OW-7U are the same as the northern location with the exception of arsenic (**Table 2**). Arsenic concentrations are higher in the southern area than in the northern area and are currently above the proposed trigger of 7.5 µg/L. For example arsenic concentrations in OW-7U are approximately 25 µg/L (**Table 2**). Arsenic in CGR production water (water south of the Cabin Bar Ranch) is currently treated. Groundwater samples will be collected from OW-7M (**Table 1**), but no triggers are proposed for this deeper completed well.

No groundwater quality trigger levels are proposed for the western monitoring locations PW-5 and MW-3. Groundwater quality triggers can be developed for the eastern monitoring locations OW-8US and OW-9U based on quarterly monitoring results to be collected in the future and on LADWP Owens Lake data as presented above. It is expected that groundwater quality triggers for OW-8US and OW-9U will be similar to the preliminary triggers proposed above, however, final quality triggers for these locations will be finalized based on quarterly groundwater quality monitoring results to be collected before project pumping is initiated.

6.2.2 Riparian and Wetland Habitat Trigger Levels

Monitoring Locations

Following a thorough analysis of the hydrogeology, observed baseline groundwater levels, surface water hydrology, vegetation types, soil composition, rooting composition and species transpiration rates, the proposed groundwater trigger for riparian and wetland habitat monitoring are as follows:

Monitoring Location Area	**Groundwater Level Triggers**
East of Spring Fault Line and East of Production Wells at location of vegetation monitoring transects A and B, and D and C (Figure 5)	Groundwater level is below 5.4 feet[7] or more for a 12-month period[8] at P-15

[7] During the period from 1996 to May 2014, depth to groundwater at P-15 has fluctuated from approximately 0.0 feet bgs to 5.4 feet bgs.

[8] The 12-month duration was selected based on observed maximum seasonal variations during the period of 1996 to 2013.

Transect Locations

Vegetation cover of obligate and facultative wetland plants at transects A and B will be compared to baseline values to determine if a 15% threshold has been exceeded[9]. If this threshold has been exceeded, data from transects C and D will be evaluated to determine if the threshold has been exceeded at these 'control' transects. If the 15% threshold is also exceeded at transects C and D, the value of the exceedance will be deducted from the difference recorded at transects A and B to isolate the impacts due to project operations from bias due to climatic conditions.

In the event that either the Monitoring Location trigger or the Transect Location trigger are exceeded, the biology monitoring team[10] will make a recommendation, using data from the other monitoring program[11], to the Inyo County Water Department as to whether action items need to be completed. The Inyo County Water Department shall have ultimate authority in the decision to complete action items.

6.2.3 Spring Fault Line Habitat Trigger Levels

Trigger levels for the Spring Fault Line Habitat will be determined through a comparison of monitoring data for direct impacts against baseline values for presence of macroinvertebrates and groundwater and spring flow dependent vegetation. Vegetation cover of groundwater and spring flow dependent vegetation will be compared to baseline values to determine if a 15% threshold has been exceeded. As more particularly described in the Spring Fault Line Baseline Report (**Appendix G**), the trigger level for faunal species will be a decline of macroinvertabre richness by $\geq$50% below baseline values.

[9] This level was selected to allow for action to avoid reaching 20% level of significance.
[10] Garcia and Associates.
[11] The other monitoring program is the Riparian and Wetland Mitigation and Monitoring program which includes vegetation cross-sections across Cartago Creek, linear transects along Cartago Creek (e.g. the greenline method) and monitoring stations and monitoring regime.

7.0 ACTION ITEMS

If groundwater trigger levels for wells or riparian and wetland habitat are exceeded, as defined in Section 6.0, then the following action items will be completed within twelve weeks of such an exceedence occurring.

A. Groundwater Level Action Items

If groundwater level triggers are exceeded in any applicable well identified above then the following action items will be completed in the order listed:

a) Review and evaluate groundwater level trends in other site monitoring wells and other wells in the vicinity of the Cabin Bar Ranch.

b) Collect and review groundwater pumping information in the area to assess any correlation between observed groundwater level trends and pumping.

c) Review regional groundwater level trends and regional rainfall/snowpack information in order to evaluate potential correlations between observed site groundwater level trends and regional trends.

d) Generate new groundwater surface potentiometric maps and update the groundwater flow model to reassess current and predicted groundwater levels, flow direction, and gradient.

