4.3 UNDESIRABLE RESULTS

Undesirable results occur when any of groundwater conditions related to the six sustainability indicators become significant and unreasonable. SGMA requires that groundwater sustainability agencies determine what constitutes significant and unreasonable undesirable results for each groundwater basin.

As applicable and related to the IWVGB, the six sustainability indicators can be organized into three categories: 1) Indicators with documented current and/or historical undesirable results that will continue in the future if not addressed, 2) Indicators with no known undesirable results and no current data to determine likelihood of future undesirable results, and 3) Indicators not applicable to the IWVGB.

There are four sustainability indicators with documented current and/or historical undesirable results: reduction in groundwater in storage, chronic lowering of groundwater levels, degraded water quality, and land subsidence. The reduction of groundwater in storage is directly related to the chronic lowering of groundwater levels. Hydrographs of wells taken throughout the IWV demonstrate significant and unreasonable prolonged drawdown causing undesirable results (see Appendix 3-D and Section 3.4.2). As discussed in Section 3.4.4.1, TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred and indicative of groundwater water quality degradation undesirable results. As discussed in Section 3.4.5, land subsidence has historically caused undesirable results to facilities at NAWS China Lake, particularly the SNORT alignment.

As discussed in Section 3.5.4, the numerical model was used to simulate future IWVGB conditions (Baseline conditions) under a no action scenario assuming the GSP was not implemented. Baseline condition model results shown in Appendix 3-H indicate continuing and worsening conditions are anticipated for reduction in groundwater in storage, chronic lowering of groundwater levels, and degraded water quality. The numerical model was also used to simulate future conditions if the GSP proposed projects and management actions described in Section 5 are implemented to use as a tool for establishing sustainable management criteria (Scenario 6.2). Section 3.5.5 and Appendix 3-H provide the description and results of that numerical model simulation.

Depletion of interconnected surface water is the one sustainability indicator with no known undesirable results and no current data to determine likelihood of future undesirable results. There are no major or significant surface water bodies within the IWVGB. Streams in the valley are typically ephemeral and contribute to mountain front recharge, but typically do not flow past the mouths of the canyon except in very wet years. When the streams do flow into the IWVGB during very wet years the surface waters are not interconnected with groundwater in the Basin. Data will be reviewed periodically to determine if any undesirable results from depletion of interconnected surface water are occurring. The IWVGA will reevaluate the need to establish sustainability criteria for interconnected surfaced water and GDEs as data gaps are filled.

Due to the location of the IWVGB, seawater intrusion is not currently applicable to the IWVGB and is not of concern in the future. Consequently, Minimum Thresholds, Measurable Objectives, and Interim Milestones are not established for this sustainability indicator.

SGMA requires three components to be addressed for each potential undesirable result (GSP Emergency Regulations (§354.26). Those components and a brief description are included below:

1. The cause of groundwater conditions occurring within the IWVGB which may lead to, or has led to, undesirable results based on information described in the Basin setting. It is recognized that the IWVGB may not have any undesirable results for some sustainability indicators.
2. The criteria used to define undesirable results for each sustainability indicator which is relevant and applicable to the IWVGB.
3. The potential effects on the IWVGB of the undesirable result of continued groundwater use including potential impacts on beneficial uses and users.

4.3.1 Reduction of Groundwater in Storage Undesirable Results

4.3.1.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable reduction of groundwater in storage. Modeling results simulating baseline conditions (no action) indicate a drastic reduction of groundwater in storage will continue in the future. (See Appendix 3-H.)

4.3.1.2 *Criteria to Define Undesirable Results*

Baseline conditions model results indicate that useable groundwater in storage could be depleted to the point that potential future demands will not be met if the IWVGB is not managed, which would jeopardize all beneficial uses and users in the IWVGB. Scenario 6.2 model results, simulating the proposed projects and management actions, indicate approximately 215,000 acre-feet of groundwater would be removed from storage over the planning horizon, compared to approximately 1.6 million acre-feet estimated to be removed from storage under Baseline conditions.

Due to data gaps that limit the understanding of the Basin and the uncertainties related to the model and the availability of and implementation schedule for supplemental water supplies, the preservation of groundwater in storage is a high priority for the IWVGA. By preserving the groundwater in storage, the IWVGA can help achieve the sustainability goal by protecting the future of the community, preserving quality of life for the residents of the Basin and sustaining the mission at NAWS China Lake. In a letter to the IWVGA, the U.S. Navy identified groundwater resources as the number one encroachment concern that has the potential to affect the mission enabled on and around NAWS China Lake (see Appendix 4-A).

In areas in the IWV where the groundwater levels have been steadily declining, the water levels have dropped enough to impact shallow wells, requiring wells to be deepened, re-drilled, or abandoned as a water source. As discussed in Section 3.4.2, an analysis was conducted on the IWVGB well inventory to estimate the number of shallow wells impacted due to the chronic lowering of groundwater levels, which is related to the significant and unreasonable reduction of groundwater in storage (Appendix 3-E). It is

estimated 97 shallow wells were impacted from 1980 to 2018 based on preliminary analysis. By 2070, an additional approximately 800 wells are estimated to be impacted under the baseline, "no action", conditions. (Additional shallow wells are anticipated to be impacted due to water quality degradation.)

The number of wells estimated to be impacted is the criterion to define significant and unreasonable reduction of groundwater in storage. The approximately 800 wells estimated to be impacted by 2070 under baseline conditions is significantly beyond what could reasonably and feasibly be mitigated. The number of shallow wells that would be impacted if the proposed projects and management actions are implemented is estimated to be 22, which is a feasible number of wells that can be mitigated.

The amount of groundwater estimated to be removed from storage with the proposed projects and management actions is the maximum amount of useable groundwater reserves than can be extracted to prevent undesirable results while still providing a margin of safety for future use, uncertainties, and potential changes to the NAWS China Lake mission.

4.3.1.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the significant reduction of groundwater in storage if not addressed through projects and management actions. The potential Basin impacts to beneficial uses and users include:

- Reduction of buffer from loss of production for deeper wells, both for municipal/domestic use, industrial use, and agriculture use
- Impacts to shallow wells due to lowering of groundwater levels which would require deepening or replacement
- Encroachment on mission of NAWS China Lake
- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Land subsidence causing impacts to infrastructure

- Jeopardy to beneficial uses due to lowering of groundwater levels and degraded water quality including environmental uses, domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs and supplemental supplies (including de minimis groundwater users and members of disadvantaged communities)
- Increase of impacts caused by dust and desertification caused by declining water tables.

4.3.2 Chronic Lowering of Groundwater Levels Undesirable Results

4.3.2.1 *Cause of Undesirable Results*

The current and prolonged state of overdraft in the IWVGB, due to unsustainable groundwater production, is causing and has caused significant and unreasonable chronic lowering of groundwater levels. Modeling results simulating Baseline conditions (no action) indicate a drastic lowering of groundwater levels will continue in the future if appropriate projects and management actions are not implemented (see Appendix 3-H.)

4.3.2.2 *Criteria to Define Undesirable Results*

The results of the shallow well impact analysis (see Appendix 3-E) is the criteria to define significant and unreasonable chronic lowering of groundwater levels. As discussed in 4.3.1.2, groundwater levels have been steadily declining and the water levels have dropped enough to impact shallow wells, requiring wells to be deepened, re-drilled, or abandoned as a water source. The number of wells estimated to be impacted is the criterion to define significant and unreasonable chronic lowering of groundwater levels. The number of shallow wells that would be impacted if the proposed projects and management actions are implemented is estimated to be 22, which is a feasible number of wells that can be mitigated. (See Section 4.3.1.2 for additional analysis.)

4.3.2.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the chronic lowing of groundwater levels if not addressed through projects and management actions. The potential Basin impacts include:

- Impacts to shallow wells directly caused by lowering of groundwater levels which would require deepening or replacement
- Impacts to shallow wells due to degraded water quality indirectly caused by lowering of groundwater levels which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Land subsidence causing impacts to infrastructure
- Jeopardy to beneficial uses including environmental uses, domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)
- Increase of impacts caused by dust and desertification caused by declining water tables.

4.3.3 Degraded Water Quality Undesirable Results

4.3.3.1 *Cause of Undesirable Results*

As discussed in Section 3.4.4.1, the groundwater movement in the IWVGB causes dissolution of evaporites, resulting in increased TDS concentrations. Groundwater production can exacerbate the process, and TDS samples indicate concentrations have increased over time in areas where high rates of pumping have occurred. Elevated and increasing TDS concentrations in areas of the IWVGB are indicative of groundwater degradation.

After considering several factors including the past, present, and probable future beneficial use of the groundwater, economic considerations, and environmental considerations, the LRWQCB has removed the

designation for Municipal and Domestic Supply for a large portion of the IWVGB underlying NAWS China Lake due to existing poor water quality. The water quality in this area is considered a pre-SGMA undesirable result and will not be addressed by projects and management actions and will not have sustainable management criteria established for it. Figure 4-1 provides a map showing the de-designated area on NAWS China Lake.

4.3.3.2 *Criteria to Define Undesirable Results*

Degradation of groundwater quality is considered significant and unreasonable if the quality is degraded such that it is unsuitable for the current beneficial uses in the IWVGB.

4.3.3.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related due to degraded water quality if not addressed through projects and management actions. The potential Basin impacts to beneficial uses and users include:

- Impacts to shallow wells due to degraded water quality which would require well abandonment or treatment
- Encroachment on mission of NAWS China Lake
- Jeopardy to beneficial uses including environmental uses, domestic supplies, industrial supplies, and agriculture supplies which could result in fallowing of agricultural land
- Financial impacts to all groundwater users and well owners for mitigation costs (including de minimis groundwater users and members of disadvantaged communities)

4.3.4 Land Subsidence Undesirable Results

4.3.4.1 *Cause of Undesirable Results*

As discussed in Section 3.4.5 and Appendix 3-G, the IWVGB is partially underlain by extensive fine-grained materials which have a high to very high susceptibility to land subsidence. These fine-grained materials

are prone to inelastic compaction when the groundwater table is lowered below historical levels. Consequently, the current overdraft conditions, resulting in lowering of groundwater levels, contribute to land subsidence conditions in the IWVGB. Additionally, due to the high tectonic activity in the IWV, the IWVGB is also subject to direct tectonic changes in ground elevation, as well as soft sediment deformation and compaction of fine-grained units due to seismic activity.

4.3.4.2 *Criteria to Define Undesirable Results*

The undesirable results associated with land subsidence are related to impacts on facilities and infrastructure. Testing and laboratory facilities on NAWS China Lake are the most sensitive facilities to the impacts of land subsidence in the IWVGB. The land subsidence analysis described in Section 3.4.5 and Appendix 3-G provides estimates of land subsidence rates due to historical declines in groundwater levels in the vicinity of the facilities on NAWS China Lake. Modeling results of baseline conditions indicate continued drastic lowering of groundwater levels if appropriate projects and management actions are not implemented (see Appendix 3-H). Scenario 6.2 model results, simulating the proposed projects and management actions, generally indicate long-term stabilization of groundwater levels in the vicinity of the sensitive facilities at NAWS China Lake; however, resulting rates of land subsidence, if any, associated with the simulated groundwater levels is not known. Accordingly, the results of the land subsidence analysis described in Section 3.4.5 and Appendix 3-G are used to define the rates and amounts of land subsidence that are significant and unreasonable.

4.3.4.3 *Potential Effects*

The IWVGB will continue to experience negative impacts related to the land subsidence if not addressed through projects and management actions. The potential Basin impacts to beneficial uses and users include:

- Encroachment on mission of NAWS China Lake
- Damage to infrastructure including high value sensitive facilities at NAWS China Lake (For example, the SNORT alignment)

4.3.5 Depletions of Interconnected Surface Water Undesirable Results

Ephemeral streams exist in the mountain canyons, but typically do not flow past the mouths of the canyon except for in very wet years. There are multiple natural springs in the IWV (see Figure 3-11). There is currently no data documenting any undesirable results or Basin impacts related to depletions of interconnected surface water. Groundwater is critical to sustaining springs, wetlands, and perennial flow (baseflow) in streams as well as to sustaining vegetation such as phreatophytes that directly tap groundwater. As discussed in Section 3.4.7, GDEs on the valley floor are vulnerable and susceptible to impacts related to the chronic lowering of groundwater levels. Model results simulating Baseline conditions (no action) indicate continued drastic lowering of groundwater levels in the vicinity of the GDEs near the China Lake Playa if appropriate projects and management actions are not implemented (see Appendix 3-H). Specifics regarding the relationship between groundwater levels and the health of GDEs is currently not known, including extinction root depths, and there is no current monitoring program to track GDE health; therefore, GDE monitoring, currently a data gap, is proposed as part of the GSP monitoring program. Due to limited data on the relationship of interconnected surface water (springs) to GDEs and GDE's direct use of groundwater, no additional sustainable management criteria are proposed at this time. The potential need for sustainable management criteria to avoid undesirable results for GDEs will be considered after additional monitoring data is collected and evaluated.

4.4 MINIMUM THRESHOLDS

A Minimum Threshold is defined as "a numeric value for each sustainability indicator used to define undesirable results" (§ 351 (t)). DWR's Sustainable Management Criteria BMP further clarifies that the Minimum Threshold is "…the quantitative value that represents the groundwater conditions at a representative monitoring site that, when exceeded individually or in combination with Minimum Thresholds at other monitoring sites, may cause an undesirable result(s) in the basin…" SGMA requires that each Groundwater Sustainability Agency determine the value for each sustainability indicator at which undesirable results occur. Impacts to groundwater pumpers, land uses, and other interests within the IWVGB were considered when developing the Minimum Thresholds.

Minimum Thresholds for the applicable sustainability indicators are established at monitoring sites that are representative of overall IWVGB conditions. It is recognized that exceeding or violating a Minimum Threshold at a single monitoring site may not be indicative of an undesirable result. Any Minimum Threshold exceedance or violating will be evaluated to determine the cause and if corrective action is necessary. There is inherent uncertainly when predicting water levels and the IWVGB anticipated response to planned projects and management actions intended to eliminate undesirable results, but groundwater levels that exceed or violate the established Minimum Thresholds will be used as an indication that additional or more aggressive actions may need to be implemented. If planned project and management actions are unable to be realized or the intended IWVGB benefits are not achieved, sustainable management criteria, including Minimum Thresholds and Measurable Objectives, will need to be revaluated and additional or more aggressive management actions may need to be implemented.

GSP Regulations § 354.28 require six components of information to be documented for each Minimum Threshold. The six components are as follows:

1. The criteria used to establish Minimum Thresholds including elements of the Basin setting and/or modeling results used to establish the thresholds.
2. The relationship to other sustainability indicators and a comparison to thresholds in adjacent representative monitoring sites, and the relationship between the selected Minimum Threshold and Minimum Thresholds for other sustainability indicators.
3. The relationship to adjacent basins and how Minimum Thresholds have been selected to avoid unintended undesirable results in an adjacent basin or impacting the ability of an adjacent basin to achieve its sustainability goals. The groundwater basins surrounding the IWVGB are Rose Valley, Coso Valley, Salt Valley, and Fremont Valley. These basins are not required to submit a GSP in accordance with SGMA. Coso Valley, Rose Valley and Salt Wells Valley have few local residents and water uses.
4. The potential effects and how an identified Minimum Threshold may impact groundwater conditions, beneficial uses, and consequently groundwater users.

5. The relationship with Federal, State and Local Standards and the justification for any differences between the selected Minimum Threshold and other regulatory standards.
6. The method of quantitative measurement and the data collection schedule.

4.4.1 Reduction of Groundwater in Storage Minimum Threshold

4.4.1.1 *Criteria used to Establish Minimum Thresholds*

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Minimum Threshold for the reduction of groundwater in storage is set at the simulated estimated value of the total loss of groundwater in storage at year 2070 after the projects and management actions are implemented (Scenario 6.2) plus an additional 10 percent buffer for the purposes of operational flexibility. The purpose of the operational flexibility is to account for uncertainties related to availability and implementation schedule of supplemental water supplies.

4.4.1.2 *Relationship to Other Sustainability Indicators*

Reduction of groundwater in storage is related to sustainability indicators for chronic lowering of groundwater levels, degraded water quality, and land subsidence for the IWVGB. By preserving groundwater in storage, the Minimum Threshold for reduction of groundwater in storage will additionally minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land subsidence.

4.4.1.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, a portion of the natural recharge into the IWVGB is from Rose Valley and there is little subsurface outflow to the Salt Wells Valley. Project and management action numerical model simulations estimate the inflow from natural recharge, including from Rose Valley, and outflow to Salt Wells Valley will remain largely unchanged on average

between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to reduce the reduction of storage are not expected to impact adjacent basins.

4.4.1.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the total volume of groundwater allowed to be removed from storage through the establishment of the Minimum Threshold that will subsequently protect beneficial users and uses from undesirable results. The Minimum Threshold for reduction of groundwater in storage will minimize undesirable results caused by chronic lowering of groundwater levels, degraded water quality, and land subsidence, which will benefit beneficial users and uses in the IWVGB. Reserve groundwater resources will be preserved for potential increased groundwater use to support the mission of NAWS China Lake. Impacts to deeper wells from impacts due to chronic lowering of groundwater levels and degraded water quality will be reduced. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold impacts and limits the volume of groundwater that can be produced by beneficial users and used for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to reduce the reduction of groundwater in storage have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.1.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any Federal, State or local standards specific to addressing the reduction of groundwater in storage. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies; accordingly, impacts on water supply planning assumptions in existing plans will need to be reevaluated for future General Plan updates. The IWVGA will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.1.6 *Representative Monitoring Sites*

The Minimum Threshold, and other sustainable management criteria, for the reduction of groundwater in storage is not set at representative monitoring sites but is set for the entire IWVGB. Accordingly, no representative monitoring sites have been selected. The procedure for determining the reduction of groundwater in storage in discussed in Section 4.4.1.7 below.

4.4.1.7 *Method of Quantitative Measurement*

The change of groundwater in storage will be estimated using the Thiessen polygon method. The IWVGB will be subdivided into discrete polygons drawn to represent the area closest to each measurement point. The measurement points will be the wells monitored semi-annually by the KCWA for groundwater levels. Discretization of the polygons will be performed using the Thiessen weighted average polygon method to proportion data that is not uniformly spaced. The polygons will be drawn to represent the area closest to a measuring point that provides physical data of the Basin. The change in groundwater in storage will be calculated annually based on bulk hydrogeologic parameters and measured fall groundwater levels for each polygon. The change in groundwater in storage will be monitored as 5-year rolling averages to determine if Minimum Thresholds are exceeded. The detailed methodology will be developed after GSP adoption and provided for public review and comment.

The following equation is used to estimate the change in storage for each polygon:

Change of Groundwater in Storage (feet^3) = [area (feet^2)] x [specific yield (unitless)] x [change in depth to water (feet)]

4.4.2 Chronic Lowering of Groundwater Levels Minimum Threshold

4.4.2.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for chronic lowering of groundwater levels are historical groundwater elevation levels/trends and simulated predicted water levels. The numerical model

was used to estimate and predict water levels throughout the IWVGB under the conditions of the proposed projects and management actions. The simulated data was compared to extrapolated trends of historical data. Operational flexibility is an important consideration when setting the Minimum Thresholds for chronic lowering of groundwater levels because groundwater levels respond to groundwater production and also changes in hydrologic cycles.

The approach for setting Minimum Thresholds is dependent on measured historical groundwater elevations and trends at specific representative monitoring sites and the simulated predicted groundwater elevations at those monitoring sites. The simulated predicted water levels were adjusted within the numerical model margin of error in order for the common point between the historical data and the simulated data to have the same value. At wells with highly variable water levels, the simulated predicted water levels were adjusted to the most recent 3-year average of historical data. Groundwater levels for some representative monitoring sites near pumping centers experience high seasonal variability. For these wells, the amplitude of the seasonal troughs extends significantly below the historical trendline. The lower value between the following data was used to determine the Minimum Threshold:

1. 5 feet below the minimum of the simulated groundwater level before groundwater level recovery is anticipated due to the implementation of projects and management actions; or
2. 5 feet below recent minimum historical value.

By using the lower value of the above-mentioned data, a more appropriate Minimum Threshold is established with greater operational flexibility.

4.4.2.2 *Relationship to Other Sustainability Indicators*

The chronic lowering of groundwater levels is related to other sustainability indicators for reduction of groundwater in storage, degraded water quality, and land subsidence for the IWVGB. By limiting the decline of groundwater levels in the IWVGB, the Minimum Threshold for chronic lowering of groundwater levels will additionally minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence.