e) Review groundwater quality trends in order to evaluate if groundwater quality is being impacted by any observed decreases in groundwater levels.

f) Using information collected in a) through e), and any other appropriate information, evaluate whether or not the groundwater level trigger was exceeded due to CGR pumping or by other factors such as regional drought or long-term dry periods, or pumping in the basin by other parties. If necessary, further evaluate potential of project pumping to generate significant impacts as defined in Section 3.0.

g) Implement mitigation measures if it is concluded that project pumping is significantly directly impacting groundwater levels or groundwater quality in the area as defined in Section 3.0 (i.e., significantly impact the production rate of off-site wells, significantly increasing pumping costs, or produces significant saline intrusion from the east). Inyo County shall have ultimate authority in this determination. Mitigation measures are provided in Section 8.0.

B. Groundwater Quality Action Items

If groundwater quality triggers are exceeded in any one well then the following actions items will be completed in the order listed within twelve weeks of such an exceedence occurring:

a) Review both groundwater level and quality trends in other site monitoring wells and wells in the vicinity of the Cabin Bar Ranch. Evaluate if any correlation exists between any observed groundwater quality trends and groundwater level trends.

b) Collect and review available groundwater pumping information in the immediate area to assess any correlation between observed groundwater level/quality trends and pumping.

c) Resample any applicable wells, if necessary, for water quality parameters and review laboratory Quality Assurance and Quality Control (QA/QC) measures. Increase groundwater sampling frequency, if necessary.

d) Review available regional groundwater level and groundwater quality trends in order to evaluate potential correlations between observed site and regional trends.

e) Generate new groundwater surface potentiometric maps and update the groundwater flow model to assess any correlation between changes in groundwater surface levels, flow direction and gradients with observed trends in groundwater quality.

f) Using information collected in a) through e) and other appropriate information, evaluate whether or not the groundwater quality trigger was exceeded due to CGR pumping or by other regional factors such as drought, long-term dry periods, or pumping in the basin by other parties. If necessary, further evaluate potential of project pumping to generate significant impacts as defined in Section 3.0.

g) Implement mitigation measures if it is concluded that project pumping is directly and significantly impacting groundwater quality in the area as defined in Section 3.0 (i.e., significantly impacting the beneficial uses of off-site wells or producing significant saline intrusion form the east). Inyo County shall have

ultimate authority in this determination. Mitigation measures are provided in Section 8.0.

C. Biological Action Items

a) Review riparian and wetland dependent vegetation trends in the vicinity of the Cabin Bar Ranch. Evaluate if any correlation exists between any observed vegetation trends and groundwater level trends.

b) Expand riparian and wetland vegetation data collection to other portions of the Cabin Bar Ranch to evaluate overall trends and potential correlation with groundwater level trends.

c) Resurvey transects to determine if any trends are seasonal fluctuations limited to late season fall sampling.

d) Using information collected in a) through c) and other appropriate information, evaluate whether or not the trigger(s) was exceeded due to CGR pumping or by other regional factors such as drought, long-term dry periods, or pumping in the basin by other parties. If necessary, further evaluate potential of project pumping to generate significant impacts as defined in Section 3.0. In assessing whether significant impacts have occurred to riparian and wetland habitats, the analysis will consider any losses against the amount of snow-melt runoff and rainfall for that year, and that the baseline data were collected during drought conditions. That is, during dry years, the health and vigor of riparian and wetland communities may decrease independent of the increased pumping. Conversely, the riparian and wetland communities may flourish during wet years. In both cases, consideration will be made for climatic conditions when examining community health and population trends.

Impacts to Spring Fault Line Habitat on the Cabin Bar Ranch (i.e., main collector ditch) will be assessed through a comparison of monitoring data of direct impacts against baseline values of macroinvertebrates, and groundwater and spring flow dependent vegetation species. Specifically, direct impacts will be evaluated in a qualitative manner using best professional judgment by the monitoring team biologist. The analysis of impacts to the Spring Fault Line Habitat will consider any losses against the amount of snow-melt runoff and rainfall for that year, and that the baseline data were collected during drought conditions.

e) Implement mitigation measures if it is concluded that project pumping is: significantly impacting habitat as defined in Section 3.0. Inyo County shall have ultimate authority in this determination. Mitigation measures are provided in Section 8.0.

8.0 MITIGATION MEASURES

If data indicates significant impacts to groundwater levels or groundwater quality due project pumping, then specific mitigation measures shall be implemented. The mitigation measures are as follows:

a) Direct provision of water from the Project owner to the impacted well owner(s), and/or

b) Direct financial compensation from the Project owner to the impacted owner(s) for the costs to modify well(s) and/or for increased water treatment or energy costs, and/or

c) A short-term or long-term reduction in pumping from one or more wells at the Cabin Bar Ranch or other wells within the Project owner's control.

Disputes as to the cause of any groundwater drawdown or groundwater quality change in well(s) or appropriate corrective measures shall be resolved by Inyo County, taking into consideration specific characteristics of each well, use of the well, and the information collected per the Action Items in Section 7.0.

If data indicates impacts to biological resources, then the following mitigation measures will be implemented:

a) Direct provision of supplemental water (i.e., irrigation) will be provided to the impacted area, and/or

b) A program of wetland and riparian restoration and/or enhancement will be initiated either on the Cabin Bar Ranch or nearby suitable location, and/or

c) A short-term or long-term reduction in pumping from one or more wells at the Cabin Bar Ranch would be implemented.

Disputes as to the cause of impacts to biological resources or appropriate corrective measures shall be resolved by Inyo County, taking into consideration the information collected per the Action Items in Section 7.0.

9.0 REPORTING

Monitoring data will be reported to the County of Inyo. . It is anticipated that monthly reports will be prepared during the first two years of monitoring. Generally, reports will be submitted to the County within 30 to 45 days of completing field work. After two years of monitoring the Inyo County Water Department will use adaptive management principles to prescribe subsequent reporting requirements. Inyo County shall have ultimate authority in this decision.

Monitoring reports will document the data collected and will contain the following:

- Field methodology and dates of field work including any deviations from the GMMRP and anomalous events;
- A tabular summary of data collected including historical data and appropriate figures showing monitoring locations and salient data;
- Results of data analysis including any statistical analyses;
- Comparison of results to trigger levels; and
- Recommendations for further work and approximate dates of next anticipated field event.

10.0 REFERENCES

County of Inyo Water Department, 2013, *Memorandum to Page Beykpour - Development of Hydrologic Monitoring and Mitigation Plan for CG Roxane Cabin Bar Ranch Plant Expansion*, March 13, 2013.

Department of Water Resources, 2003, California's Groundwater, Bulletin 118.

Geosyntec Consultants, 2011, *Test Well Installation and Hydrogeology Report, Cabin Bar Ranch, US Highway 395, Olancha, California*, dated February 7, 2011.

James M. Montgomery, 1993, *Environmental Impact Report/Environmental Assessment for the Anheuser-Busch Companies Los Angeles Brewery Water Supply Study*.

PCR Services Corporation, November 2012, Final Environmental Impact Report, Crystal Geyser Roxane Cabin Bar Ranch Water Bottling Facility, Inyo County, California.

Richard Slade and Associates, 2012, *Hydrogeological Evaluation For Crystal Geyser Roxane Cabin Bar Ranch, Water Bottling Facility Project, Inyo County, California*, June 2012.

TABLES

Table 1: Summary of Groundwater Monitoring Program

Monitoring Area	Well #	Monitored Zone	Well Currently Completed (Y/N)	Depth of Reported or Planned Well Screen Interval (ft)	Water Level Monitoring	Quarterly and Semi- Annual Groundwater Quality Monitoring[1]	Proposed Trigger Level (ft of drawdown)	Current Baseline Level[2] (ft btoc)	Recent Groundwater Level Collected in May 2014 (ft btoc)	Purpose or Rationale
Northern	P-10	Shallow	Y	33 - 48	X		6	21.63	21.61	Monitor area north of production wells and provide sentinel monitoring to Cartago Area.
	OW-10U	Shallow	N	~ 55 – 74*	X	X	6	--	--	
	OW-10M	Deep	N	~ 115 – 150*	X	X	6	--	--	
Western	P-5	Shallow	Y	23 - 28	X	X	np	np	14.85	Monitor area hydraulically upgradient of production wells.
	MW-3	Deep	Y	200 – 420	X	X	np	np	52.72	
Southern	OW-7U	Shallow	Y	54 - 74	X	X	10	13.5	13.20	Monitor area south of production wells.
	OW-7M	Deep	Y	212 – 252	X	X	10	4.96	4.96	
Eastern	OW-8US	Shallow	N	~ 55 – 75*	X	X	np	np	--	Provide sentinel monitoring to potential brine intrusion from the east.
	OW-9U	Shallow	N	~ 55 – 75*	X	X	7	--	--	
Off-Site	CMW-2	Deep	Y	115 - 150	X	X	np	np	--	Monitor Cartago area.
	PAT-1	Shallow/Deep	Y	50 – 155	X	X	np	np	--	
Vegetation Monitoring	P-15	Shallow	Y	4-9	X		5.4[1]	0	3.40	Monitor wetland area east of production wells.
	SS-1	Shallow	Y	~4-6	X		np	np	--	