4.4.2.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, a portion of the natural recharge into the IWVGB is from Rose Valley and there is little subsurface outflow to the Salt Wells Valley. Project and management action numerical model simulations estimate the inflow from natural recharge, including from Rose Valley, and outflow to Salt Wells Valley will remain largely unchanged on average between 2020 and 2070 (see Appendix 3-H). Consequently, the Minimum Thresholds selected to address chronic lowering of groundwater levels are not expected to impact adjacent basins.

4.4.2.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by limiting the decline of groundwater levels. The Minimum Threshold for the chronic lowering of groundwater levels will minimize undesirable results caused by reduction of groundwater in storage, degraded water quality, and land subsidence which will subsequently protect beneficial users and uses from undesirable results. The risk to wells going dry, along with the associated financial impacts, will be mitigated by limiting the chronic decline of groundwater levels. Beneficial uses including groundwater for domestic/municipal use, industrial use, and agriculture use will be protected; however, the Minimum Threshold for the chronic lowering of groundwater levels impacts and limits amount of groundwater production that can occur for beneficial uses in the IWVGB. As discussed in Section 5, projects and management actions implemented to mitigate the chronic lowering of groundwater levels have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.2.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any Federal, State or local standards specific to addressing the chronic lowering of groundwater levels. As discussed in Section 2.5.1, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies; accordingly, impacts on water supply planning assumptions in existing plans will need to be reevaluated

for future General Plan updates. The IWVGA will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.2.6 *Representative Monitoring Sites*

Ten monitoring wells have been selected to be representative key wells to monitor chronic lowering of groundwater levels. The locations of these wells are provided in Figure 4-2. To determine the selection of representative monitoring sites, groundwater levels throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted water levels over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the decline of groundwater levels. Monitoring wells with longer periods of record of historical data were prioritized over wells with little recorded historical data. If these wells are determined after additional verification to not be suitable to be a representative monitoring site, additional and comparable wells will be selected and updated in the monitoring network.

Table 4-1 provides the list of representative monitoring sites to monitor chronic lowering of groundwater levels.

Table 4-1. Representative Monitoring Sites for Chronic Lowering of Groundwater Levels.

Well Name [1]	Well Type	T/R-S	Depth (feet bgs)	Screen Intervals (feet bgs)	Latitude (NAD83)	Longitude (NAD83)	Monitoring Frequency
USBR-01	Monitoring	27S/38E-23F01	635	615-635	35.569683	117.863691	Semi-Annual
USBR-03	Monitoring	27S/39E-11D01	670	650-670	35.607183	117.755633	Semi-Annual

Well Name [1]	Well Type	T/R-S	Depth (feet bgs)	Screen Intervals (feet bgs)	Latitude (NAD83)	Longitude (NAD83)	Monitoring Frequency
USBR-04	Monitoring	26S/39E-26A03	1200	1190-1200	35.649682	117.743133	Semi-Annual
USBR-05	Monitoring	25S/38E-34G01	870	850-870	35.718013	117.871749	Semi-Annual
USBR-06	Monitoring	25S/38E-12L01	350	330-350	35.776068	117.842027	Semi-Annual
MW 32	Monitoring	26S/39E-27D02	900	880-900	35.648571	117.775912	Semi-Annual
NR-2	Monitoring	25S/38E-36G01	350	330-350	35.718739	117.834723	Semi-Annual
Kerr McGee	Monitoring	26S/39E-17G02	881	681-881	35.676348	117.804524	Semi-Annual
Sandquist Spa	Monitoring	26S/39E-11E02	191	135-191	35.688570	117.756468	Semi-Annual
Steele 31L01 [2]	Monitoring	26S/39E-32L01			35.629935	117.811488	Semi-Annual

[1] In wells that are nested and have multiple depths, the shallow depth is used for setting sustainable management criteria. [2] Video logging will be used to confirm missing well construction data.

4.4.2.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring chronic lowering of groundwater levels is direct measurement of groundwater levels. Groundwater levels will be monitored at the representative

monitoring sites semiannually. Groundwater levels will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.3 Degraded Water Quality Minimum Threshold

4.4.3.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish Minimum Thresholds for degraded water quality are historical TDS concentrations and historical trends. The numerical model was also used to estimate TDS concentrations throughout the IWVGB under the conditions of the proposed projects and management actions (Numerical Model Scenario 6.2). The simulated data was compared to extrapolated trends of historical data when available; however, there are many areas of the IWVGB that have limited or no TDS data. Operational flexibility is an important consideration when setting the Minimum Thresholds due to current uncertainties. Likewise, there are areas where there is not enough reliable data to establish Minimum Thresholds at this time until baseline TDS conditions are established.

The approach for setting Minimum Thresholds is dependent on historical TDS concentrations and trends in specific representative monitoring sites. In areas of the IWVGB with generally good water quality, the Minimum Threshold is set at the Secondary TDS MCL (500 mg/l) in order protect current beneficial uses for domestic supply. After evaluating historical data and trends, Minimum Thresholds were established in some areas with poorer water quality at 600 mg/l. The northwest area of the IWVGB has documented poor quality that is still designated for domestic use and is also used for agricultural uses. This area of the IWVGB is of particular concern for water quality degradation; however, limited publicly available water quality data indicate that this area has already documented high TDS concentrations that are pre-SGMA undesirable results. Due to the limited publicly available data, Minimum Thresholds (and other sustainable management criteria) in this area of the IWVGB will need to be established after baseline TDS concentrations are established. This area of the IWVGB would also benefit from cooperative sharing of private data to fill these data gaps.

4.4.3.2 *Relationship to Other Sustainability Indicators*

Degradation of water quality is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and chronic lowering of groundwater levels. The Minimum Thresholds established for the reduction of groundwater in storage and the chronic lowering of groundwater levels minimize undesirable results caused by degraded water quality. The Minimum Threshold established for degraded water quality does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.3.3 *Relationship to Adjacent Basins*

As described in the hydrogeologic conceptual model in Section 3.3.4.1, there is very little subsurface outflow to adjacent groundwater basins that could potentially be impacted by sustainable management criteria established for degraded water quality, with 50 AFY estimated to flow to the Salt Wells Valley from the years 2011-2015 (See Table 3-7). Project and management action numerical model simulations estimate the outflow to Salt Wells Valley will remain largely unchanged at approximately 40 AFY (see Appendix 3-H). Groundwater from the IWVGB is used for beneficial uses in the Salt Wells Valley; therefore, the establishment of sustainable management criteria will benefit groundwater supplies used in the Salt Wells Valley. Inflow from Rose Valley will not be impacted by sustainable management criteria established downgradient in the IWVGB. Consequently, the Minimum Thresholds selected to address degraded water quality are not expected to impact adjacent basins.

4.4.3.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved by establishing Minimum Thresholds to limit and mitigate the degradation of groundwater quality, which will subsequently protect beneficial users and uses from undesirable results. By maintaining TDS concentrations below Minimum Threshold, the number of wells that would require well abandonment or treatment due to water quality degradation will be reduced and beneficial uses will be protected. As discussed in Section 5, projects and management actions

implemented to mitigate the degraded water quality have financial costs that will be partially borne by beneficial users in the IWVGB.

4.4.3.5 *Relationship with Federal, State and Local Standards*

The LRWQCB issues water quality objectives that apply to all groundwater in the Lahontan region. In general, the groundwater quality objectives are set to be protective of beneficial uses. Groundwaters in the Lahontan region designed for municipal and domestic use should not contain concentrations above MCLs or SMCLs based on drinking water standards. The water quality objectives for the Lahontan region are provided in Appendix 4-B. As discussed in Section 3.4.4, groundwater concentrations already exceed MCLs and SMCLs for TDS and arsenic in certain areas of the IWVGB are pre-SGMA undesirable results. Consequently, the proposed projects and management actions are intended to improve water quality, but will not necessarily reduce concentrations in every area of the IWVGB to below MCLs and SMCLs. As discussed in Section 2.5.2, implementation of the GSP may impact the water supply and water demand assumptions of existing General Plans due to changes in the quantities and locations of groundwater extractions and acquisition of alternative water supplies. Accordingly, the IWVGA will coordinate with the relevant land use planning agencies for future General Plan updates.

4.4.3.6 *Representative Monitoring Sites*

Eleven monitoring wells and production wells have been selected to be representative key wells to monitor water quality degradation. The locations of these wells are provided in Figure 4-3. To determine the selection of representative monitoring sites, historical TDS concentration data in wells throughout the IWVGB were analyzed for historical and current trends and compared to modeled predicted TDS concentrations over the planning horizon. The representative monitoring well network was selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor the effectiveness of projects and management actions that will be implemented to limit the degradation of water quality, with a higher density of representative wells in sensitive and/or vulnerable areas of the IWVGB that is put to greater beneficial uses. Wells with historical increasing TDS trends are intended to be used as “sentinel” wells in the monitoring network, with the intention that by

monitoring these wells for water quality degradation, additional IWVGB wells will likewise be protected. Monitoring wells with good period of record of historical data were prioritized over wells with little recorded historical data. Other factors, including accessibility and reliability of data, were also considered in the section of representative monitoring well sites.

One representative monitoring well has been selected in an area of poor water quality on NAWS China Lake that is no longer designed for municipal or domestic use. Additional data will be collected to establish Baseline TDS conditions before setting sustainable management criteria at that well.

One representative monitoring well has been selected in the El Paso subbasin because there are only minimal beneficial uses in that area and stable groundwater levels and water quality.

If these wells are determined after additional verification to not be suitable to be a representative monitoring site, additional and comparable wells will be selected and updated in the monitoring network.

Table 4-2 provides the list of representative monitoring sites to monitor water quality degradation.

Table 4-2. Representative Monitoring Sites for Degraded Water Quality.

Well [1]	Well Type	T/R-S	Depth (feet bgs)	Screen Intervals (feet bgs)	Latitude (NAD83)	Longitude (NAD83)	Monitoring Frequency
USBR-01	Monitoring	27S/38E-23F01	635	615-635	35.56968	-117.86369	Annual
IWVWD Well 33	Public	27S/39E-08L01	1020	560 - 1000	35.60051	-117.80419	Annual
Owens Peak South Well 01	Public	26S/39E-32N	n/a	366 - 376	35.62377	-117.80867	Annual

Well [1]	Well Type	T/R-S	Depth (feet bgs)	Screen Intervals (feet bgs)	Latitude (NAD83)	Longitude (NAD83)	Monitoring Frequency
IWVWD Well 30	Public	26S/39E-27D	1200	600-1200	35.65024	-117.77578	Annual
Hometown Water Association Well 01	Public	26S/39E-26B1	n/a	263-323	35.64835	-117.74803	Annual
IWVWD Well 11	Public	26S/40E32-K01	620	260-310, 340-380, 470-500, 520-600	35.62833	-117.69602	Annual
Sandquist Spa	Monitoring	26S/39E-11E02	191	135-191	35.68857	-117.75647	Annual
22B	Monitoring	26S/40E-22B	651.5	531-631	35.661433	-117.666783	Annual
West Valley Mutual 01	Public	26S/39E-07M1	n/a	200-400	35.68696	-117.83003	Annual
USBR 6	Monitoring	25S/38E-12L01	350	330-350	35.77607	-117.84203	Annual
NR-2	Monitoring	25S/38E-36G01	350	330-350	35.71874	-117.83472	Annual

[1] In wells that are nested and have multiple depths, the shallow depth is used for setting sustainable management criteria.

4.4.3.7 *Method of Quantitative Measurement*

The method of quantitative measurement for monitoring degraded water quality is TDS sampling. Groundwater samples will be collected at the representative monitoring sites annually and analyzed for TDS at qualified laboratories. TDS concentrations will be monitored as 3-year rolling averages to determine if Minimum Thresholds are exceeded.

4.4.4 Land Subsidence Minimum Threshold

4.4.4.1 *Criteria Used to Establish Minimum Thresholds*

The criteria used to establish the Minimum Threshold for land subsidence are historical data on land subsidence rates in the area of most concern and susceptibility to land subsidence: the southern subsidence area, specifically near the SNORT alignment on NAWS China Lake (see Appendix 3-G). The Minimum Threshold for land subsidence is set at the rate from the most recent data period that has been analyzed (2005-2010) which is a value of 2.2 mm/year or 0.09 inches/year, due to declines in water levels and not tectonic processes, based on a 5-year running average in order to avoid additional undesirable results occurring at SNORT due to increased rates of land subsidence as compared to the current rates. The Minimum Threshold may not provide total protection from the impacts of land subsidence to the most sensitive facilities on NAWS China Lake due to their extremely low tolerances for changes in ground surface elevation; however, it is not known if it is feasible to manage the Basin to prevent such small increments of land subsidence.

4.4.4.2 *Relationship to Other Sustainability Indicators*

Land subsidence is related to other sustainability indicators pertinent to the IWVGB: reduction of groundwater in storage and the chronic lowering of groundwater levels. By establishing Minimum Threshold to preserve groundwater in storage and limit the decline of groundwater levels in the IWVGB, the aquifer materials that may be subject to compaction will not be dewatered and therefore undesirable results caused by land subsidence will be minimized. The Minimum Threshold established for land subsidence does not influence the established Minimum Thresholds for the other sustainability indicators.

4.4.4.3 *Relationship to Adjacent Basins*

The Minimum Thresholds selected to address land subsidence are not expected to impact adjacent basins.

4.4.4.4 *Potential Effects*

Groundwater conditions in the IWVGB will be improved and impacts caused by land subsidence will be reduced by establishing Minimum Thresholds to limit land subsidence.

4.4.4.5 *Relationship with Federal, State and Local Standards*

Other than SGMA, the IWVGA is not aware of any Federal, State or local standards specific to addressing the reduction of land subsidence.

4.4.4.6 *Representative Monitoring Sites*

Data from future geodetic surveys for existing monuments along the SNORT alignment conducted by the U.S. Navy will be reviewed if available. The IWVGA will evaluate new surveying, InSAR data and Light Detection and Ranging (LiDAR) data for the IWVGB, as available, to analyze basin-wide land subsidence rates and to determine if additional monitoring locations are necessary and if additional Minimum Thresholds are required for additional IWVGB locations.

4.4.4.7 *Method of Quantitative Measurement*

Common land subsidence measurement techniques include level-line surveys, InSAR and LiDAR measurements, and extensometers. The U.S. Navy periodically performs geodetic surveys across the China Lake ranges and the SNORT alignment to monitor land subsidence. The U.S. Navy has proposed establishing additional geodetic control points on NAWS China Lake. Additionally, InSAR and airborne LiDAR, a pulsed laser sensing method, data has been collected for NAWS China Lake following the significant earthquakes that occurred in the IWVGB in July 2019. The IWVGA will coordinate with the U.S.

Navy to obtain data related to land subsidence in order to evaluate potential Minimum Threshold exceedances. As discussed in 4.4.4.6, surveying, InSAR, and LiDAR data will be analyzed, as available.

4.5 MEASURABLE OBJECTIVES AND INTERIM MILESTONES

Measurable Objectives are defined as the "…quantitative goals that reflect the basin's desired groundwater conditions and allow the GSA to achieve the sustainability goal within 20 years…" This GSP Measurable Objectives are established at the same representative monitoring sites selected for monitoring conditions for potential Minimum Threshold exceedance. The planned Projects and Management Actions have been selected to achieve the Measurable Objectives. In addition to the Measurable Objective, Interim Milestones are identified in five-year increments at each monitoring site.

4.5.1 Reduction of Groundwater in Storage Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the total cumulative volume of groundwater removed from storage over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objective for the reduction of groundwater in storage is set at the simulated estimated total loss of storage at the end of the planning horizon in 2070. The value for the Measurable Objective is 213,474 acre-feet of groundwater removed from storage.

As discussed in Section 3.3.5, although the IWVGB will be operating within the current estimated sustainable yield of 7,650 AFY by 2040, additional losses will continue due to ET losses occurring in the China Lake Playa region causing additional reductions of groundwater in storage. Modeling has indicated that additional recharge of imported water in the recharge zone by the Sierra Nevada Mountains does not substantially reduce the ET losses occurring in the China Lake Playa within the time frame of the 50-year planning horizon. Accordingly, the Measurable Objective will be met by 2040, despite some additional losses occurring from 2040 through the planning horizon.

The Interim Milestones for 2025, 2030, and 2035 are the simulated estimated values of total cumulative volume of groundwater removed from storage at January 1 of those years: 81,952 acre-feet, 119,661 acre-feet, and 131,896 acre-feet of groundwater removed from storage, respectively.

4.5.2 Chronic Lowering of Groundwater Levels Measurable Objective and Interim Milestones

The numerical model was used to estimate and predict the groundwater levels over the implementation horizon under the conditions of the proposed projects and management actions. The Measurable Objectives for each representative well for the chronic lowering of groundwater levels is set at the simulated estimated value at that well at year 2040, after the projects and management actions are implemented and sustainability is reached. The Interim Milestones for 2025, 2030, and 2035 are the simulated groundwater levels at January 1 of those years.

Groundwater levels will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.3 Degraded Water Quality Measurable Objective and Interim Milestones

At representative monitoring sites that have historical TDS data, the Measurable Objective for degraded water quality is set at the highest recent TDS concentration. At wells where the TDS concentrations at the representative monitoring sites are anticipated to generally be stable or stabilize after projects and management actions are implemented based on simulated TDS concentrations, the Interim Milestones are established at the same value as the Measurable Objective. For wells with increasing historical trends, Interim Milestones are established at the extrapolation of the historical trend to the year 2030, at which time some stabilization of TDS trends is anticipated. At representative monitoring sites in areas of the IWVGB were there is not enough historical data to set criteria, Measurable Objectives and Interim Milestones will be established after baseline TDS conditions are established through monitoring.

TDS concentrations will be monitored as 3-year rolling averages to determine if Measurable Objective and Interim Milestones are met.

4.5.4 Land Subsidence Measurable Objective and Interim Milestones

Due to implementation of projects and management actions that will result in stabilization of groundwater levels, the current rate of land subsidence is not anticipated to increase from the most recent available data period (2005-2010). Accordingly, the Measurable Objective is set at the historical rate of subsidence of approximately 1.1 mm/year (0.04 inches/year) over an 18-year period from 1992 to 2010. The Interim Milestones for 2025, 2030, and 2035 are set at the same rate as the Measurable Objective at 1.1 mm/year (0.04 inches/year).

4.6 SUMMARY OF SUSTAINABLE MANAGEMENT CRITERIA

4.6.1 Reduction of Groundwater in Storage Summary

Table 4-3 below shows the numerical sustainable management criteria established for the reduction of groundwater in storage. Figure 4-4 provides a graph of predicted simulated reduction of storage along with the sustainable management criteria.

Table 4-3. Sustainable Management Criteria Summary: Reduction of Groundwater in Storage.

Sustainable Management Criteria	Value (acre-feet of groundwater removed from storage)
Minimum Threshold	234,821
2025 Interim Milestone	81,952
2030 Interim Milestone	119,661
2035 Interim Milestone	131,896
Measurable Objective	213,474

4.6.2 Chronic Lowering of Groundwater Levels Summary

Table 4-4 below shows the numerical sustainable management criteria established for representative monitoring sites for chronic lowering of groundwater levels. Figure 4-5a through Figure 4-5j provide graphs of historical and simulated groundwater levels along with the sustainable management criteria.

Table 4-4. Sustainable Management Criteria Summary: Chronic Lowering of Groundwater Levels.

Representative Monitoring Site	Minimum Threshold (ft msl)	2025 Interim Milestone (ft msl)	2030 Interim Milestone (ft msl)	2035 Interim Milestone (ft msl)	Measurable Objective (ft msl)
USBR-01	2,659	2,667	2,667	2,666	2,664
USBR-03	2,139	2,145	2,148	2,151	2,153
USBR-04	2,110	2,118	2,123	2,125	2,126
USBR-05	2,151	2,157	2,156	2,156	2,156
USBR-06	2,166	2,179	2,175	2,173	2,171
MW 32	2,119	2,125	2,131	2,132	2,134
NR-2	2,150	2,157	2,155	2,155	2,155
Kerr McGee	2,138	2,145	2,144	2,144	2,145
Sandquist Spa	2,162	2,168	2,167	2,167	2,167
Steele 31L01	2,140	2,146	2,148	2,150	2,152

4.6.3 Degraded Water Quality Summary

Table 4-5 below shows the numerical sustainable management criteria established for representative monitoring sites for degraded water quality. Figure 4-6a through Figure 4-6f provide graphs of historical TDS concentrations along with the sustainable management criteria.

Table 4-5. Sustainable Management Criteria Summary: Degraded Water Quality.

Representative Monitoring Site	Minimum Threshold (mg/l)	2025 Interim Milestone (mg/l)	2030 Interim Milestone (mg/l)	2035 Interim Milestone (mg/l)	Measurable Objective (mg/l)
USBR-01	ND	ND	ND	ND	ND
IWVWD Well 33	500	310	310	310	310
Owens Peak South Well 01	500	300	300	300	300
IWVWD Well 30	500	341	341	341	240
Hometown Water Association Well 01	500	448	448	448	370
IWVWD Well 11	600	546	546	546	530
Sandquist Spa	ND	ND	ND	ND	ND
22B	ND	ND	ND	ND	ND
West Valley Mutual 01	600	511	511	511	500
USBR-06	ND	ND	ND	ND	ND
NR-2	ND	ND	ND	ND	ND

ND = not determined at this time. As baseline TDS sampling data is gathered, these criteria will be established.

4.6.4 Land Subsidence Summary

Table 4-6 below shows the numerical sustainable management criteria established for land subsidence.

Table 4-6. Sustainable Management Criteria Summary: Land Subsidence.

Sustainable Management Criteria	Value at SNORT Alignment (inches/year)
Minimum Threshold	0.09 inches/year

Sustainable Management Criteria	Value at SNORT Alignment (inches/year)
2025 Interim Milestone	0.04
2030 Interim Milestone	0.04
2035 Interim Milestone	0.04
Measurable Objective	0.04

4.7 GSP PROPOSED MONITORING NETWORK

4.7.1 Proposed Monitoring Network and Schedule

The objective of the GSP proposed monitoring network is to monitor and track Basin conditions and progress towards reaching sustainability. The monitoring network will be reevaluated periodically, as needed, and at least every five years in order to ensure the monitoring network is satisfying SGMA requirements and effectively monitoring for seasonal, short-term, and long-term trends in the Basin. The proposed monitoring network is designed to monitor for the sustainability indicators relevant to the IWVGB and to monitor for groundwater flow directions and hydraulic gradients between aquifers. Information about monitoring wells, including depths and screen intervals, in the network can be found in the DMS at https://iwvgsp.com/. Data and information will be provided to the community and stakeholders on the status of and progress toward sustainability.

The existing groundwater level monitoring network is very robust for establishing changes in groundwater levels over time throughout the IWVGB and will continue throughout the planning horizon. As discussed in Section 3.6, depth to water is, and will continue to be, measured biannually at 198 wells during Spring (March) and Fall (October) to observe seasonal changes in groundwater levels. Water levels measured at these wells will also be used to determine the change of storage in the Basin annually. The density of wells monitored for groundwater levels is approximately 0.33 wells per square mile.

Ten representative key wells have been selected specifically to monitor for sustainable management criteria (i.e. addressing chronic lowering of groundwater levels) and used to track progress toward sustainability. These ten key wells are a subset of the 198 wells in the IWVG groundwater monitoring network and will be monitored on a semi-annual basis. Newly drilled wells installed to fill data gaps and groundwater level monitoring in the vicinity of GDEs will be added to the existing monitoring network. As data gaps in the groundwater level monitoring program outside of the pumping areas are filled, additional monitoring points will be added to the groundwater level monitoring network. Basin stakeholders may cooperatively and voluntarily provide additional groundwater data to assist in Basin understanding.

The currently monitored stream gages, weather stations, and eddy covariance station will continue to be monitored. Newly installed stream gages and weather stations will be incorporated into the GSP monitoring network.

As discussed in Section 3.6.1.3, the existing TDS database has water quality data from 1920 to present; however, the dataset includes only a limited number of wells, or a one-time sample when the well was drilled. Baseline sampling at 30 wells and 10 springs basin-wide will be conducted to fill water quality data gaps. Additionally, water quality data from 39 wells that are currently reporting under the GAMA program will continue to be incorporated into the IWV DMS and used to evaluate the changes in TDS within the Basin. The 11 monitoring wells that have been selected to be representative key wells to monitor sustainable management criteria for degraded groundwater quality will be monitored annually and reported, as part of the GSP outreach, specifically to track progress toward sustainability.

Land subsidence is not currently monitored in the IWVGB, with the exception of infrequent monitoring conducted by the U.S. Navy at established monuments on NAWS China Lake. The IWVGA will coordinate with the U.S. Navy to obtain data related to land subsidence as monitored. Additionally, the USGS provides InSAR and earthquake activity data to monitor for land subsidence.

See Section 3.6.1 for discussion of the data gap evaluation of the existing monitoring network for additional information on the proposed changes to the existing monitoring network.

4.7.2 Monitoring Protocols

An integral part of each GSP is to collect, process, and store data necessary to assess the physical condition of the groundwater Basin. The data collection and reporting standards shall also be consistent with the DMS used to support the implementation of the GSP for the IWV. The goal of the IWV monitoring protocol and reporting standards is to establish a set of monitoring protocols and reporting standards with respect to groundwater levels, groundwater production, groundwater quality, precipitation, streamflow, and evapotranspiration within the IWV watershed. The standards allow IWVGA to assess the sustainable yield for IWVGB to effectively manage groundwater use and production and track progress towards sustainability. These standards were developed and maintained in accordance with the BMPs established by DWR. The standards will be re-evaluated by the IWVGA at least every five years to provide for continued efficacy and relevance.

A copy of the full Technical Memorandum entitled "Monitoring Protocols and Reporting Standards", dated October 26, 2018 is included in Appendix 4-C.

4.8 REFERENCES

California Code of Regulations; Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans. GSP Emergency Regulations.

California Regional Water Quality Control Board Lahontan Region, 2016. *Water Quality Control Plan for the Lahontan Region*. January 2016.

California Regional Water Quality Control Board Lahontan Region, 2016. *Proposed Basin Plan Amendment to Remove the Municipal and Domestic Supply (MUN) Beneficial Use Designation from Certain Ground Water Beneath Naval Air Weapons Station China Lake, Kern, Inyo, and San Bernardino Counties.* Resolution R6V-2015-0005. February 2015.

California Water Code; SB1168, AB1739, and SB1319. Sustainable Groundwater Management Act.

Dutcher L.C. and W.R. Moyle, 1973. *Geologic and Hydrologic Features of Indian Wells Valley, California.* USGS Water Supply Paper 2007. Prepared in cooperation with the California Department of Water Resources.

California Department of Water Resources (DWR), 2016. *Water Budget Best Management Practice.* Sustainable Groundwater Management Program BMP, 53pp. December, 2016.

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SECTION 5: PROJECTS AND MANAGEMENT ACTIONS

5.1 INTRODUCTION

As established in Section 3, the IWVGB is in critical overdraft. Projects and management actions are required to be implemented in order to respond to changing conditions in the groundwater Basin such that undesirable results are avoided and/or mitigated. Groundwater pumping estimates for 2016 indicate that groundwater production in the IWVGB is approximately four times the estimated Current Sustainable Yield of the Basin. This level of overdraft, and the current depletion rates of groundwater reserves (see Sections 3.3.4 and 4.3), has already resulted in undesirable results in the Basin and it will continue to do so until the IWVGB is brought within the Future Sustainable Yield of the Basin. As stated in the GSP Emergency Regulations (§354.44), the GSP must include "a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin" Implementation of the management actions and projects presented below is intended to bring operation of the IWVGB within its Future Sustainable Yield.

While it would be beneficial to immediately reduce all pumping to the Current Sustainable Yield of 7,650 AFY, it is not feasible for the community to make such immediate and drastic reductions without extreme lifestyle changes, alteration of the community character, loss of livelihoods, great financial costs, and other significant negative impacts. Water demands in 2015 for municipal and domestic use alone were greater than the Current Sustainable yield of the IWVGB. A high percentage of the municipal and domestic water demands support the domestic needs of the staff needed to support the mission of NAWS China Lake.

It is anticipated that with the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production will reduce to approximately 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation, anticipated to be 2021. This program will greatly reduce the amount of annual

overdraft that will continue until supplemental water supplies, Project No. 1 – Imported Water Supply Project, and Project No. 2 – Optimization of Recycled Water Use are implemented.

Demand management measures, Project No. 3 – Conservation, will be implemented to reduce demands on groundwater.

There will potentially be continuing shallow domestic well impacts, either lost well production capacity due to lower groundwater levels or increasing TDS concentrations, until the IWVGB is operated within the Future Sustainable Yield. Project No. 4 – Shallow Well Mitigation Program, will be implemented to mitigate impacted wells.

The implementation of Augmentation Fees and the Fallowing Program, discussed in Management Action No. 1 below, will lead to a reduction of agricultural operations in the IWVGB. Project No. 5 – Dust Mitigation Plan, discussed below, will be implemented, if needed, to mitigate secondary impacts caused by windblown dust due to fallowed agricultural land.

Evaluation of groundwater management and project modeling scenarios showed that some current pumping needs to be redistributed in the Basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells. Project No. 6 – Optimization of Basin Pumping will be implemented to mitigate these localized conditions.

According to the GSP Emergency Regulations (§354.44), the GSP shall include a description of the projects and management actions that include the following:

1. **A list of projects and management actions** proposed in the GSP with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The GSP shall include the following:
    a. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of

projects or management actions, and the process by which an agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

b. The process by which an agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

2. If overdraft conditions are identified through the analysis required by Section 354.18, the GSP shall describe projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
3. A summary of the **permitting and regulatory process** required for each project and management action.
4. The status of each project and management action, including a **time-table** for expected initiation and completion, and the accrual of expected benefits.
5. An **explanation of the benefits** that are expected to be realized from the project or management action, and how those benefits will be evaluated.
6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of an agency, an explanation of the source and reliability of that water shall be included.
7. A description of the **legal authority** required for each project and management action, and the basis for that authority within an agency.
8. A description of the **estimated cost** for each project and management action and a description of how the Agency plans to meet those costs.
9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or deletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The proposed projects and management actions are supported by the best available information and best available science and have considered the level of uncertainty associated with the IWVGB Basin setting during development.

A summary of the IWVGA proposed planned projects and management actions and the potential projects and management actions are discussed in the subsections below. The GSP is a planning document, and consequently, the level of detail in the proposed planned projects and management actions reflect the necessary level of specificity. After projects and management actions are fully developed, specific design and/or implementation plans will be prepared, as applicable and necessary. These plans will be made available to the public prior to any Board action for implementation. Given the magnitude of overdraft and the current Basin conditions, all planned projects and management actions should be implemented

to eliminate undesirable results and shall be implemented with the earliest feasible timetable. If one, or more, of the planned projects and management actions cannot be implemented, the IWVGA will consider additional, and perhaps more severe, actions to reach sustainability. If necessary, in the future, total annual pumping for the Basin may need be reduced to the Current Sustainable Yield of about 7,650 AFY, which would have significant impacts to the community and NAWS China Lake.

5.2 PLANNED MANAGEMENT ACTIONS

5.2.1 Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program

5.2.1.1 *Management Action Description*

The primary initial management action is the establishment of annual groundwater pumping allocations ("Annual Pumping Allocations") of the safe yield[44]. These Annual Pumping Allocations will be used for the purpose of assigning pumping fees ("Augmentation Fees"). The Augmentation Fees will in turn provide the funding for the development of supplemental water supplies and other projects and management actions to achieve sustainability. Accordingly, these Annual Pumping Allocations are not a determination of water rights in that they do not prohibit the pumping of groundwater. Rather, all groundwater pumpers continue to possess the right to produce groundwater provided they pay the Augmentation Fee. While this action will not directly limit groundwater extraction by any individual entity, it is anticipated that the costs associated with the Augmentation Fee will result in voluntary pumping reductions and the implementation of additional conservation measures to lower demands thereby assisting in achieving sustainability.

[44] The safe yield is equal to the long-term average natural recharge of the basin, currently estimated to be 7,650 AFY. The current estimate of the sustainable yield, defined by SGMA as the maximum quantity of water that can withdrawn annually without causing undesirable results, is also currently estimated to be 7,650 AFY. The sustainable yield may change as projects and management actions are implemented that artificially recharge the basin and increase the volume of water that can be withdrawn annually without causing undesirable results.

In accordance with California law, water produced within the safe yield of the Basin, generally considered to be equal to the long-term average natural recharge of the Basin, may be charged a General Administration fee but it shall be free of any Augmentation Fees. Water produced in excess of the safe yield shall be subject to an Augmentation Fee as set forth below. The Federal entities (NAWS China Lake and BLM) are exempt from these fees through the legal principles of sovereign immunity.

The Annual Pumping Allocation program will assign each qualified groundwater pumper, as described in the following, an Annual Pumping Allocation of the safe yield, if any, after consideration of:

1) Federal Reserve Water Rights (FRWR);
2) California water rights;
3) Beneficial use priorities under California Law;
4) Historical groundwater production; and,
5) Municipal requirements for health and safety.

SGMA recognizes FRWR as distinct from water rights that are based in State law and directs that FRWR be respected in full, and in case of any conflict between Federal and State law, Federal law shall prevail (Water Code Section 10720.3(d)). SGMA also directs that IWVGA consider the interests of all beneficial uses and users of groundwater, listing the Federal government, including, but not limited to, the military and managers of Federal lands among those interests (Water Code Section 10723.2).

While NAWS China Lake may voluntarily agree to an allocation under the GSP less than its full FRWR, the IWVGA has no legal authority to enforce such an allocation and NAWS China Lake has not provided a final accounting of its FRWR. In recognition of these facts and the acknowledgment of the limits on the IWVGA to regulate the Federal government, any such FRWR allocation shall be directly assigned to the Federal agency and shall not be subject to the requirements of any allocation ordinance, including but not limited to allocation carryovers, borrowing, transfers, reductions and/or variances and fees.

In accordance with SGMA and California Water law, a five-year base period defined as January 1, 2010 through December 31, 2014 (“Base Period”) will be used to evaluate groundwater production for all

groundwater pumpers, with the exception of NAWS China Lake and de minimis users. An Annual Pumping Allocation, based on California water rights law and historical pumping during the Base Period, will be assigned to groundwater pumpers. The Annual Pumping Allocations will be regularly reevaluated to ensure sustainability.

The IWVGA recognizes that the safe yield is significantly lower than current pumping and some groundwater pumpers with inferior rights will not be granted any Annual Pumping Allocations. As this groundwater may have been put to significant and important economic use and to ease the transition from current pumping levels to sustainable pumping levels, the IWVGA has determined that some additional loss of storage is acceptable and necessary to ease the transition from current pumping to the Future Sustainable Yield. See Section 4 for the sustainable management criteria for the reduction of groundwater in storage.

All groundwater pumpers who were producing groundwater during the Base Period and who are not given an Annual Pumping Allocation will be eligible to receive a Transient Pool Allocation. The Transient Pool, which consists of a limited non-transferable one-time allocation of water to be used prior to 2040, will be created to facilitate coordinated production reductions and to allow groundwater users to plan and coordinate their individual groundwater pumping termination. The Transient Pool Allocation water is a single use, non-transferable, one-time allocation of water, and once all water in the Transient Pool has been consumed (or sold through the Fallowing Program as set forth below), the Transient Pool will cease. Each party's share of the Transient Pool will be determined pursuant to the same principals of water law used to establish the Annual Pumping Allocations. The total allocations from Transient Pool are anticipated to be limited to no more than 51,000 acre-feet. Each party will be assessed the Administration Fee for water pumped from the Transient Pool.

Groundwater production in excess of Annual Pumping Allocations and Transient Pool Allocations will be subject to an Augmentation Fee in an amount that is determined to be sufficient for the acquisition of supplemental water supplies pursuant to this plan.

All groundwater pumpers who are assigned a Transient Pool Allocation may be enrolled, at their sole election, in a Fallowing Program. Pursuant to the Fallowing Program, the groundwater pumper may elect to sell their Transient Pool Allocation back to the IWVGA. This payment shall be made in three equal payments to be paid annually. The IWVGA, in conjunction with groundwater pumpers electing to be participate in the Fallowing Program, may also explore alternative land uses for the fallowed land, which may include use as enhanced habitat or grazing lands.

Given the amount of overdraft and the cost and scarcity of supplemental water supplies (see Section 5.3.2), the IWVGA will allow some reasonable overdraft of the IWVGB due to groundwater production to continue until supplemental water supplies are acquired. It is anticipated that with the implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, IWVGB groundwater production is anticipated to reduce to around 12,000 AFY plus any agricultural pumping as part of the Transient Pool program in the first year of implementation. Some overdraft will continue until the augmentation program is able to increase supplies with estimated importation supplies becoming operational by 2035, but not later than 2040 to reach sustainability. Under baseline conditions, which assumes no GSP projects and management actions are implemented, annual average pumping from 2020 to 2070 is anticipated to be approximately 37,000 AFY. The Annual Pumping Allocation Plan is anticipated to significantly reduce pumping to an annual average of approximately 14,000 AFY from 2020 to 2070. The difference between pumping and the long-term natural recharge to the IWVGB will be augmented with supplemental water to bring operation of the Basin within the Future Sustainable Yield.

5.2.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in significantly less groundwater production and will help alleviate and mitigate overdraft conditions. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;

- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

The corresponding cumulative loss of groundwater in storage under Baseline conditions is estimated to be approximately 1.6 million acre-feet, while the cumulative loss of groundwater storage with the Annual Pumping Allocation Plan, and the proposed projects and management actions, is estimated to be approximately 215,000 acre-feet. These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWVGB, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program will assist the IWVGA to achieve the sustainability goal by preserving the character of the community, preserving the quality of life for the residents in the IWVGB, and sustaining the mission at NAWS China Lake.

The metric for measuring management actions benefits, relative to the measurable objectives and minimum thresholds established in Section 4, will be to monitor groundwater levels, groundwater quality, and change in groundwater in storage in the IWVGB. In addition, groundwater production by groundwater users will be reported to the IWVGA to monitor anticipated reductions in production.

5.2.1.3 *Justification*

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program are necessary to reach sustainability due to the current state of overdraft, the current unavailability of a supplemental water supply, and the costs of building the infrastructure and obtaining the supplemental supplies once they become available. The estimated Current Sustainable Yield of 7,650 AFY does not support current groundwater production. As discussed previously, it is infeasible for the community to make such immediate reductions to the Current Sustainable Yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. The distribution and volume of groundwater production in the IWVGB is such that proportional reductions to reach the Current Sustainable Yield are infeasible because the majority of individual groundwater users would not have a large enough allocation to maintain an acceptable quality of life and

the drastic community changes would impact the support of NAWS China Lake. Economically viable agricultural operations cannot be sustained with a greatly reduced water supply (pumping allocation) as would be required with a proportional reduction to the Current Sustainable Yield. Similarly, domestic and municipal users would not be able to meet basic health and safety requirements under a proportional reduction allocation. Accordingly, the IWVGA is currently working with groundwater users in the IWV to determine an equitable process for assigning allocations. In order to implement the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, the IWVGA must consider and evaluate the following: 1) FRWR of NAWS China Lake, 2) California water rights, 3) beneficial use priorities, 4) historical groundwater production, and 5) municipal requirements for health and safety.

Under U.S. Supreme Court case law defining the FRWR, Federal agencies have an implied right to water to support the primary mission for which Congress and the Federal government have designated that land, including a provision of water for growth to support that mission[45]. It is well established in the Supremacy Clause of the U.S Constitution, Article VI, Clause 2, that the Federal Government is not subject to State regulation, unless Congress clearly and unambiguously waives this sovereign immunity. There is no such waiver for State regulation of groundwater, except in the case of a comprehensive State court adjudication of all rights to water, as expressed in the McCarran Amendment (43 U.S.C § 666). SGMA does not meet the requirements set forth in the McCarran Amendment and the IWVGA is therefore unable to regulate NAWS China Lake.