Explanation:

Y/N: Yes/No
X: Designated for monitoring per table heading.
ft.: feet
np: trigger levels are not proposed for this location and groundwater baselines have not been developed.
--: Not Available (i.e., well has not been installed or well was not monitored recently)
~: Approximate.
ft btoc: feet below top of casing
1: Trigger level for P-15 is water level below 5.4 feet for any continuous 12 month period.
2: May change based on future data collection.
*: Final well construction/screen-interval will be based on lithology observed during drilling and geological evaluation. It assumed that the new monitoring wells will be installed using standard mud-rotary drilled methodology.

TABLE 2

**PRELIMINARY GROUNDWATER QUALITY TRIGGERS
FOR NORTHERN AND SOUTHERN MONITORING LOCATIONS**

Constituent	CA MCL	EPA Advisory Rec.	CMW-2 Concentrations	OW-7U Concentrations	Concentration in DWP-7 T910/T909	Trigger Based on 75% of Primary MCL or EPA Advisory	Trigger Based on Average Concentration in DWP-7 T910/T909
As	10 ug/L		3.2 ug/L	25	9.0/5.3 ug/L	7.5 ug/L[4]	--
TDS	500 mg/L		140 mg/L	137	222/420 mg/L	--	321 mg/L
Alkalinity	--		110 mg/L	74	149/209 mg/L	--	179 mg/L
Cl	250 mg/L		1.3 mg/L	2.4	5.6/49.9 mg/L	--	27.7 mg/L
Na	--	30-60 mg/L[2]	13 mg/L	20.5	56.8/140 mg/L	34 mg/L[3]	--
Barium	1.0 mg/L		0.18 mg/L[1]	0.006	0.837/0.10 mg/L	0.75 mg/L	--

ug/L: micrograms per liter

mg/L: milligrams per liter

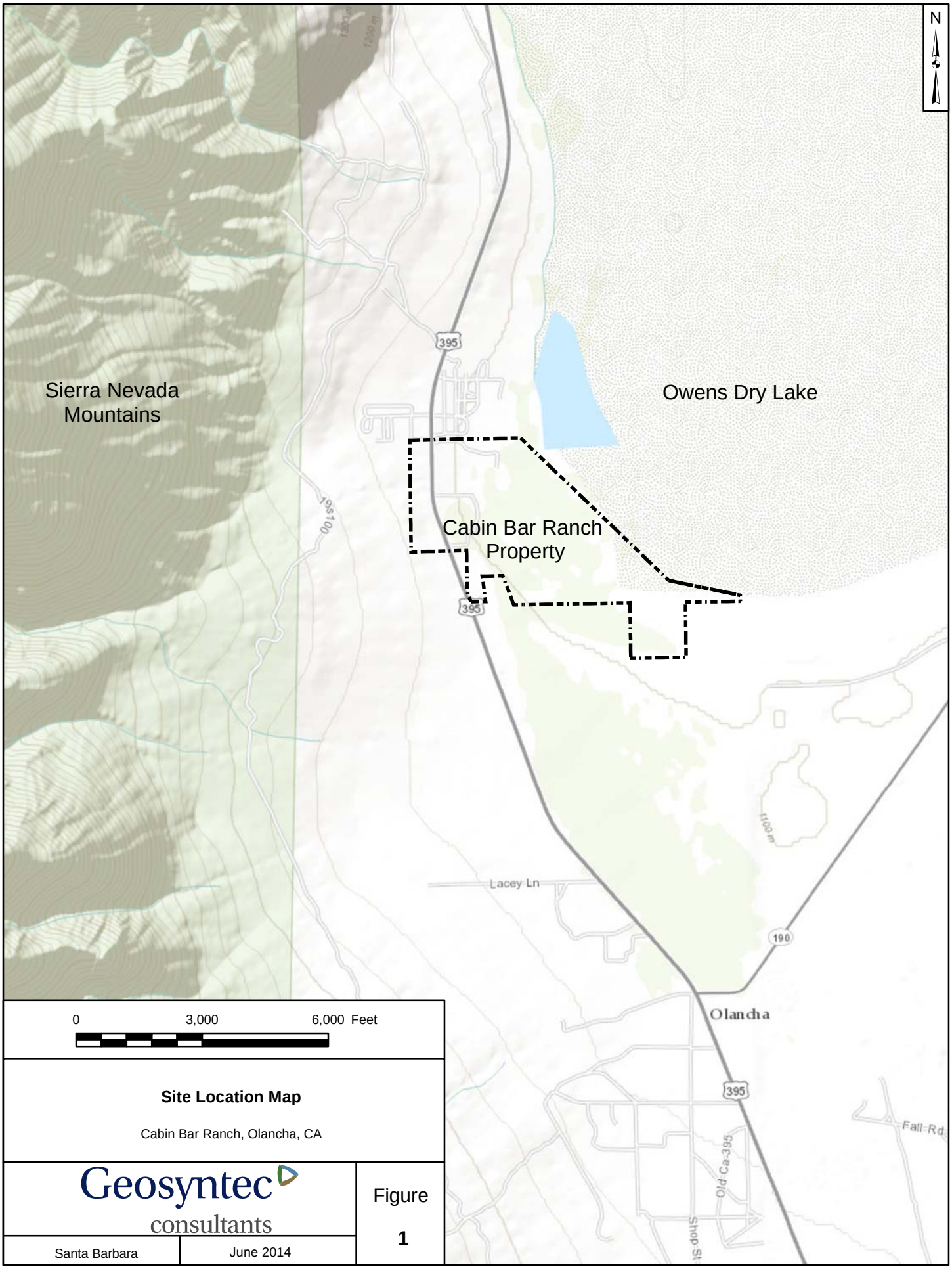
1: Concentration in Cartago Mutual Water Well CMW-1.