Due to the NAWS China Lake FRWR being currently unquantified and not established, the IWVGA is faced with planning and management hurdles related to allocations. In June 2019, the U.S. Navy provided the IWVGA documentation regarding historical water use, workforce trends, and current water requirements. This letter, provided in Appendix 5-A, estimates the NAWS China Lake water requirement to be 6,530 AFY. While this U.S. Navy estimate is not NAWS China Lake's FRWR, it demonstrates that the majority, if not all, of the estimated safe yield of 7,650 could be held as a Federal right and must be respected by the IWVGA and the GSP. For planning purposes, the U.S. Navy requested the IWVGA use 2,041 AFY as a

[45] The FRWR was first recognized by the U.S. Supreme Court in the context of tribal interests (See Winters v. United States, 207 U.S. 564 (1908)) and subsequently expanded to Federal agencies (See Cappaert v. United States, 426 U.S. 128 (1976)), Federal Power Commission v. Oregon, 349 U.S. 435 (1955)).

reasonable estimate of current and future annual groundwater production on the installation. The Navy's response also expressly provides that, because of the movement of Navy staff and dependents off-Station, "the water requirements of the Navy cannot be determined solely by the Navy's recent direct production amounts". The response further provides that "[s]ince the Navy mission at China Lake requires its workforce, the full Navy water requirements are the combination of the on-Station requirements and those of the Navy workforce and their dependents off-Station." The IWVGA does not have legal authority to restrict, assess, or regulate production for NAWS China Lake; therefore, NAWS China Lake groundwater production is considered of highest beneficial use.

According to CWC 10723.2, the IWVGA must "consider the interest of all beneficial uses and users of groundwater…" The groundwater user categories in the IWV currently are:

- Municipal
- Domestic (De Minimis private well owners and mutuals/co-ops)
- City/County
- NAWS China Lake
- Industrial
- Large Agriculture
- Small Agriculture

CWC Section 106 expressly declares that it is "the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." Accordingly, aside from NAWS China Lake production, which cannot be regulated, and use by SGMA defined de minimis pumpers, which also cannot be reduced, the highest beneficial use of water in the IWVGB is for domestic purposes including human consumption, cooking, and sanitary uses. In the IWVGB, groundwater pumpers in the domestic category which would provide the highest beneficial use include production by the IWVWD, Inyokern CSD, Searles Domestic Water Company, individual domestic well owners (de minimis pumpers), and mutual water companies serving domestic users. These groundwater pumpers can and should implement additional conservation measures (see Section 5.2.4); however, the allocations for these pumpers would be continual and annual. In addition, the City and Kern County overlying groundwater production rights are superior to all other overlying rights because public entity rights may not be prescribed against.

The beneficial uses of other groundwater users, including agricultural and industrial users, will subsequently be evaluated based on water rights priorities. The IWVGA will allow all IWVGB groundwater pumpers the opportunity to provide documentation on historical groundwater production and other pertinent information. Current groundwater production that has existed and has been continuous prior to the establishment of NAWS China Lake will be given a priority over more recent pumping that has occurred since the IWVGB has been documented to be in overdraft conditions, at least since the 1960s. Accordingly, all groundwater users and uses will be equitably considered and prioritized, as required by SGMA.

5.2.1.4 *Costs*

The IWVGA will incur costs to develop the annual Pumping Allocations and Transient Pool Allocations and the Augmentation fees. There will be administrative costs and engineering costs for conducting hearings, verifying pumping documentation, and preparing the final report to the IWVGA Board with the recommendations, among other implementation tasks, estimating to be $340,000.

The IWVGA will incur administrative costs to implement and manage the Fallowing Program. Additionally, the IWVGA may incur costs to purchase Transient Pool Allocations from groundwater pumpers electing to enroll in the Fallow Program estimated to be $9 million.

Administrative costs to run all program components are estimated to be $40,000 annually.

The Annual Pumping Allocation Plan, Transient Pool and Fallowing Program costs will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof. See Section 6.3 for details of funding options.

5.2.1.5 *Permitting and Regulatory Process*

Implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program may be subject to environmental regulations and could require the preparation of environmental studies. The

IWVGA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

5.2.1.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to present historical pumping documentation provided to the IWVGA. The IWVGA will provide sufficient public notice of a public hearing to adopt the Annual Pumping Allocation and the Transient Pool Allocation. See Section 5.2.1.7 below for additional details.

5.2.1.7 *Implementation Process and Timetable*

The IWVGA shall determine each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation following the adoption of this plan. All groundwater pumpers shall be instructed to submit records of their historical pumping and any other relevant material to the IWVGA prior to March 1, 2020. On or before April 15, 2020, the IWVGA Water Resources Manager shall review these materials and provide a draft recommendation of each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation to each groundwater pumper who submitted materials and to the IWVGA TAC members. By April 30th, 2020, all groundwater pumpers shall submit comments on the draft recommendation to the Water Resources Manager. The Water Resources Manager shall consider these comments and present a final report and recommendation to the IWVGA Board for consideration at its June 2020 meeting. Those receiving a Transient Pool Allocation may elect to join the Fallowing Program by no later than August 1, 2020.

5.2.1.8 *Legal Authority*

SGMA broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, CWC Section 10726.2 provides the IWVGA with the authority to develop and implement an

Annual Pumping Allocation Plan, Transient Pool and Fallowing Program to meet the needs of the Basin and CWC Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement the GSP management action set forth above.

Although not subject to formal regulation under SGMA, NAWS China Lake is committed to being a good steward of water resources and to exploring partnerships that help to achieve groundwater sustainability, including projects and management actions that benefit both the Navy and the community.

Draft recommendations of each groundwater pumper's Annual Pumping Allocation will be prepared in accordance with existing California water rights laws, with consideration to beneficial uses of water in the IWVGB.

5.3 PLANNED PROJECTS

5.3.1 Project No. 1: Develop Imported Water Supply

5.3.1.1 *Project Description*

The IWVGA does not currently have access to any water supply from outside of the IWVGB. Procuring an imported water supply will require purchasing water supplies (with all required contractual and/or appurtenant water rights) as well as obtaining access to existing water conveyance facilities and constructing additional infrastructure to bring imported water to the IWVGB. The majority of the IWVGB is within the boundaries of the KCWA, a SWP Contractor. KCWA does not have unused SWP water that can be made available to the IWVGB. A small portion of the southern portion of the IWVGB is within the boundaries of Antelope Valley – East Kern Water Agency (AVEK). The nearest existing imported water conveyance facilities are the Los Angeles Department of Water and Power's (LADWP) Los Angeles Aqueduct (LA Aqueduct) and AVEK's water transmission pipeline that terminates near California City (California City Pipeline). The LA Aqueduct conveys surface water runoff from the Eastern Sierra Nevada Mountains in Inyo County as well as groundwater from the Mono Basin (collectively referred to in this section as Owens Valley water). The LA Aqueduct extends through the western portion of the IWVGB,

including through the Freeman-Dixie Wash and El Paso areas. The California City pipeline is located at California City, approximately 15 miles south of the IWVGB boundaries and 50 miles south of the City of Ridgecrest.

The IWVGA has identified the following two imported water project options as conceptually feasible for potential implementation. Other imported water project options may be evaluated after the GSP is adopted and could subsequently be developed into the final imported water project for implementation. Each of the options is briefly described below, and a technical memorandum that more fully describes the projects is included in Appendix 5-B. It is anticipated that either one of the two imported water project options will be fully implemented by 2035.

Option 1: Direct Use Project with AVEK

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be wheeled through existing AVEK facilities, specifically through existing AVEK surface water treatment facilities and the California City Pipeline. AVEK staff has indicated that there is currently unused capacity in the California City pipeline. The California City Pipeline would require an extension of approximately 50 miles along Highway 14 into the populated centers of the IWVGB. Due to the elevation profiles of the proposed pipeline alignment, at least two (2) pump stations will be required to lift the IWVGA's imported water supplies over the El Paso Mountains and through the El Paso area. A potable water storage tank would also be required. The treated water would be used directly to meet water demands that exceed the long-term natural recharge to the IWVGB. A map of the facilities required for Imported Water Option 1 is shown on Figure 5-1, including approximate locations of pump stations.

Option 2: Groundwater Recharge Project with LADWP

The IWVGA would purchase SWP Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with KCWA. The IWVGA would arrange for the purchased water supply to be delivered to MWD and subsequently provided to LADWP for use in LADWP's service area. In

exchange, LADWP would provide Owens Valley water from the LA Aqueduct to the IWVGB for use in a groundwater recharge project. A new turnout from the LA Aqueduct would be required, along with a raw water pipeline conveying Owens Valley water to a potential new spreading grounds located northwest of the Inyokern Airport. The Owens Valley water would be recharged into the IWVGB at the spreading grounds and serve as a supplemental source of recharge to replace any groundwater pumping that exceeds the long-term natural recharge to the IWVGB. A map of the facilities required for the Option 2 project is shown on Figure 5-2, including a preliminary location of the surface spreading grounds.

5.3.1.2 *Project Benefits and Mitigation of Overdraft*

The proposed Option 1 project will directly meet groundwater demands above the current sustainable yield of the IWVGB. The proposed Option 2 project will replace any groundwater produced above the natural recharge to the IWVGB and allow the IWVGB to be operated within the Future Sustainable Yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. By reducing groundwater production in the IWWGB, development of imported water supplies will assist the IWVGA to achieve the sustainability goal by preserving the character of the community, preserving the quality of life for the residents in the IWVGB, and sustaining the mission at NAWS China Lake.

The metric for measuring management actions benefits, relative to the measurable objectives and minimum thresholds established in Section 4, will be to monitor groundwater levels, groundwater quality,

and change in groundwater in storage in the IWVGB. in addition, imported water use would be directly measured by metering deliveries.

5.3.1.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Economically viable agricultural operations and industrial operations cannot be sustained without an augmented water supply. Similarly, current domestic and municipal users would not be able to meet demands without an augmented water supply. Accordingly, the IWVGA is currently working with potential water supply sellers and transfer partners to secure opportunities to purchase and convey imported water supplies to the IWVGB.

See Section 5.2.1.3 for additional justification.

5.3.1.4 *Costs*

A summary of the conceptual capital costs, water rights acquisition costs, annual operations and maintenance (O&M costs), and annual service costs for the necessary infrastructure for Imported Water Project Option 1 is shown in Table 5-1. Annual O&M for Imported Water Project Option 1 would primarily consist of maintenance on the two pump stations and power to lift water across the El Paso Mountains into the IWVGB. Annual service costs for Imported Water Project Option 1 would consist of transportation, wheeling, and treatment fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5-1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-1. Conceptual Costs for Direct Use Project with AVEK (Imported Water Project Option 1).

Item	Total
Capital Costs[1]	$177,975,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$2,280,000
Annual Service Costs[4]	$5,860,000

Notes:

1) Includes two 8,800 gpm pump stations; a 28" steel pipeline extension approximately 50 miles in length; and a one million gallon steel reservoir. Includes costs for appurtenances, engineering design and management, and contingency (see Appendix 5-B).

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes pump station maintenance and pump station power supply.

4) Includes estimated State Water Project transportation charges, wheeling charges, and treatment charges.

A summary of the conceptual costs, water rights acquisition costs, annual O&M costs, and annual service costs associated with Imported Water Project Option 2 is shown in Table 5-2. Annual O&M for Imported Water Project Option 2 would primarily consist of maintenance on the IWVGA's new surface spreading grounds. Annual service costs for Imported Water Project Option 2 would consist of transportation and wheeling fees applied volumetrically to the IWVGA's delivered imported water supplies. The costs presented in Table 5.1 are based on an assumed average annual delivery of 5,000 acre-feet of imported water per year.

Table 5-2. Conceptual Costs for Groundwater Recharge Project with LADWP (Imported Water Project Option 2).

Item	Total
Capital Costs[1]	$55,046,000
Water Rights Acquisition Costs[2]	$48,390,000
Annual Operations & Maintenance Costs[3]	$180,000
Annual Service Costs[4]	$4,260,000

Notes:

1) Includes a new turnout from the Los Angeles aqueduct; a new 28" steel pipeline approximately 10 miles in length; and an approximately 800-acre surface spreading grounds. Includes costs for appurtenances, engineering design and management, and contingency (see Appendix 5-B).

2) Includes purchase of 8,065 acre-feet of State Water Project Table A Entitlement via a permanent transfer at $6,000 per acre-foot.

3) Includes spreading grounds maintenance.

4) Includes estimated State Water Project transportation charges and wheeling charges.

Costs for this project may be funded through fees, grants, State and Federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.1.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. Imported Water Project Options 1 and 2 will require encroachment permits from Kern County Public Works to secure right-of-way for the IWVGA's new imported water pipelines. The Option 1 project will require an encroachment permit from the California Department of Transportation to secure right-of-way for the new California City pipeline extension along Highway 14.

An application may need to be submitted to the Bureau of Land Management to secure a Land Use Permit for construction of the new imported water pipelines (Options 1 and 2) and surface spreading grounds (Option 2 only) on lands within the jurisdiction of the Bureau of Land Management.

Implementation of either Imported Water Option is subject to environmental regulations and would require the preparation of environmental studies. The IWVGA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

If treated water is delivered to the IWVWD for direct use through Imported Water Project Option 1, an amendment to the IWVWD's current Domestic Water Supply Permit from the State Water Resources Control Board – Division of Drinking Water will be required.

Transportation and wheeling of imported water supplies will need either approvals from or agreements with the Department of Water Resources; KCWA; AVEK (for Imported Water Project Option 1 only); and MWD and LADWP (for Imported Water Project Option 2 only).

Per the IWVGA's Joint Powers Authority Agreement, this GSP shall not authorize any water supply augmentation to the IWVGB with groundwater from a basin within the jurisdiction of a general member of the IWVGA without the approval of the Primary Director representing that general member. Any proposal to transfer groundwater from Inyo County to the IWVGB (i.e. under Imported Water Project Option 2) would require the approval of the Inyo County Board of Supervisors, who will consider the existing environmental, agricultural, business, and civic interests in Inyo County in their decision to approve such a proposal. Inyo County Code Section 18.77 requires that any transferor of water pursuant to California Water Code Section 1810 obtain a conditional use permit (CUP) from the Inyo County Planning Commission (ICPC). The CUP would only be approved should the ICPC—as well as the Inyo County Water Commission and the Inyo County Water Department—find that the transfer of water does not unreasonably affect the environmental interests of Inyo County.

5.3.1.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to participate in and provide feedback on the procurement of imported water supplies through the project's environmental review processes.

5.3.1.7 *Implementation Process and Timetable*

The IWVGA has retained the services of Capitol Core Group, a water marketing and lobbying firm, to identify potential water supplies available for purchase as well as potential funding opportunities for the Imported Water Project Options. Capitol Core Group has provided the IWVGA with written deliverables outlining the potential future water supply opportunities available for the IWVGA to purchase and the potential strategic funding plans to pay for the infrastructure associated with the Imported Water Project Options. These written deliverables are confidential and are neither provided nor discussed in this GSP.

The IWVGA will continue to develop an imported water project as a post-GSP action. The IWVGA will meet with AVEK to discuss use of the existing California City pipeline capacity and the transfer agreements with DWR, KCWA, and AVEK. The IWVGA will also meet with LADWP to discuss Inyo County public approval, the nature of the exchanges with MWD and LADWP, and the transfer agreements with DWR, KCWA, LADWP, and MWD. The IWVGA will also conduct additional engineering studies of both Imported Water Project Options, including a groundwater recharge feasibility study and pilot recharge project for Imported Water Option 2 to finalize the size and location of the new surface spreading grounds. It is anticipated that final selection of the most feasible Imported Water Project Option will occur in January 2023 after preparation of an engineering report and negotiation with the relevant transfer agencies. It is anticipated that the permitting and regulatory process will commence in January 2023 and will be completed in January 2026. Design, permitting, and construction of the infrastructure for the final Imported Water Project Option will begin in January 2026 and will be completed in January 2035. Throughout this process, the implementation schedule and feasibility of the options will be examined on a regular schedule, and management actions and projects will be adjusted if needed. As a minimum, this will occur in a timely fashion so that it can be reported to the DWR at the scheduled 5-year report periods.

5.3.1.8 *Legal Authority*

SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code Section 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface or groundwater into the agency, and conserve and store within or outside the agency that water for any purpose necessary or proper to carry out the provisions of this part, including, but not limited to, the spreading, storing, retaining, or percolating into the soil of the waters for subsequent use or in a manner consistent with the provisions of Section 10727.2." Accordingly, SGMA grants the IWVGA the legal authority to implement the development of imported water supplies as a GSP management action. The legal authority granted to the IWVGA under SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of the imported water project(s). As such, the IWVGA will coordinate and cooperate with the appropriate stakeholders and governing agencies (specifically the IWVWD, SVM, and other water purveyors in the IWVGB) in implementing the imported water project(s).

5.3.1.9 *Source and Reliability*

Imported Water Project Options 1 and 2 will require the IWVGA to secure temporary transfer(s) or a single permanent transfer of external water supplies from a water district or water rights holder. The water rights acquisition costs shown in Tables 5-1 and 5-2 assume that the IWVGA will be able to secure a permanent transfer of SWP Table A Entitlement. The annual availability of SWP water supplies is highly variable due to hydrologic conditions. From 2007-2016, total historical annual deliveries of Table A allocation ranged from 475 TAF in 2014 (approximately 11% of the total Table A entitlement) to 2,901 TAF in 2011 (approximately 70% of the total Table A entitlement). The ten-year average of Table A deliveries from 2007-2016 was 1,778 TAF, but the running long-term average of Table A deliveries is currently 2,571 TAF, or approximately 62% of the total Table A entitlement (DWR 2018).

The hydrologic variability of SWP and other external water supplies may be addressed through water banking. The IWVGA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the IWVGB. Participation in a groundwater banking program would improve the reliability of the IWVGA's purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries. Participation in a groundwater banking program may also allow the IWVGA to purchase additional water supplies during wet periods. The potential groundwater banks in relative proximity to the IWVGB include:

- Willow Springs Water Bank
- Semitropic Water Storage District
- Rosedale Rio Bravo Water Storage District
- AVEK Water Banks
    - Westside Water Bank, Eastside Water Bank, and High Desert Water Bank
- Kern Water Bank

The IWVGA will continue to evaluate the availability and reliability of external water supplies, including SWP water supplies, in its effort to define the most feasible Imported Water Project Option. The IWVGA will also continue to evaluate potential groundwater banking opportunities to enhance the reliability of its purchased water supplies.

The IWVGA's adaptive management approach to IWVGB management includes a periodic evaluation of the current feasibility of procuring imported water supplies. At a minimum, this periodic evaluation will be conducted at the scheduled 5-year report periods. Should it be determined with certainty that imported water supplies will be unavailable (or unavailable at a reasonable cost) within the planning and implementation horizon, the IWVGA will consider modifications to the GSP including potentially revisiting Management Action No. 1 and modifying the Annual Pumping Allocations such that the IWVGB may reach sustainability without imported water supplies.

5.3.2 Project No. 2: Optimize Use of Recycled Water

5.3.2.1 *Project Description*

The IWVGA, working with the City of Ridgecrest (City), will optimize the use of recycled water supplies in the IWVGB. The City currently operates an existing 3.6 million gallon per day (MGD) WWTF[46] located on NAWS China Lake, approximately 3.5 miles northeast of the City center. Annual average day flows at the WWTF were approximately 2.44 MGD in 2017, or approximately 2,739 AFY. The City WWTF produces recycled water that is currently applied at a City site for irrigation of alfalfa fields with a recycled water demand of approximately 220 AFY, and at NAWS China Lake for irrigation of a golf course with a recycled water demand of approximately 500 AFY. The remaining treated wastewater generated at the City WWTF—approximately 2,010 AFY—is discharged to evaporation/percolation ponds at the City WWTF site. A portion of the treated wastewater discharged to the evaporation/percolation ponds serves as seepage flow to the Mojave Tui Chub habitat, located north of the City WWTF. It has been estimated that the annual water demands to maintain the habitat is approximately 805 AFY (ERS 1991). The existing uses of recycled water in the IWVGB are discussed further in Section 2.7.5 of this GSP.

The City of Ridgecrest's existing WWTF is currently the only facility which generates a recycled water supply for direct beneficial or controlled use within the IWVGB. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The new recycled water facilities that the City plans to construct would provide up to 1.8 MGD (2,016 AFY) of recycled water for City use in landscape irrigation and/or groundwater recharge (Provost & Pritchard, 2015).

[46] A Memorandum of Agreement dated April 1, 1993, between the Navy and the City states that the City owns and operates the WWTF, though there is a general lack of consensus among the IWVGB stakeholders regarding the ownership and operations of the WWTF. The term "City WWTF" is used in this GSP for the sole purpose of distinguishing between the two existing WWTFs in the IWVGB.