2: EPA (2003), Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sodium.

3: Seventy-five percent of 45 mg/L which is middle of range shown as EPA Advisory.

4: Arsenic trigger for northern monitoring locations only.

FIGURES



Site Location Map

Cabin Bar Ranch, Olancha, CA

Geosyntec consultants

Figure 1

Santa Barbara | June 2014

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N

P-10
Main Ranch House
Reservoir
CBR-1
P-8
P-9
395
CBR-2
Cartago Creek
P-6
P-7
CBR-3
Corral
P-11
MW-3
RP-4
CBS-9
CGR-10
P-5
TH-1
PW-1
MW-2
MW-1
CBS-8
P-12
CBS-7
P-15
CBS-6
New Spring
CGR-9
RP-3
TH-2
CBS-1
Meadows Area
Caretaker Residence
CBS-2
CBR-4
RP-2
Main Collection Ditch
P-1
P-2
RP-5
TH-3
CBS-3
RP-1
CBS-4
P-13
P-4
CGR-8
TH-4
CBS-5
P-3
OW-7U
OW-7D
ES-1
OW-7M
CGR-4
CGR-6
ES-3A
CGR-2

Legend

- Well
- Monitoring Well
- Piezometer
- Spring
- Test Hole
- CBR Property Boundary

Notes:

NAD_1983_StatePlane_California_IV_FIPS_0404_Feet
Projection: Lambert_Conformal_Conic
GCS_North_American_1983

0 250 500 Feet

Site Plan

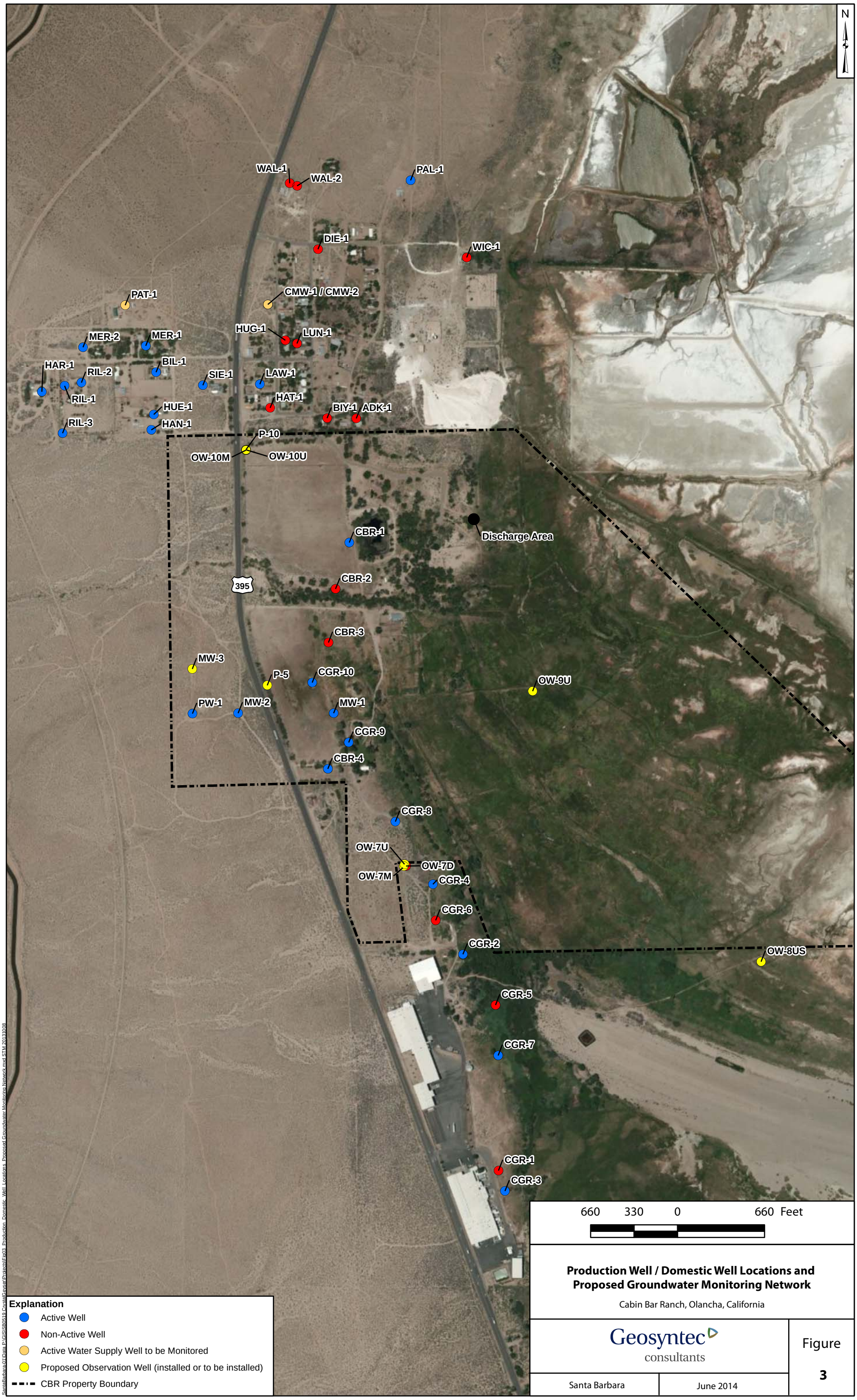
Cabin Bar Ranch, Olancha, CA

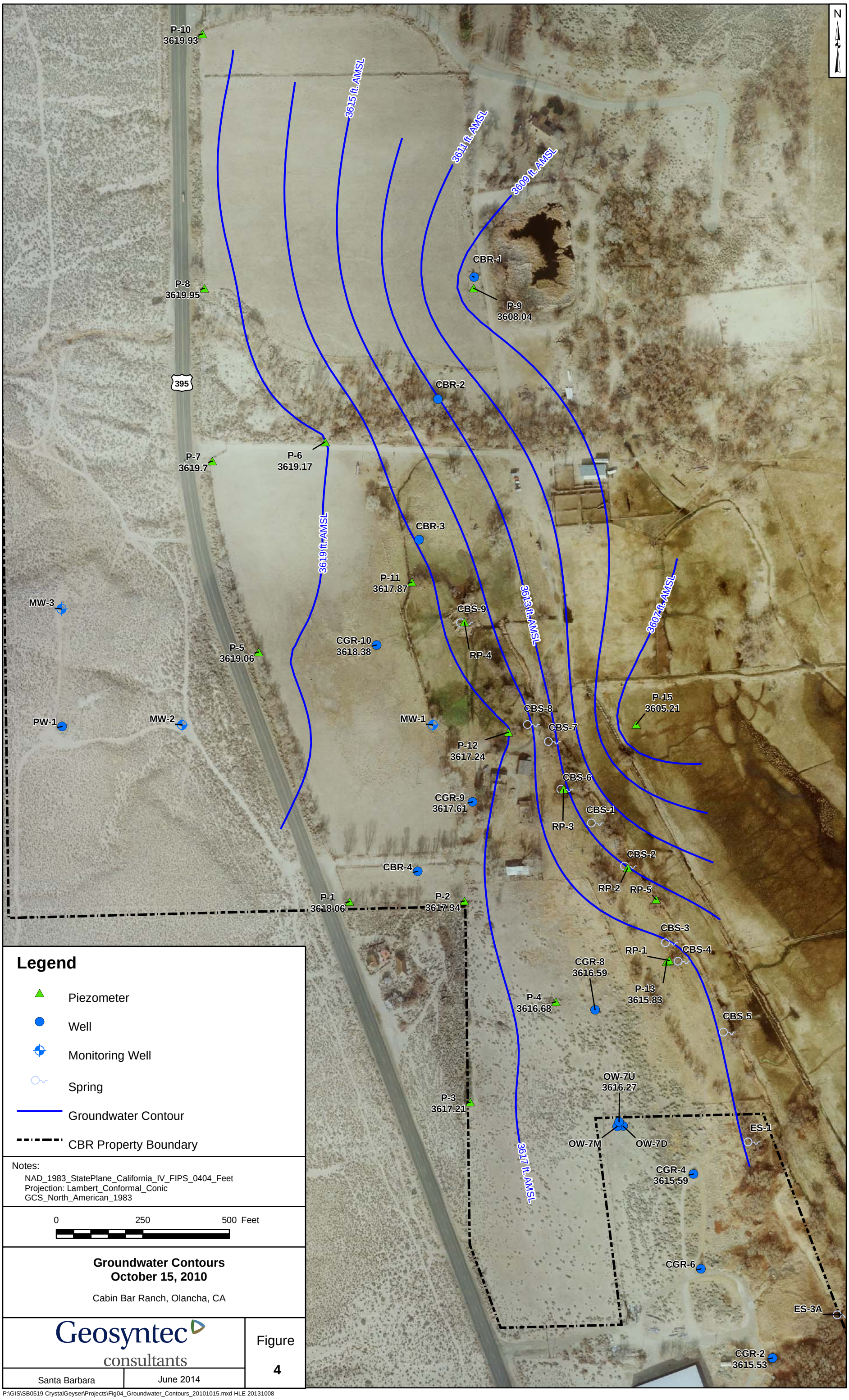
Geosyntec consultants

Santa Barbara | June 2014

Figure 2

P:\GIS\SB0519 CrystalGeyser\Projects\Fig02_Springs_Well_Locations.mxd STM 20131009


N
WAL-1
WAL-2
PAL-1
DIE-1
WIC-1
PAT-1
CMW-1 / CMW-2
HUG-1
LUN-1
MER-2
MER-1
BIL-1
HAR-1
RIL-2
SIE-1
LAW-1
RIL-1
HAT-1
HUE-1
BIY-1
ADK-1
RIL-3
HAN-1
P-10
OW-10M
OW-10U
CBR-1
Discharge Area
395
CBR-2
CBR-3
MW-3
P-5
CGR-10
OW-9U
PW-1
MW-2
MW-1
CGR-9
CBR-4
CGR-8
OW-7U
OW-7D
OW-7M
CGR-4
CGR-6
CGR-2
OW-8US
CGR-5
CGR-7
CGR-1
CGR-3
660 330 0 660 Feet
Explanation
Active Well
Non-Active Well
Active Water Supply Well to be Monitored
Proposed Observation Well (installed or to be installed)
CBR Property Boundary
Production Well / Domestic Well Locations and Proposed Groundwater Monitoring Network
Cabin Bar Ranch, Olancha, California
Geosyntec consultants
Figure 3
Santa Barbara
June 2014
SantaBarbara-01\Data P:\GIS\SB0519 Crystal Geyser\Projects\Fig03_Production_Domestic_Well_Locations_Proposed Groundwater Monitorinn Network.mxd STM 20131008



Legend

- Piezometer
- Well
- Monitoring Well
- Spring
- Groundwater Contour
- CBR Property Boundary

Notes:

NAD_1983_StatePlane_California_IV_FIPS_0404_Feet
Projection: Lambert_Conformal_Conic
GCS_North_American_1983