The IWVGA will coordinate with the City to further optimize the use of recycled water in the IWVGB beyond the current scope of the City's project to upgrade, expand, and potentially relocate the existing City WWTF. The optimization of recycled water in the IWVGB will include conversion of additional landscaping from potable groundwater use to recycled water use, as well as a new application of recycled water for groundwater recharge. The IWVGA has identified the following three (3) recycled water subprojects as conceptually feasible for potential implementation in accordance with this GSP.

- Recycled Water Subproject 1 – Landscape Irrigation in the City and NAWS China Lake
- Recycled Water Subproject 1a – Landscape Irrigation at Cerro Coso Community College
- Recycled Water Subproject 2 - Groundwater Recharge

Each of the currently proposed recycled water subprojects is briefly described below. A technical memorandum that more fully describes the recycled water subprojects is included in Appendix 5-C. Further evaluation of the other potential opportunities for recycled water subprojects in the IWVGB (including industrial use of recycled water) will be conducted as a post-GSP action. Accordingly, other recycled water subprojects may be developed after the GSP is adopted and could be subsequently developed into the final recycled water project for implementation.

Recycled Water Subproject 1: Landscape Irrigation in the City and NAWS China Lake

The City currently operates five (5) groundwater wells that provide irrigation for approximately 53 acres of landscaping located at City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Water District serves a large portion of the City, and it is assumed that the Water District provides groundwater for landscape irrigation within City boundaries with the exception of City Hall, Pearson Park, Jackson Park, and the Kerr-McGee Sports Complex. The Navy operates wells that provide groundwater for landscape irrigation within the China Lake NAWS.

Under Recycled Water Subproject 1, the IWVGA will replace the groundwater currently used for landscape irrigation within the City with recycled water. While the IWVGA cannot require NAWS China Lake to use recycled water for irrigation, when practical and pending funds availability, NAWS China Lake will

implement additional water conservation measures that could include the use of recycled water for irrigation of landscaping beyond that of the golf course. Approximately 119 acres of existing landscaping have been identified within the City (95 acres) and NAWS China Lake (24 acres) for potential landscape irrigation with recycled water (see Appendix 5-C). The estimated annual recycled water demand for landscape irrigation within the City and NAWS China Lake for Recycled Water Subproject 1 is estimated to be 930 AFY. The new facilities for Recycled Water Subproject 1 include a new 5,100 gpm recycled water booster pump station; approximately 15 miles of new purple pipe distribution system; and site retrofits for existing landscape areas including connections to existing irrigation mains, recycled water meters, pressure-reducing valves, and backflow prevention devices. A map of facilities required for Recycled Water Subproject 1 is shown on Figure 5-3.

Recycled Water Subproject 1a: Landscape Irrigation at Cerro Coso Community College

Under Recycled Water Subproject 1a, the IWVGA will extend the recycled water distribution system from Recycled Water Subproject 1 to replace existing groundwater use for landscape irrigation at Cerro Coso Community College (Cerro Coso) with recycled water. Approximately 25 acres of landscaping at Cerro Coso have been identified for potential irrigation with recycled water, and the estimated annual recycled water demand at Cerro Coso is approximately 194 AFY. The facilities to be constructed under Recycled Water Subproject 1 as well as additional new facilities will be required to deliver 194 AFY of recycled water to Cerro Coso. The additional new facilities include an additional 900 gpm recycled water booster pump station; approximately 4 miles of additional purple distribution pipe; and appropriate site retrofits at Cerro Coso. A map of facilities required for Recycled Water Subproject 1a is shown on Figure 5-4.

Recycled Water Subproject 2: Groundwater Recharge

Under Recycled Water Subproject 2, the IWVGA will further treat the produced recycled water supplies at the City WWTF for groundwater recharge through subsurface applications (deep injection). A recycled water groundwater recharge project through surface applications (surface spreading grounds) would not be feasible due to the limiting geologic and hydrogeologic conditions in the vicinity of the City WWTF. The presence of thick lacustrine clay layers and the minimal groundwater flow between water-bearing zones

would prevent surface application of recycled water in the vicinity of the City WWTF from recharging the active production zones in the IWVGB. For effective recharge of the IWVGB, deep injection facilities will be required for Recycled Water Subproject 2.

The IWVGA estimates that approximately 352 AFY of recycled water will be available for groundwater recharge under Recycled Water Subproject 2. Additional quantities of recycled water for groundwater recharge may become available should any of the existing recycled water practices, such as maintaining seepage flow to the Tui Chub habitat (see Section 2.7.5.3), be discontinued.

The new facilities for Recycled Water Subproject 2 include new advanced wastewater treatment facilities; a new 300 gpm recycled water booster pump station; approximately 3 miles of new transmission pipeline; and deep injection wells. The City has developed efforts independent of this GSP to construct a new WWTF including tertiary treatment facilities with the capacity to treat 1.8 MGD (2,016 AFY) of wastewater. In accordance with the provisions for subsurface applications of recycled water as published in Title 22 Section 60320.201 of the California Code of Regulations, the recycled water supplies produced for deep injection must undergo advanced treatment through reverse osmosis and advanced oxidation. The IWVGA will construct the appropriate advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation) solely for the recycled water produced for groundwater recharge through deep injection. A map of facilities required for Recycled Water Subproject 2 is shown on Figure 5-5.

5.3.2.2 *Project Benefits and Mitigation of Overdraft*

The proposed Recycled Water Subprojects 1 and 1a will directly reduce groundwater produced above the current sustainable yield of the IWVGB for landscape irrigation. The proposed Recycled Water Subproject 2 will replace some groundwater produced above the natural recharge to the IWVGB and contribute to allowing the IWVGB to be operated within the future sustainable yield. Project benefits are anticipated to include the following:

- Reduction of loss of groundwater in storage when compared to current trends and baseline conditions;

- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or Improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

Reduction of loss of groundwater in storage and of the chronic lowering of groundwater levels will reduce impacts to shallow wells. In addition, the proposed project will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, optimization of recycled water supplies will assist the IWVGA to achieve the sustainability goal by preserving the character of the community, preserving the quality of life for the residents in the IWVGB, and sustaining the mission at NAWS China Lake.

The metric for measuring management actions benefits, relative to the measurable objectives and minimum thresholds established in Section 4, will be to monitor groundwater levels, groundwater quality, and change in groundwater in storage in the IWVGB. In addition, recycled water use will be directly measured by metering deliveries.

5.3.2.3 *Justification*

The estimated current sustainable yield of 7,650 AFY does not support current groundwater production. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions to in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Accordingly, the IWVGA plans to work with the City to generate new recycled water supplies for replacement of existing groundwater uses in landscape irrigation and for augmentation of the current natural recharge to the IWVGB. Existing groundwater uses for landscape irrigation should be replaced with non-potable water supplies (i.e. recycled water) to the greatest extent feasible so that groundwater may be produced primarily for domestic purposes.

See Section 5.2.1.3 for additional justification.

5.3.2.4 *Project Costs*

The City's independent efforts to construct a new WWTF include construction of tertiary treatment facilities to treat up to 1.8 MGD (2,016 AFY) of wastewater. The tertiary treatment capacity developed as part of the City's independent efforts is sufficient to treat 930 AFY of recycled water for Recycled Water Subproject 1 as well as the quantities of recycled water for Recycled Water Subprojects 1a and 2 discussed below. Therefore, the conceptual costs for the recycled water subprojects described below do not include estimates to construct new tertiary treatment facilities.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1 is shown in Table 5-3. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1 include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-3. Conceptual Costs for Landscape Irrigation with Recycled Water at City/NAWS China Lake (Recycled Water Subproject 1).

Item	Total
Capital Costs [1]	$42,757,200
Annual Operations & Maintenance Costs [2]	$395,500

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices. Includes costs for appurtenances, engineering design and management, and contingency (see Appendix 5-C).

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 1a is shown in Table 5-4. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 1a include annual maintenance and power supplies for the new recycled water pump station and annual maintenance of the purple pipe distribution system.

Table 5-4. Conceptual Costs for Landscape Irrigation with Recycled Water at Cerro Coso Community College (Recycled Water Subproject 1a).

Item	Total
Capital Costs[1]	$10,183,200
Annual Operations & Maintenance Costs[2]	$129,300

Notes:

1) Includes new purple pipe distribution pipelines; a 5,100 gpm recycled water pump station; connections to existing irrigation mains; recycled water meters; pressure-reducing valves; and backflow prevention devices. Includes costs for appurtenances, engineering design and management, and contingency (see Appendix 5-C).

2) Includes pump station maintenance, pump station power supply, and distribution system maintenance.

It should be noted that the required facilities for Recycled Water Subproject 1a are considered an extension of the facilities required for Recycled Water Subproject 1. The costs presented above and in Table 5-4 are considered incremental extensions of the costs listed in Table 5-3.

A summary of the conceptual capital costs and annual O&M costs for the necessary infrastructure for Recycled Water Subproject 2 is shown in Table 5-5. Annual O&M costs associated with the newly constructed facilities for Recycled Water Subproject 2 include annual maintenance and power supplies for the new recycled water pump station, annual maintenance of the purple pipe distribution system, and annual maintenance of the advanced wastewater treatment facilities.

Table 5-5. Conceptual Costs for Deep Injection with Recycled Water for Groundwater Recharge (Recycled Water Subproject 2).

Item	Total
Capital Costs[1]	$22,798,000
Annual Operations & Maintenance Costs[2]	$480,300

Notes:

1) Includes new purple pipe distribution pipelines; a 300 gpm recycled water pump station; advanced treatment facilities (microfiltration, reverse osmosis, and advanced oxidation with UV/H_2O_2); and a 500 gpm deep injection well. Includes costs for appurtenances, engineering design and management, and contingency (see Appendix 5-C).

2) Includes pump station maintenance, pump station power supply, distribution system maintenance, and advanced treatment facilities maintenance.

Costs for this project may be funded through fees, grants, State and Federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.2.5 *Permitting and Regulatory Process*

This project will require the IWVGA to obtain approved permits. The City will need to obtain a new NPDES permit from the LRWQCB for the new wastewater treatment facility. The IWVGA will need to prepare a Report of Waste Discharge for the new advanced wastewater treatment facilities and submit an application to the LRWQCB for a Waste Discharge Requirements/Water Reclamation Requirements (WDR/WRR) permit for a new groundwater replenishment project using recycled water. In accordance with the regulations for Groundwater Replenishment Reuse Projects (GRRPs) through subsurface application (per California Code of Regulations, Title 22, Division 4, Chapter 3, Article 5.2), the IWVGA will also need to submit and have approved by the State Water Resources Control Board – Division of Drinking Water (DDW) a Title 22 Engineering Report to obtain the WDR/WRR permit.

The City's existing wastewater treatment facility is located within the boundaries of the NAWS China Lake. An easement permit from the U.S. Navy may be required to modify the existing wastewater treatment facility and/or to construct the proposed recycled water pipelines for Recycled Water Subprojects 1, 1a, and 2.

Construction of the recycled water distribution system and transmission pipelines may require encroachment or excavation permits from the City.

Implementation of this project is subject to environmental regulations and would require the preparation of environmental studies. The IWVGA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

5.3.2.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to participate in and provide feedback on the optimization of recycled water supplies through the project's environmental review processes.

5.3.2.7 *Implementation Process and Timetable*

Prior to implementing the optimization of recycled water supplies, the IWVGA will coordinate with and assist the City in its independent efforts to relocate, expand, and enhance the existing City WWTF. It is anticipated that the recycled water permitting and regulatory process will commence in January 2022 and will be completed in January 2023. Construction of the infrastructure for the Recycled Water Subprojects will begin in January 2023 and will be completed in January 2025. The implementation process and timetable for Project No. 2 will be reliant on the City's independent schedule for upgrading, expanding, and potentially relocating the existing City WWTF, and on coordinating any necessary agreements with NAWS China Lake; therefore, the proposed implementation process and schedule may be subject to change.

5.3.2.8 *Legal Authority*

SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Specifically, California Water Code Section 10726.2 grants the IWVGA authority to "transport, reclaim, purify, desalinate, treat, or otherwise manage and control polluted water, wastewater, or other waters for subsequent use in a manner that is necessary or proper to carry out the purposes of this part." Accordingly, SGMA grants the IWVGA the legal authority to implement the optimization of recycled water supplies as a GSP management action. The legal authority granted to the IWVGA under SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of the recycled water subprojects. As such, the IWVGA will coordinate and cooperate with the appropriate stakeholders and governing agencies (specifically the City of Ridgecrest and potentially SVM) in implementing the recycled water subprojects.

5.3.2.9 *Source and Reliability*

The IWVGA's recycled water subprojects will rely on the availability of treated effluent generated at the City WWTF. Independent of this GSP, the City is currently planning to upgrade, expand, and potentially relocate the existing City WWTF. The City has also independently evaluated constructing new recycled water treatment facilities, a new recycled water storage tank, a new recycled water pump station, and a new purple pipe distribution system. The City is working with the Navy to finalize a new easement to include additional acreage adjacent to the existing facility where the City could develop a new tertiary WWTF. The IWVGA's recycled water subprojects will build upon the tertiary treatment facilities that the City plans to construct at its new WWTF. Before implementation of the IWVGA's recycled water subprojects can commence, the City must complete negotiations with the NAWS China Lake and construct the modified/relocated City WWTF.

5.3.3 Project No. 3: Basin-wide Conservation Efforts

5.3.3.1 *Project Description*

The Water District, City, and NAWS China Lake have previously adopted conservation measures within their respective service areas in an effort to mitigate the conditions of overdraft in the IWVGB (see Sections 2.7.3 and 2.7.4). An additional project is to develop additional voluntary, rebate-based, and mandatory conservation efforts for domestic beneficial uses in the IWVGB, and to also promote additional conservation efforts for the other beneficial uses that rely on groundwater from the IWVGB.

The IWVGA will confer with domestic and municipal groundwater producers (namely the Water District, City, Navy, SDWC, Inyokern CSD, and private/domestic well owners) to discuss historical and current conservation measures, which will be used as a guide to establish the new voluntary conservation measures on a basin-wide level. Specifically, the IWVGA will review the current conservation measures governing landscape irrigation, wash-downs, and other practices that potentially waste water that could be directed toward higher beneficial uses. The IWVGA may also determine the health and safety water use requirements for domestic water use in the IWVGB and use these requirements as another guide to establish the new voluntary conservation measures. The IWVGA will retain the services of a professional water conservation consultant to prepare a Water Conservation Strategic Plan that will incorporate the IWVGA's discussions with domestic and municipal groundwater producers as well as the IWVGA's evaluation of health and safety water use requirements for all communities served by the IWVGB. The IWVGA will implement the Water Conservation Strategic Plan in all domestic and municipal uses of groundwater in the IWVGB that are within the IWVGA's jurisdiction. The Water Conservation Strategic Plan will also identify conservation actions that other entities will implement.

Historically, the Water District, the City, and the Navy have implemented mandatory water use restrictions within their service areas/jurisdictions in an effort to reduce groundwater production in the IWVGB (see Section 2.7.3). The IWVGA will build upon the historical and current mandatory water use restrictions to potentially establish new basin-wide mandatory conservation measures that will reduce per-capita water demands for domestic and recreational (irrigation) uses of groundwater to the greatest extent feasible.

The new basin-wide mandatory conservation measures would also be enforced in the communities outside of the IWVGB that rely on groundwater from the IWVGB—namely the communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley.

The results of the IWVGA's Water Conservation Pilot Project (Rebate Program and Water Audit, Leak Detection, and Leak Repair Program) for Severely Disadvantaged Communities will be evaluated for potential implementation on a basin-wide level, including those severely disadvantage communities located in Searles Valley that are dependent on the groundwater exported from the IWVGB. Pending evaluation of the Rebate Program, the IWVGA may implement a basin-wide rebate program to promote the installation of water-conserving fixtures and appliances. Pending evaluation of the Water Audit, Leak Detection, and Leak Repair Program, the IWVGA may oversee a basin-wide leak detection and repair effort to reduce system water losses in the IWVGB.

The IWVGA will also coordinate with SVM to investigate the potential for and feasibility of conservation in the industrial water uses of SVM. The IWVGA will reach out to SVM staff to discuss the historical conservation measures that have been implemented in SVM's mineral recovery process. In conjunction with SVM staff, the IWVGA will also explore if SVM's mineral recovery process may be supplied with non-potable water resources such as recycled water and/or brackish water. If so, the IWVGA will conduct a feasibility study on the infrastructure and cost required to convey non-potable water resources to SVM for use in the mineral recovery process, including all necessary retrofits to SVM's existing mineral recovery facilities. If SVM's use of recycled and/or brackish water is determined to be feasible, the IWVGA will construct new facilities for production and conveyance of recycled and/or brackish water to SVM, as well as all necessary retrofits to SVM's existing potable water facilities.

The IWVGA will also coordinate with agricultural pumpers to investigate the potential for and feasibility of additional conservation in irrigation practices.

5.3.3.2 *Project Benefits and Mitigation of Overdraft*

The proposed management action will directly result in less groundwater production and will help alleviate and mitigate overdraft conditions, although even extreme conservation will likely not entirely mitigate the overdraft conditions in the IWVGB. Management action benefits are anticipated to include the following:

- Reduction of loss of groundwater storage when compared to current trends and baseline conditions;
- Reduction of unreasonable and chronic lowering of groundwater levels with many areas of the IWVGB anticipated to show improved and rising groundwater levels;
- Reduction of unreasonable water quality degradation and/or improvement of water quality conditions; and
- Reduction and/or prevention of land subsidence conditions.

These benefits will cumulatively reduce impacts to shallow wells. In addition, the proposed management action will decrease the volume of imported water which will be required to achieve sustainability. By reducing groundwater production in the IWWGB, the IWVGA will preserve the character of the community, quality of life for the residents of the Basin and sustain the mission at NAWS China Lake.

The metric for measuring management actions benefits, relative to the measurable objectives and minimum thresholds established in Section 4, will be to monitor groundwater levels, groundwater quality, and change in groundwater in storage in the IWVGB. In addition, water savings will be estimated for all water conservation efforts that are implemented.

5.3.3.3 *Justification*

Due to the current state of overdraft and the current unavailability of supplemental water supplies, further developing and expanding current conservation efforts are a necessity to reach sustainability. The estimated current sustainable yield of 7,650 AFY does not support current groundwater production and

current demands. As discussed in Section 5.2.1.3, it is infeasible for the community to make immediate reductions in demands to the current sustainable yield without extreme lifestyle changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. In addition, the high cost to acquire and convey supplemental water supplies will impact the financial status of the IWVGB's residents and local entities. Accordingly, the IWVGA must work with groundwater users in the IWVGB to implement basin-wide conservation measures that will minimize groundwater production and therefore minimize the quantity (and cost) of supplemental water required to reach future Basin sustainability.

5.3.3.4 *Project Costs*

At this time, there are no capital costs anticipated with implementing basin-wide conservation efforts. The IWVGA will dedicate approximately $20,000 annually to find opportunities for additional conservation and implement the new basin-wide conservation measures. The associated costs will consist of evaluating current conservation measures, determining opportunities for additional conservation, conducting public outreach, meeting with groundwater producers, and drafting and adopting conservation ordinances.

The costs for implementing basin-wide conservation efforts may increase should the IWVGA determine that the Water Conservation Pilot Project for Severely Disadvantaged Communities be implemented at a basin-wide level. The costs associated with a basin-wide Rebate Program would consist of advertising, marketing, customer service, processing rebate applications, purchasing water-conserving fixtures and appliances, vendor coordination, and issuing rebates. The costs associated with a basin-wide Water Audit, Leak Detection, and Repair Program would consist of conducting water audits, conducting leak detection surveys, reporting distribution system and storage leak occurrences, and repairing identified leaks.

The costs for implementing basin-wide conservation efforts may also increase should the IWVGA pursue conservation efforts in SVM's mineral recovery process. The associated costs would consist of coordination, meetings, and site tours with SVM staff; review of SVM's historical conservation measures; and analysis of opportunities for additional conservation in the mineral recovery process. Should the IWVGA and SVM conclude that SVM's mineral recovery process may use non-potable water supplies

(recycled and/or brackish water), other associated costs would consist of preparing a feasibility study and engineering report, permitting, construction of recycled/brackish water production facilities, construction of recycled/brackish water conveyance facilities, and installation of all necessary retrofits to SVM's existing mineral recovery facilities.

Costs may be funded through fees, grants, State and Federal appropriations, pumping assessments, or combinations thereof. See Section 6.3 for details of funding options.

5.3.3.5 *Permitting and Regulatory Process*

This management action currently does not require the IWVGA to obtain approved permits. However, should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, construction of infrastructure to convey recycled and/or brackish water to SVM may be subject to the environmental regulatory processes.

5.3.3.6 *Public Notice*

The public and relevant entities will be given notice of the IWVGA's adoption of ordinances that would enforce any additional conservation measures. As part of marketing the new voluntary conservation measures, the public will be provided with materials documenting the opportunities for voluntary conservation as well as the associated rebates issued by the IWVGA.

Should the IWVGA implement a Rebate Program on a basin-wide level, including those located in Searles Valley, the public will be provided with materials documenting the methods by which domestic and municipal groundwater producers may apply for rebates for water-conserving fixtures and appliances. Should the IWVGA implement a Water Audit, Leak Detection, and Leak Repair Program, members of the public that own or operate a groundwater production and distribution system will be provided with opportunities for a consultant to conduct system water audits with leak detection surveys and repairs to minimize system water losses.

Should the IWVGA determine that it is feasible for SVM to use recycled and/or brackish water in the mineral recovery process, the public will be provided with the opportunity to participate in the required environmental regulatory processes.

5.3.3.7 *Implementation Process and Timetable*

Prior to implementing basin-wide conservation measures, the IWVGA will determine acceptable conservation measures based on an analysis of historical and current conservation measures enforced by the Water District, the City, and the Navy, as well as health and safety requirements for water use in the IWVGB. The IWVGA will confer with domestic and municipal groundwater producers to discuss opportunities for additional water conservation. The IWVGA will also retain its professional water conservation consultant to develop a Water Conservation Strategic Plan. It is anticipated that the Water Conservation Strategic Plan will be completed by no later than January 2023 and will be implemented over the GSP planning and implementation horizon.

The IWVGA's Water Conservation Pilot Program for Severely Disadvantaged Communities is expected to be completed by December 2020. The results of the Pilot Program will be evaluated by IWVGA staff for potential basin-wide implementation, which is tentatively planned for no later than January 2023.

IWVGA will coordinate with SVM staff starting as soon as practical regarding possible additional opportunities for conservation in SVM's mineral recovery process. A feasibility study and engineering report describing the potential for SVM to use recycled and/or brackish water will be completed as soon as practical. If SVM use of recycled and/or brackish water is technologically and financially feasible, construction of new production facilities and conveyance infrastructure, will commence no later than January 2025.

5.3.3.8 *Legal Authority*

SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the

IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (California Water Code 10725.2). Specifically, California Water Code Section 10726.4 grants the IWVGA authority to "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells". California Water Code Section 10725.4 authorizes the IWVGA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the IWVGA the legal authority to implement basin-wide conservation measures as a GSP management action. The legal authority granted to the IWVGA under SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of basin-wide conservation measures. As such, the IWVGA will coordinate and cooperate with the appropriate stakeholders and governing agencies (including but not limited to SVM, the IWVWD, and the SDACs identified in the IWVGA's Water Conservation Pilot Project) in implementing basin-wide conservation measures.

5.3.4 Project No. 4: Shallow Well Mitigation Program

5.3.4.1 *Project Description*

As discussed in Section 3.3.4.4, the IWVGB has been in overdraft for many decades resulting in a significant lowering of the regional and local groundwater elevations, and a significant reduction in the amount of useable groundwater in storage. In addition, the IWVGB has areas with poor water quality (specifically high total dissolved solids) which has migrated to areas that previously had higher quality groundwater, resulting in water quality impacts to some wells. Most of the impacted wells are "shallow" wells, constructed to serve rural households, rural domestic/mutual water companies, small agricultural, and livestock water supply needs. Shallow well impacts are anticipated to continue past the year 2020 until the Basin is brought into balance by year 2040 due to both the chronic lowering of groundwater levels and degraded water quality, and therefore a Shallow Well Mitigation Program is necessary to reach IWVGB sustainability.

The IWVGA will prepare a mitigation plan (Shallow Well Mitigation Plan) to address the approximately 872 shallow wells in the IWVGB. The Shallow Well Mitigation Plan will include the development of criteria to characterize the level of impacts and the development of an evaluation process to access the viability of the wells. Existing shallow wells that experience impacts related to chronic lowering of groundwater

levels and/or degraded water quality occurring after February 1, 2020 are eligible for mitigation, pending the evaluation of the impacts. The evaluation process will include, but not be limited to, analysis of:

1) loss of efficiency/performance reduction
2) the appropriateness of the original well design and construction
3) water level and water quality impacts, and
4) the percentage (if any) of well owner's mitigation responsibility.

The Shallow Well Mitigation Plan will also outline the process by which individual well owners can apply and submit wells for evaluation and consideration for mitigation by the IWVGA, including the evaluation and review process the IWVGA's Water Resources Manager will follow to process the applications and make recommendations to the IWVGA Board.

After the adoption of the Shallow Well Mitigation Plan, in appropriate intervals throughout the planning horizon, shallow wells will be evaluated based on the adopted criteria and organized into specific areas/zones for development of effective mitigation options. Some wells may be proposed to be abandoned (not mitigated) based on evaluation of impacts. Specific improvements will be identified for impacted shallow well which may include deepening the well, replacing the well, connecting to existing water systems, or other mitigation measures. The wells recommended for mitigation will be placed on an Impacted Shallow Well Priority List and will be scheduled for mitigation.

5.3.4.2 *Project Benefits and Mitigation of Overdraft*

The proposed Shallow Well Mitigation Project will directly mitigate impacts due to the following:

- Reduction of groundwater in storage;
- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Shallow Well Mitigation program will provide a direct benefit to beneficial users in the IWVGB who have unreasonably experienced water supply and financial hardships due to overdraft conditions in the IWVGB. Many of the beneficial users that will benefit from the implementation of this project are

members of disadvantaged communities. The implementation of the other proposed projects and management actions will also improve groundwater conditions and are anticipated reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E).

The metric for measuring project benefits will be the number of shallow wells that are impacted and mitigated under this program.

5.3.4.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Shallow Well Mitigation Program to mitigate undesirable results caused by chronic lowering of groundwater levels and degraded water quality that are directly impacting individual well owners and directly impacting their ability to meeting potable water demands, including demands for basic health and safety.

5.3.4.4 *Project Costs*

The estimated cost to develop the Shallow Well Mitigation Plan is $70,000. The estimated annual cost to administer the program is $20,000. The model results for the proposed projects and management actions indicate that potentially 22 shallow wells could be impacted. The estimated cost to mitigate these impacts is $1.65 million.

5.3.4.5 *Permitting and Regulatory Process*

The shallow well mitigation effort will require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. Furthermore, implementation of shallow well mitigation measures is anticipated to require a series of permits and approvals, including but not limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will conduct an environmental review to identify potential impacts for some mitigation projects. The IWVGA

will follow all regulatory requirements associated with the environmental process including public noticing and review requirements.

5.3.4.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to comment on the Shallow Well Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the environmental studies, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.4.7 *Implementation Process and Timetable*

The Shallow Well Mitigation Plan will be developed to describe the process and criteria used to evaluated impacted shallow wells and the process by which well owners can submit their wells for consideration for mitigation by the IWVGA. It is anticipated the Shallow Well Mitigation Plan will be developed by December 2020, with implementation of mitigation measures continuing throughout the planning horizon. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Shallow Well Mitigation Plan. In appropriate intervals throughout the planning horizon, shallow wells will be evaluated in accordance with the Shallow Well Mitigation Plan and the Impacted Shallow Well Priority List will be available for public review prior to implementing mitigation.

5.3.4.8 *Legal Authority*

The SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Shallow Well Mitigation Program.

5.3.5 Project No. 5: Dust Control Mitigation Program

5.3.5.1 *Project Description*

Section 5.2.1 identifies the first planned management action as implementation of the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program. Implementation of this management action could potentially result in an increase in windblown dust and sand, due to the climate of the IWV, which must be mitigated concomitant with decreased agricultural water use.

The IWVGA will prepare a study (Dust Control Mitigation Plan) to investigate best management practices to address windblown dust and sand that can be used on fallowed agricultural land (see Management Action No. 1) and to identify the location and magnitude of the potential need for dust control. In 1991, the "Dustbusters Research Group" was formed to develop "…best management practices for mitigating wind erosion, reducing blowing dust and improving air quality" in the Antelope Valley, which has comparable issues as the IWV regarding windblown dust. (Agricultural Guide to Controlling Windblown Sand and Dust, October 2010). Mitigation measures applicable to farmland that do not require addition water use include, but are not limited to, the following:

- Wind breaks/wind barriers: According to the Agricultural Guide to Controlling Windblown Sand and Dust, wind typically does not lift sand much more than three feet into the air. Consequently, the wind breaks/wind barriers create a "trap" which interrupts to transport of blowing sand and causes the sand to deposit at the site of the wind break. Wind breaks may include, but are not limited to, solid or porous fences, straw bales, tilling soils to create surface roughness, and berms.

- Mulch: According to the Agricultural Guide to Controlling Windblown Sand and Dust, surface coverings to address blowing dust may include, but are not limited to, mulch (wood chips, gravel, and /or plastic products) and chemical dust suppressants.

In addition, the requirements for restoration of natural habitat on fallowed land will be investigated. This could include grading, soil decompaction, and seeding with native plants. It could also include irrigation, maintenance, and monitoring until the native habitat is suitably established.

Based on the results of the Dust Control Mitigation Plan and which current IWVGB farms voluntarily fallow agricultural land as part of Management Action No. 1, critical areas will be identified and prioritized for mitigation. The IWVGA initially will monitor dust issues as agricultural practices continue and are gradually phased out, to create a baseline by which to compare and evaluate future mitigation needs. IWVGA will continue to monitor the occurrence of windblown dust and sand and implement proactive mitigation measures as identified in the Dust Control Mitigation Plan.

5.3.5.2 *Project Benefits and Mitigation of Overdraft*

The proposed Dust Control Mitigation Program will directly mitigate secondary impacts caused by implementing necessary management actions to address impacts caused by the following sustainability indicators:

- Reduction of groundwater in storage; and
- Chronic lowering of groundwater levels;

The Dust Control Mitigation Program will provide a direct benefit to beneficial users in the IWVGB that may experience undesirable secondary impacts related to the reduction in vegetation and the reduction of use of applied water on agricultural lands. Implementation of mitigation efforts which do not involve use of water will result in an effective replacement of vegetation, and contribute to long-term decreased groundwater use.

The metric for measuring project benefits will be the number of acres of fallowed agricultural lands that have dust control mitigation measures implemented.

5.3.5.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement Management Action 1 (Annual Pumping Allocation Plan, Transient Pool and Fallowing Program) which may cause secondary impacts related to dust that must also be mitigated to achieve sustainability and prevent undesirable results in the IWVGB. If the Dust Control Mitigation Program is not implemented,

IWV residents may experience impacts to finances, health, and quality of life as a result of unmitigated windblown dust and sand. The unmitigated windblown dust and sand can also affect mission capabilities at NAWS China Lake.

5.3.5.4 *Project Costs*

The estimated cost to develop the Dust Control Mitigation Plan is $70,000. The estimated annual cost to administer the program is $20,000. The estimated costs to mitigate these impacts may be up to $19 million, with approximately $100,000 of annual costs.

5.3.5.5 *Permitting and Regulatory Process*

The study of the dust control mitigation effort will likely require action by the IWVGA to fund the study, retain a consultant and take action on the recommendations included in the study. However, implementation of dust control measure will likely include a series of permits and approvals, including but not limited to, access agreements, construction permits, and indemnification agreements. The IWVGA will be required to comply with environmental regulatory requirements to identify potential impacts and to describe mitigation measures. The IWVGA will follow all regulatory requirements associated with the environmental process including public noticing and review requirements.

5.3.5.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to comment on the Dust Control Mitigation Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the environmental studies, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.5.7 *Implementation Process and Timetable*

The Dust Control Mitigation Plan will be developed to investigate the magnitude and need for mitigation and best management practices to address windblown dust and sand that can be used on fallowed agricultural land. It is anticipated the Dust Control Mitigation Plan will be developed by June 2021, with implementation of mitigation measures continuing throughout the planning horizon as necessary based

on the voluntary schedule of the fallowing of agricultural lands. The IWVGA will coordinate the necessary regulatory review and hold public meetings/public hearing prior to taking final action on the Dust Control Mitigation Plan. In appropriate intervals throughout the planning horizon, agricultural lands that may require dust mitigation measures will be evaluated with the recommended mitigation measures made available for public review prior to implementing mitigation. The IWVGA will implement certain proactive mitigation measures in areas of greatest risk and gradually ramp up dust control mitigation, as circumstances demonstrate.

5.3.5.8 *Legal Authority*

The SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to implement the Dust Control Mitigation Program.

5.3.6 Project No. 6: Pumping Optimization Project

5.3.6.1 *Project Description*

Evaluation of the modeling results for the proposed groundwater management and project scenarios showed that some current groundwater pumping may need to be redistributed in the Basin to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells.

It is anticipated that the implementation of Management Action No. 1, the Annual Pumping Allocation Plan, Transient Pool and Fallowing Program, will greatly reduce groundwater pumping for agricultural uses in the northwestern portion of the IWGWB over time. The modeling results indicate groundwater levels in this area will not only stabilize but will increase as a result of the proposed management actions and projects.

It is also anticipated that groundwater pumping by the Water District west and southwest of the City will continue and that, along with pumping by SVM and others, the groundwater levels in these areas may not completely stabilize by 2040 without source redistribution.

The pumping optimization program is proposed to relocate some of the Water District, and potentially some of SVM's groundwater pumping, to the northwest portion of the Basin. The pumping optimization program is anticipated to include the construction of two new wells in the northwest portion of the Basin along Brown Road and approximately nine miles of pipeline to connect the wells to the Water District's water system.

5.3.6.2 *Project Benefits and Mitigation of Overdraft*

The proposed Pumping Optimization Project will directly mitigate impacts due to the following:

- Chronic lowering of groundwater levels; and
- Water quality degradation.

The Pumping Optimization Project will stabilize groundwater levels west and southwest of the City and reduce the number of shallow wells that will be impacted in the future, as compared to the anticipated number of impacted shallow wells under baseline conditions (see Appendix 3-E), due to both lower groundwater levels and from potential water quality impacts.

The metric for measuring project benefits, relative to the measurable objectives and minimum threshold established in Section 4, for this project will be will be to monitor groundwater levels and water quality.

5.3.6.3 *Justification*

The IWVGB is in overdraft and is currently experiencing undesirable results and will continue to experience undesirable results until sustainability is reached. Accordingly, it is necessary to implement the Pumping Optimization Project to mitigate undesirable results that would directly impact the ability of shallow well owners to meeting potable water demands, including demands for basic health and safety.

5.3.6.4 *Project Costs*

Infrastructure costs are for the design and construction of a new well and new distribution system. The estimated cost to develop and construct the facilities for the Pumping Optimization Project is $23 million. Approximately $150,000 for annual maintenance would be required.

5.3.6.5 *Permitting and Regulatory Process*

Implementation of the Pumping Optimization Project will require encroachment or excavation permits for construction of the pipeline, well permits from Kern County, and agreements for use of the facilities or to take water from the facilities with the Water District and perhaps Searles Valley Minerals Inc. An environmental review will be conducted to identify potential impacts from construction of the facilities. The IWVGA, and potentially other implementing entities, will follow all regulatory requirements associated with the environmental review process including public noticing and review requirements. There may be agreements that restrict options for pumping locations that will need to be addressed post GSP adoption.

5.3.6.6 *Public Notice*

The public and relevant entities will be given the opportunity and time to comment on the Pumping Optimization Plan prior to adoption by the IWVGA Board. The IWVGA will be required to provide the public with opportunity to comment on the environmental studies, if any. Subsequently, the IWVGA will provide sufficient public notice of a public hearing for approval of mitigation measures.

5.3.6.7 *Implementation Process and Timetable*

The Pumping Optimization Project will require significant funding from outside the IWV to be feasible. If adequate funding is obtained it is anticipated the Pumping Optimization Project will be complete by December 2025.

5.3.6.8 *Legal Authority*

The SGMA statute broadly grants the IWVGA, as a groundwater sustainability agency, the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows the IWVGA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2). Accordingly, SGMA grants the IWVGA the legal authority to coordinate the planning and implementation of the Pumping Optimization Project. The legal authority granted to the IWVGA under SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of the pumping optimization project. As such, the IWVGA will coordinate and cooperate with the appropriate stakeholders and governing agencies (specifically the IWVWD and SVM) in implementing the pumping optimization project.

5.4 CONCEPTUAL PROJECTS STILL UNDER CONSIDERATION

5.4.1 Brackish Groundwater Project

To further enhance the sustainable and adaptive management strategies for Indian Wells Valley (IWV), the Brackish Water Resources Partnership was formed, consisting of IWVWD, the Coso Operating Company, Mojave Pistachios, Searles Valley Minerals Inc, and Meadowbrook Dairy, to evaluate the feasibility of extracting and treating brackish groundwater from the IWVGB to produce fresh water for potential multiple beneficial uses including, among other things:

- Providing a source of water as a bridge or buffer to assist in achieving SGMA sustainability;
- Diversifying local water supplies;
- Improving reliability as part of a portfolio of multiple sources of water; and
- Providing a local, beneficial industrial use for the waste brine.

There are areas in the IWVGB that have TDS concentrations greater than 1,000 mg/L, particularly in the intermediate and deep aquifer layers and primarily underlying NAWS China Lake. These groundwater areas are considered to be brackish, and are the subject of the Brackish Groundwater Feasibility Study.

The Brackish Groundwater Feasibility Study will examine the feasibility of extracting brackish groundwater, options for treating the brackish groundwater, and options for delivery of all water quality types to the various connection points. On the basis of examining several criteria, the "ideal" brackish groundwater extraction well has several characteristics:

- Completed in a sand layer that will yield a desirable volume of water over the long term;
- Completed where the long-term TDS concentrations of the brackish groundwater are greater than 1,000 milligrams per liter (mg/L) (up to 4,000 mg/L);
- Located away from existing freshwater production wells;
- Located in an area where the potential for impacts to freshwater resources are minimized (lateral transport, vertical transport); and
- Located in an area where impacts from subsidence are minimized.

NAWS China Lake has engaged the Brackish Water Resources Partnership members and expressed concerns that brackish water extraction wells and infrastructure developed within the NAWS China Lake ranges posed a risk to the Navy mission. Accordingly, an additional constraint is that all brackish groundwater extraction wells and infrastructure has to occur outside the boundaries of NAWS China Lake.

After examining several areas within the Basin that have proved to be unsuitable for project implementation, the Brackish Groundwater FS has now narrowed its focus to the northwest part of the IWVGB just south of Pearsonville and north of Brown Road, outside the boundaries of NAWS China Lake. The Brackish Groundwater Feasibility Study is evaluating if brackish groundwater could be extracted from the deep aquifer zone in this geographical area. After the Brackish Groundwater Feasibility Study is complete, and if brackish groundwater extraction, treatment, and conveyance is found to be feasible and consistent with the GSP, the next steps in the project process would include:

- Conduct a pilot test of brackish groundwater extraction and treatment in the area of interest;
- Design a full-scale brackish groundwater extraction system with associated treatment plant and conveyance works; and
- Construct and commission the full-scale brackish groundwater extraction, treatment, and conveyance system.

5.4.2 Direct Potable Reuse Project

California Water Code section 13561(b) defines direct potable reuse (DPR) as "the planned introduction of recycled water either directly into a public water system or into a raw water supply immediately upstream of a water treatment plant." Possible methods of DPR include:

- Raw water augmentation
  - The planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system.
- Reservoir water augmentation
  - The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, or into a constructed system conveying water to such a reservoir.
- Treated drinking water augmentation
  - The planned placement of recycled water into the water distribution system of a public water system.

The SWRCB currently has no regulatory criteria for DPR projects in California, though uniform water recycling criteria for DPR through raw water augmentation are required to be adopted by the SWRCB by December 31, 2023, in accordance with California Water Code Section 13561.2. At this time, uniform water recycling criteria for DPR through reservoir water augmentation or treated drinking water augmentation are not anticipated to be adopted.

Because no raw water treatment facilities currently exist in the Indian Wells Valley, a reservoir water augmentation project or treated drinking water augmentation project would currently be the only feasible alternatives for DPR of recycled water in the IWVGB. The IWVGA will evaluate the compatibility of the planned recycled water subprojects (see Section 5.3.2) with a future DPR project as the regulations for DPR projects are developed and adopted. Significant coordination with the SWRCB, DDW, the Lahontan RWQCB, and potentially the USEPA would be required to implement such a project, including conceptual-level planning, treatment evaluations, permit issuance, pilot testing, regulation development, establishing monitoring requirements, etc. Should the IWVGA pursue imported water opportunities that would require construction of new surface water treatment and storage facilities, a raw water or reservoir water

augmentation project may be a feasible alternative for a DPR project. Otherwise, the IWVGA will continue researching the feasibility of a potential DPR project through reservoir water augmentation or treated drinking water augmentation over the GSP planning and implementation horizon.