0 250 500 Feet

Groundwater Contours
October 15, 2010

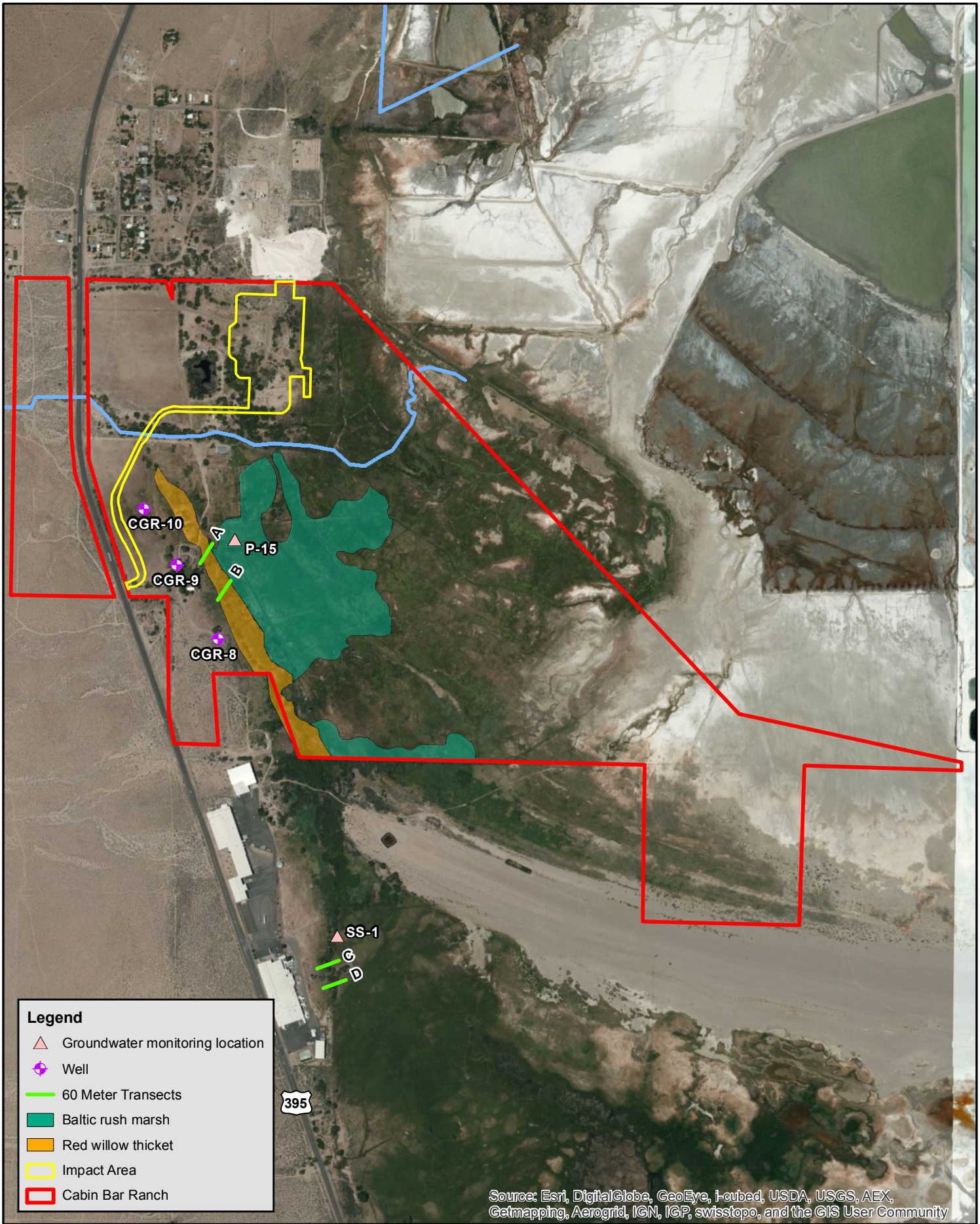
Cabin Bar Ranch, Olancha, CA

Geosyntec consultants

Santa Barbara | June 2014

Figure **4**

P:\GIS\SB0519 CrystalGeyser\Projects\Fig04_Groundwater_Contours_20101015.mxd HLE 20131008



GANDA

Project Location

0 1,000 2,000 Feet

0 250 500 Meters

N

Source: GANDA GIS 2013, ESRI Basemap Imagery

Figure 5. Groundwater Dependent Vegetation Monitoring Transect Locations

Inyo County, CA