5.4.3 Additional Projects

The IWVGA is taking an adaptive management approach to IWVGB management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to reach sustainability in the IWVGB. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

5.5 REFERENCES

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SECTION 6: IMPLEMENTATION PLAN

6.1 IMPLEMENTATION PLAN SUMMARY

Due to prolonged overdraft conditions in the IWVGB, the community is currently experiencing the undesirable impacts of prolonged overdraft and will continue to experience increasing environmental, social, and economic impacts if sustainability is not achieved. The IWVGB is currently experiencing unreasonable reduction of groundwater in storage, chronic lowering of groundwater levels which result in shallow well performance being impacted or being impacted by poorer water quality, degradation of water quality, and localized land subsidence impacting structures/facilities at NAWS China Lake.

Increasing water reliability and preserving groundwater resources are critical tasks of the IWVGA. The sustainability goal is to manage and preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of the IWV residents, and sustain the mission at NAWS China Lake. The absence of undesirable results, defined as significant and unreasonable effects of groundwater conditions, throughout the planning horizon will indicate that the sustainability goal has been achieved. The sustainability goal will be accomplished by achieving the following objectives:

- Operate the IWVGB groundwater resource within the sustainable yield.
- Implement projects and management actions to reduce IWVGB groundwater demands, increase reuse of current supplies, obtain supplemental water supplies, and mitigate undesirable results.
- Monitor the IWVGB actively and thoroughly and adaptively manage the projects and management actions to ensure the GSP is effective and undesirable results are avoided.

A suite of project and management actions have been evaluated and selected to address current and projected undesirable results with the goal of bringing the IWVGB into sustainable balance (see Section 5). There are currently no reliable sources of supplemental water available to help achieve sustainability.

Therefore, the initial priority is on demand reductions, at least until a reliable supplemental water supply is secured. These projects and management actions are the following:

- Pumping Limitations Program
- Dust Control Mitigation Program
- Conservation Program including programs that assist Severely Disadvantaged Communities in the IWVGB
- Shallow Well Mitigation Program for shallow well failures due to water quality degradation and lowering of groundwater levels
- Recycled Water Project
- Imported Water Project
- Pumping Optimization Program

In addition to the proposed projects and management actions, GSP implementation requires continual monitoring of the proposed monitoring networks to evaluate IWVGB conditions in relation to the sustainable management criteria, as well as annual and periodic GSP updates to DWR, pursuant to SGMA regulations. Data gaps will continue to be analyzed and monitoring and data management programs will be implemented as necessary. Progress on the Imported Water Project will be monitored, and management actions and projects will be revised if the schedule, amount, cost or feasibility of importing water dictates. The IWVGA is taking an adaptive management approach to reach sustainability; therefore, additional projects and management actions not discussed in this GSP will be evaluated and implemented over the planning horizon, as necessary, and the proposed planned projects and management actions may be modified, as necessary.

The public will be invited to participate in the implementation of the proposed GSP projects and management actions, monitoring, and data gap projects over the GSP planning-horizon. As plans related to implementation of specific projects are developed, the public will be provided opportunity to review and provide comments to the IWVGA Board.

6.2 SCHEDULE FOR IMPLEMENTATION

The IWVGA will start implementation of the GSP after adoption of the GSP by the IWVGA Board. Given the available data and the current conditions of the IWVGB, all of the proposed planned projects and management actions are required to be implemented by 2040 in order to reach sustainability. The anticipated implementation timelines and schedules for the projects and management actions are discussed in Section 5. The anticipated implementation timeline for the projects and management actions range from 2020 to 2035. With this broad range of implementation timelines, there are likewise broad estimates of the project and management action task schedules.

Some of the proposed projects and management actions are dependent on activities and schedule beyond the control of the IWVGA. The schedule for the proposed Recycled Water Project is dependent on the completion of the upgraded Ridgecrest's wastewater treatment facility. The schedule for the proposed Imported Water Project is dependent on securing an imported water supply source, completing agreements for the transportation and exchange of water, and obtaining sufficient funding to construct the needed infrastructure. Accordingly, there is uncertainty of project implementation schedules at this stage of planning.

The GSP Implementation Schedule is provided in Figure 6-1. This implementation schedule will be revised as necessary to reflect any changes based on updated information and to provide more specificity as the projects are further developed.

6.3 GSP IMPLEMENTATION COSTS AND FUNDING

6.3.1 Implementation Costs

The GSP Implementation costs can be categorized in the following manner:

- Administrative Costs
    - GSP Reporting

  - Funding Administration
    - Fee Administration
    - Grant/Loan administration
  - Stakeholder Involvement/Outreach
- Program/Project Development and Implementation for Projects and Management Actions
- GSP Monitoring
- GSP Data Gap Analyses and Updates
- Data Management System maintenance

Administrative costs for an agency the size of the IWVGA are typically $1 million to $2 million annually. It is anticipated the administrative costs for the IWVGA will be on the lower end of the typical range of costs. The IWVGA may also incur additional costs that include, but are not limited to, additional administrative expenses, salaries and benefits, legal services, etc. These costs, when eligible, will also be funded through the funding sources discussed in 6.3.2.

The estimated preliminary costs for each project and management action and IWVGA implementation is provided in Table 6-1. These estimates will be refined and revised during GSP implementation as more information becomes available.

Table 6-1. Estimated GSP Implementation Costs.

Task	Development/ Engineering Costs	Implementation/ Capital Costs	Total Annual Costs
Projects and Management Actions			
Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program	$340,000	$9,000,000	$40,000
Project No. 1: Develop Imported Water Supply			

Task	Development/ Engineering Costs	Implementation/ Capital Costs	Total Annual Costs
Option 1:	$28,875,000	$197,490,000	$8,140,000
Option 2:	$8,613,000	$94,823,000	$4,440,000
Project No. 2: Optimize Use of Recycled Water			
Option 1:	$7,005,700	$35,751,500	$395,500
Option 1a:	$1,737,300	$8,445,900	$129,300
Option 2:	$4,936,200	$17,861,800	$480,300
Project No. 3: Basin-wide Conservation Efforts	--	Unknown	$20,000
Project No. 4: Shallow Well Mitigation Program	$70,000	$1,650,000	$20,000
Project No. 5: Dust Control Mitigation Program	$70,000	$19,000,000	$100,000
Project No. 6: Pumping Optimization Project	$3,230,000	$20,170,000	$150,000
GSP Monitoring	--	--	$60,000
Data Gap Projects [1]	--	$270,000	--
Annual GSP Reporting	--	--	$30,000
GSP 5-Year Updates [2]	$360,000	--	--
Data Management System	--	--	$20,000
ESTIMATED TOTALS [3]	$26,362,200 - $46,624,200	$206,972,200 - $309,634,200	$5,884,800 - $9,584,800

[1] *Costs for data gap projects are currently funded under Prop 1 grant funding. Additional data gaps will be evaluated periodically to determine if additional projects are required. Estimated costs will be updated as necessary.*

[2] *Assumes four 5-year updates through 2040.*

[3] *Estimate total costs show a range of potential estimated costs. The low end of the range assumes Project No. 1 Option 1 will be implemented and the high end of the range assumes Project No. 1 Option 2 will be implemented.*

6.3.2 Potential Funding Sources

Development of this GSP was funded through the following sources:

- Proposition 1 Sustainable Groundwater Planning Grant
- Pump Fee applicable to all non de minimis pumpers in the IWVGB (with the exception of U.S. Navy pumping to support NAWS China Lake)
- Local Contributions by IWVGA Member Agencies and other local entities
- In-kind Services by IWVGA Member Agencies and other local agencies and entities

GSP implementation costs will require a broad variety of funding sources, from Federal, State, and local sources. Supplemental water supplies, as required for the IWVGB to be sustainable, are extremely costly and limited. Even if supplemental water supplies are available, the IWV community is not financially capable of supporting an imported water supply without significant public funding. As such, the IWVGA will pursue all reasonable funding opportunities to support GSP implementation tasks. Federal and State funding sources that have been identified as potential options for GSP implementation funding include the following:

- Federal Sources
    - Water Infrastructure Financing and Integration Act (WIFIA)
    - Reclamation Integration Financing and Integration Act (RIFIA)
    - Bureau of Reclamation – WaterSMART Program
    - Department of Defense – Defense Communities Infrastructure Program
    - Department of Defense – Readiness and Environmental Protection Integration Act (REPI)
    - Water Resources Development Act (WRDA)
    - U.S. Department of Agriculture
        - Community Facilities program
        - Regional Conservation Program
- State Sources
    - State Water Resources Control Board Loans and Grants

- Clean Water State Revolving Fund (CWSRF)
- Drinking Water State Revolving Fund (DWSRF)
- Small Community Grant Fund
- Groundwater Grant Fund (Chapter 10, Prop 1)
- Parks and Water Bond (Chapter 11, Prop 68)

- Legislative Appropriations

Local sources of funding will include administering a pump fee on groundwater production, similar to the fee that was used to partially fund the GSP preparation. The pump fee structure may have multiple components such as an administration fee, a remediation fee (for mitigation for impacted shallow wells, and an augmentation fee (for imported water supplies) (see Management Action No. 1 in Section 5.2.1). With that said, the remediation and augmentation fees may be combined into one fee since those that will be subject to these fees are likely the same. Additionally, the administration fee may not be adopted at the outset because the current structure and operation of the IWVGA is such that there is limited, if any, costs for general administration.

The U.S. Navy receives royalties from the sale of electricity generated at the geothermal power plants located on NAWS China Lake in the Coso Geothermal Field. A portion of those funds are available each year to fund local energy or water security initiatives that support the NAWS China Lake mission. GSP implementation projects and related tasks may be eligible to receive funding from these royalties if deemed necessary and a priority to support the NAWS China Lake mission.

6.4 PROGRESS ASSESSMENT AND REPORT

6.4.1 Annual Reports

As required by GSP Emergency Regulations §356.2, the IWVGA will prepare an annual report which will describe the progress being made toward implementation of this GSP and reaching sustainability. The content of the annual report will include the following information, but is not limited to:

- General information including an executive summary and location maps;
- Description of Basin conditions including monitoring data and groundwater production, and;
- Description of progress made toward implementation of the planned projects, progress made on achieving the interim milestones identified in the GSP, and a discussion on sustainability progress.

6.4.2 Periodic Evaluations and Assessments

The IWVGA recognizes that IWVGB management requires an adaptive management approach and supports the necessity of periodic updates to the GSP. Accordingly, in five-year increments, the IWVGA will evaluate the GSP and prepare a Five-Year Evaluation Report. The Five-year Evaluation Report will include discussions on 1) Sustainability Evaluation, 2) GSP Implementation Progress, 3) GSP Elements Evaluation, 4) Monitoring Network and Data Gaps, 5) New Information and Data, 6) Instituted Regulations, Ordinances, and Legal Actions, 7) GSP Amendments, and 8) On-going Coordination.

- Sustainability Evaluation: A summary of the groundwater conditions for each of the identified sustainability indicators and a summary of progress toward IWVGB sustainability will be provided. A discussion of progress on each of the identified milestones and a summary of the measurable objectives in relation to the minimum thresholds will be included.
- GSP Implementation Progress: A summary of the implementation of GSP projects and management actions, including an updated implementation schedule and summary of the quantifiable benefits realized from implementation of projects and management actions, will be provided.
- GSP Elements Evaluation: If new or additional data from the monitoring program or the implementation of projects and management actions is available, GSP elements, including the suitability of the established sustainable management criteria, will be evaluated and reconsidered. Based on the findings, the IWVGA may suggest revisions to the GSP.
- Monitoring Network and Data Gaps: A description of the monitoring network will be provided. Data gaps that have been identified and efforts to fill those gaps will be described. An assessment of the effectiveness of the monitoring programs will be provided, along with a schedule to address the data gaps.

- New Information and Data: New data obtained since the last GSP update will be provided.
- Regulations, Ordinances, and Legal Actions: A summary of regulations and/or ordinances the IWVGA has implemented to assist with implementation of the GSP will be provided. IWVGA legal actions and enforcement activities will be discussed.
- GSP Amendments: Any approved or proposed GSP amendments will be discussed.
- On-going Coordination: A summary of the coordination between the IWVGA and other agencies within the IWVGB will be provided.

6.5 REFERENCES

California Code of Regulations; Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans. GSP Emergency Regulations.

IWVGA

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

FIGURES

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FIGURE 2-1

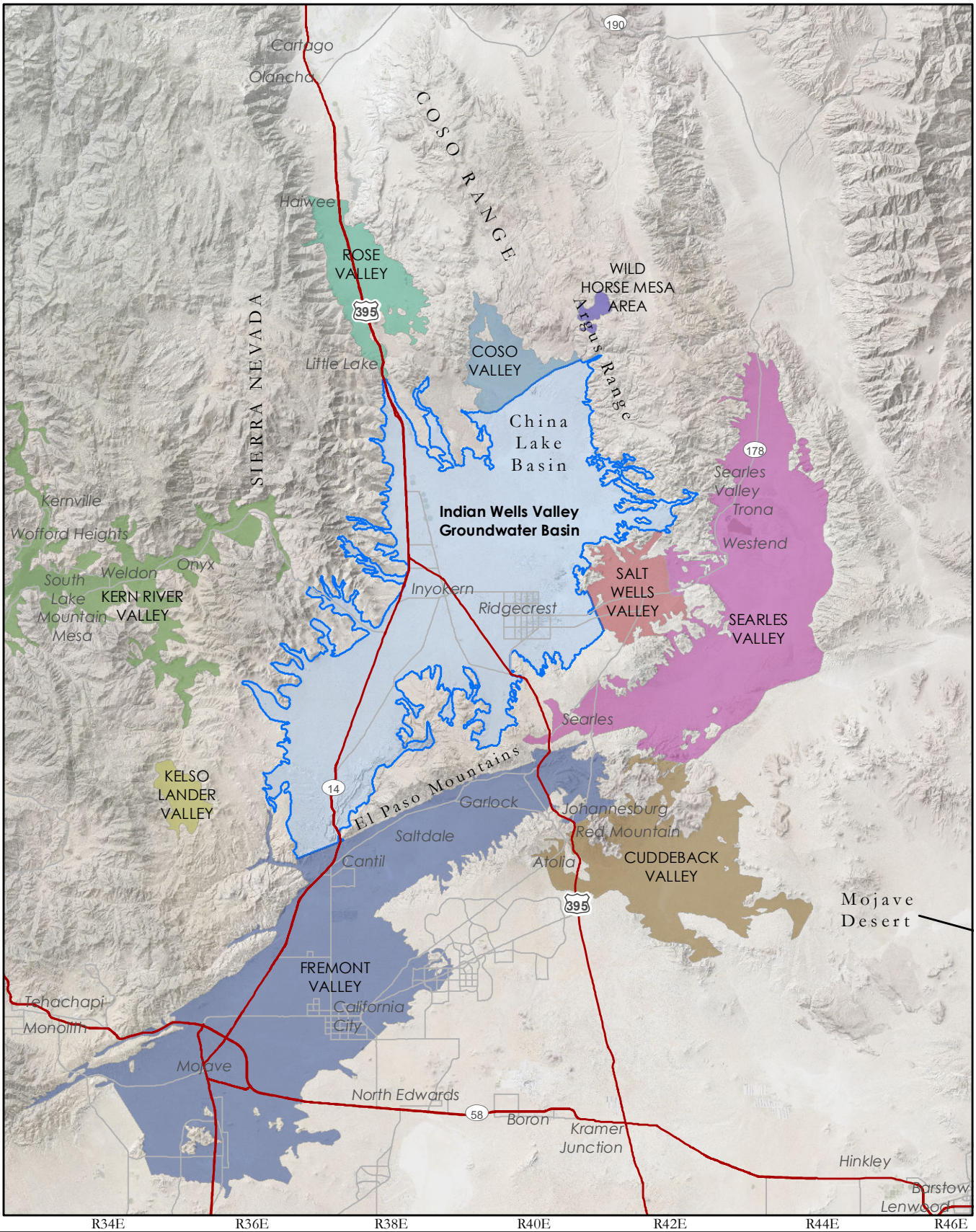
STETSON ENGINEERS INC.

GENERAL BASIN SETTING
INDIAN WELLS VALLEY GROUNDWATER BASIN
(DWR BULLETIN 118 BASIN NO. 6-054)

N

0 5 10 Miles

Document Path: J:\jn2652\IWV_Sec2_General_Basin_Setting.mxd



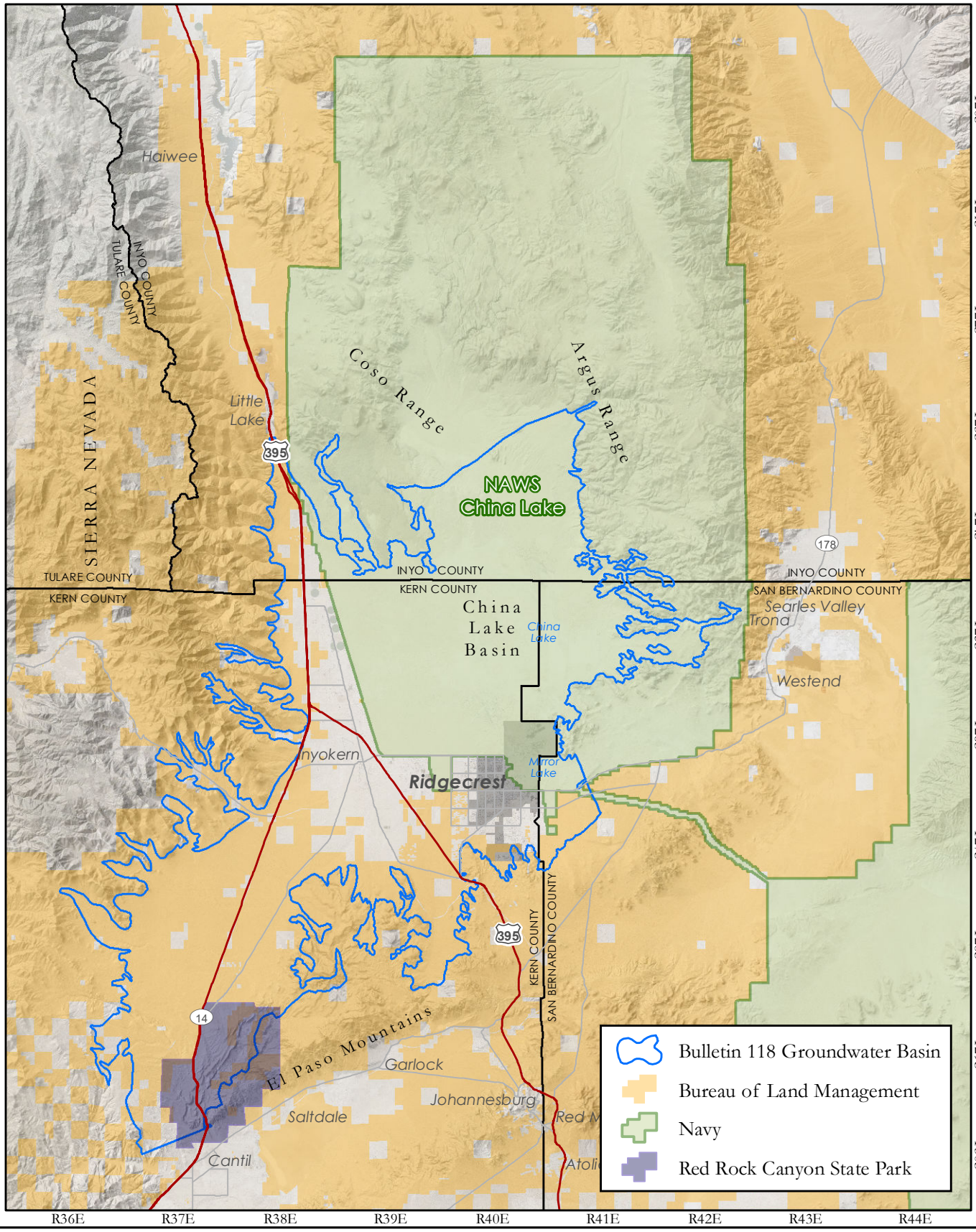
STETSON ENGINEERS INC.

ADJACENT AND NEIGHBORING GROUNDWATER BASINS
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 5 10 Miles

Document Path: J:\in2652\IWV_Sec2_Adjacent_GW_Basins.mxd



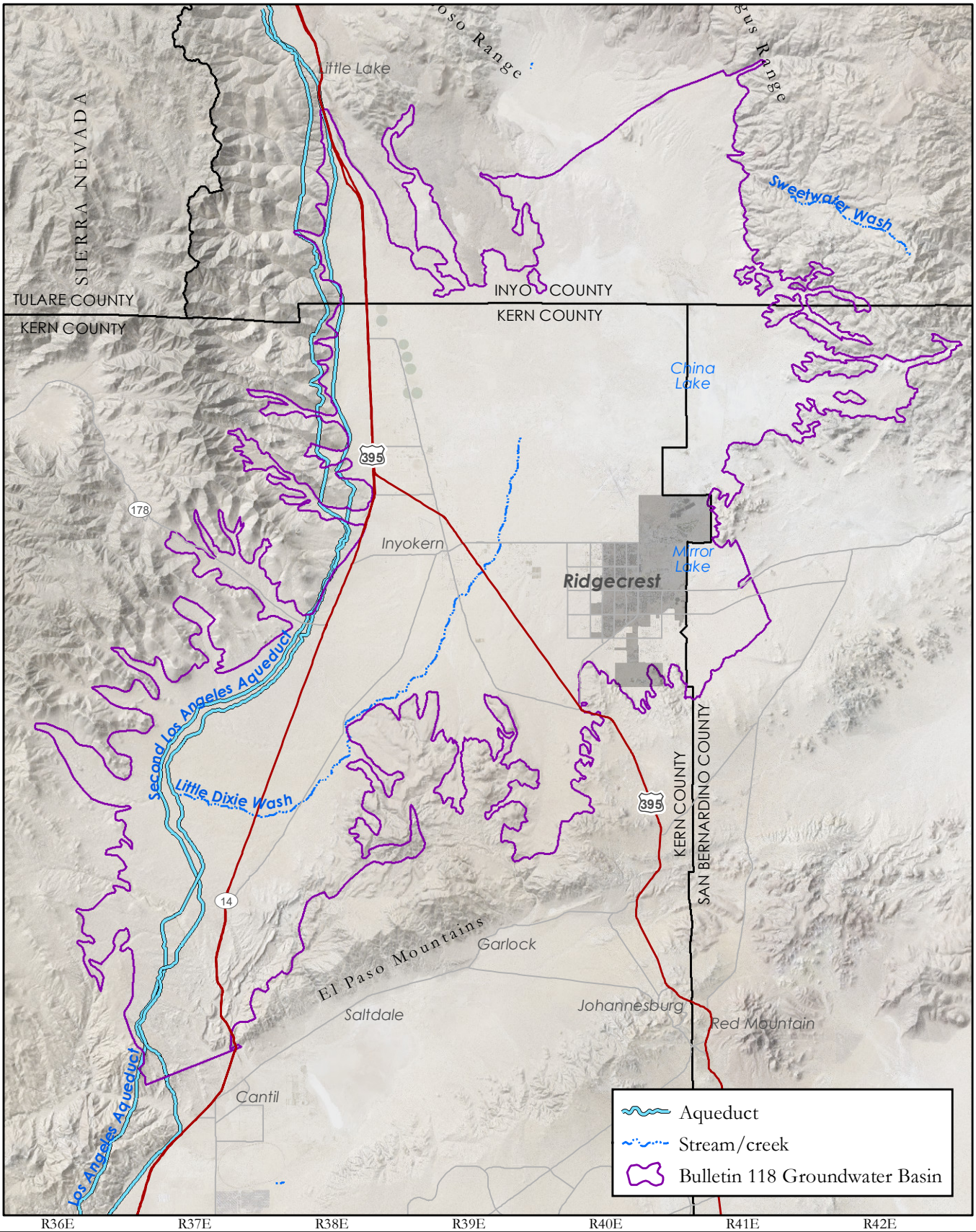
JURISDICTIONS AND BOUNDARIES OF FEDERAL AND STATE LANDS INDIAN WELLS VALLEY GROUNDWATER BASIN

STETSON ENGINEERS INC.

N

0 2.5 5 Miles

Document Path: J:\jn2652\IWV_Sec2_Jurisdictions_and_Boundaries.mxd



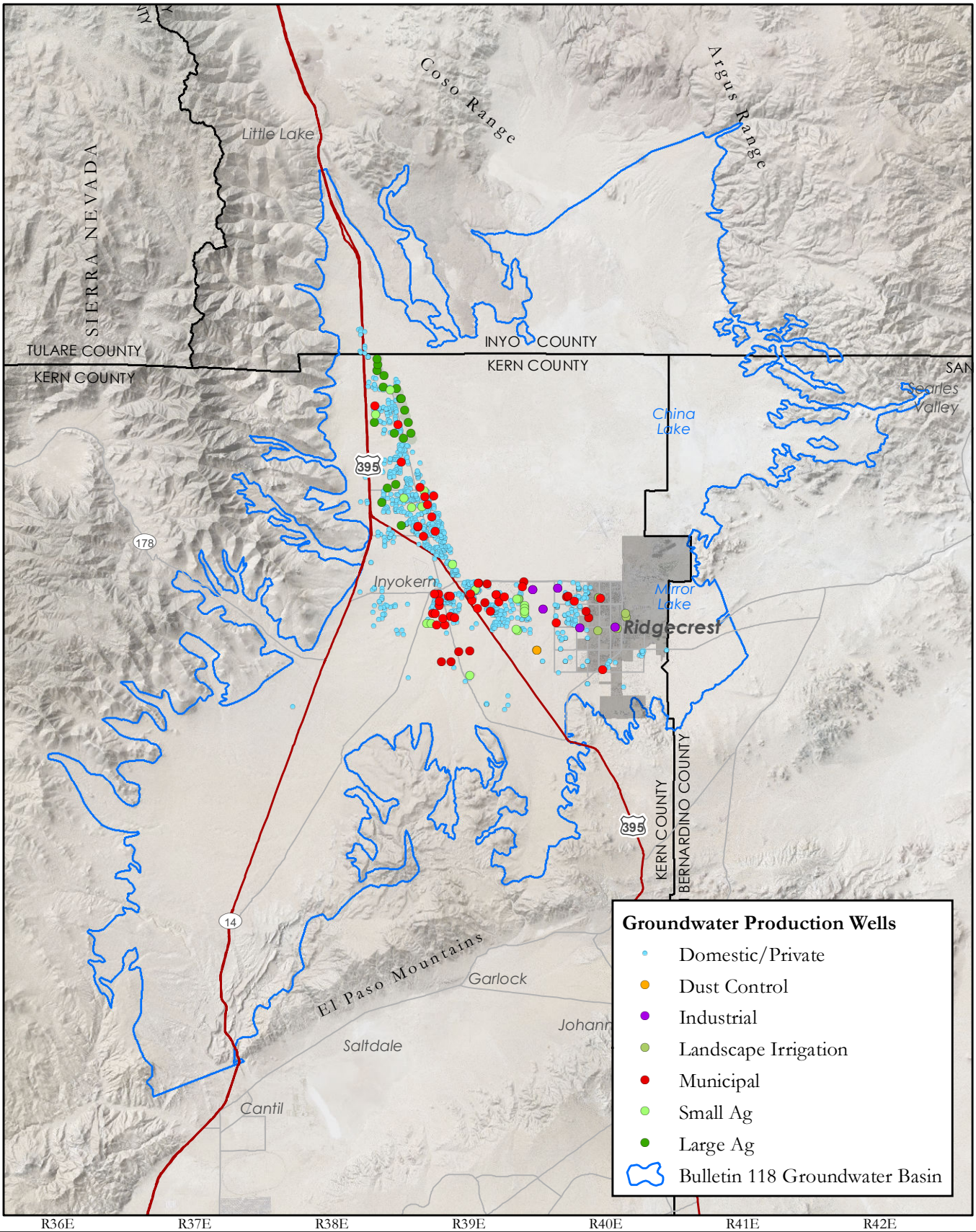
Document Path: J:\jn2652\IWV_Sec2_Surface_water.mxd

STETSON ENGINEERS INC.

STREAMS, RIVERS, AND OTHER SURFACE WATERS
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles



Document Path: J:\jn2652\IWV_Sec2_Groundwater_Production_Wells.mxd

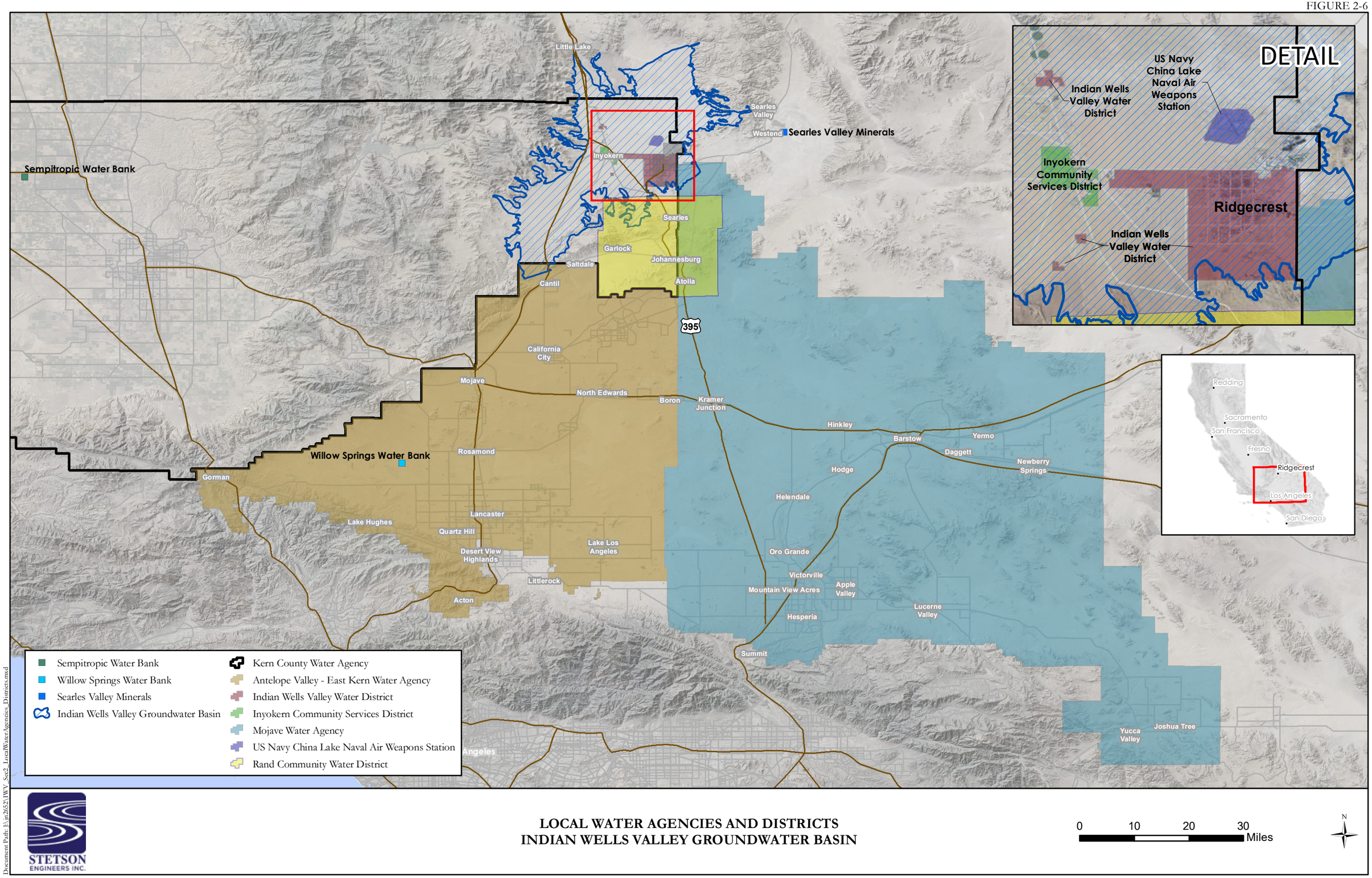
STETSON ENGINEERS INC.

LOCATIONS OF KNOWN GROUNDWATER PRODUCTION WELLS INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles

FIGURE 2-6



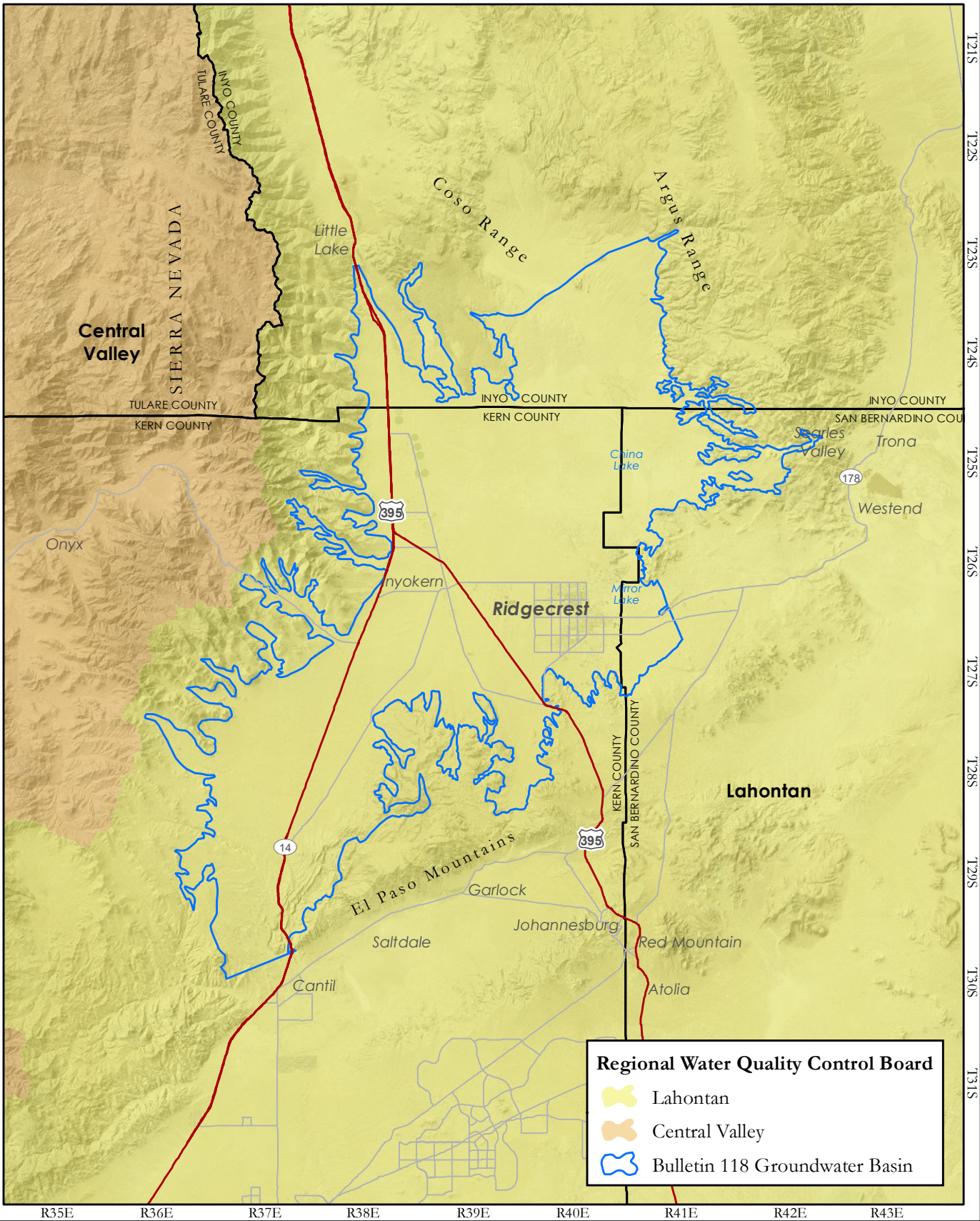
Document Path: J:\jn\2652\IWV_Sec2_LocalWaterAgencies_Districts.mxd

STETSON ENGINEERS INC.

LOCAL WATER AGENCIES AND DISTRICTS
INDIAN WELLS VALLEY GROUNDWATER BASIN

0 10 20 30 Miles

N



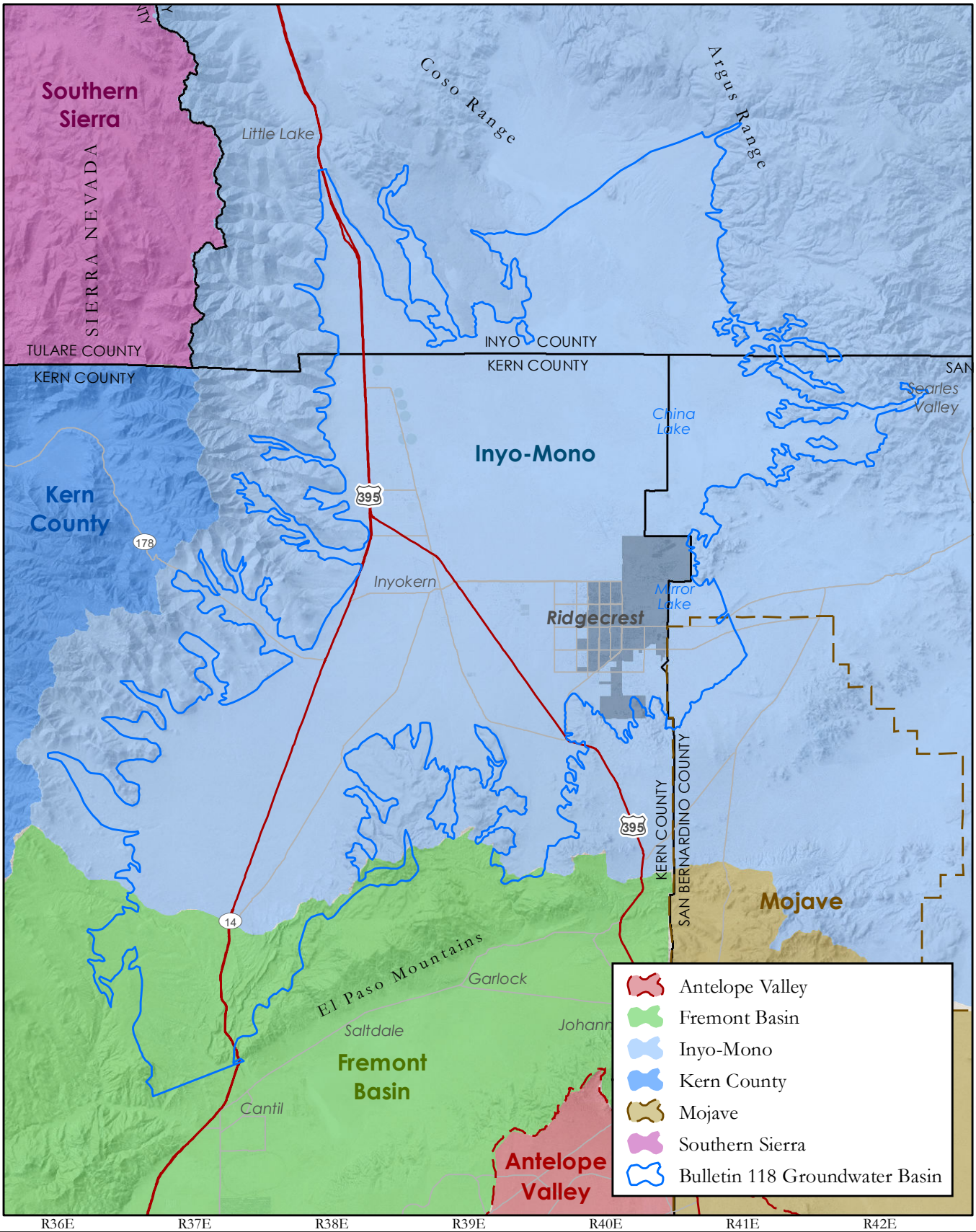
STETSON ENGINEERS INC.

REGIONAL BOARD BOUNDARIES
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2.5 5 Miles

Document Path: J:\jn2652\IWV_Sec2_Regional_Board_Boundaries.mxd



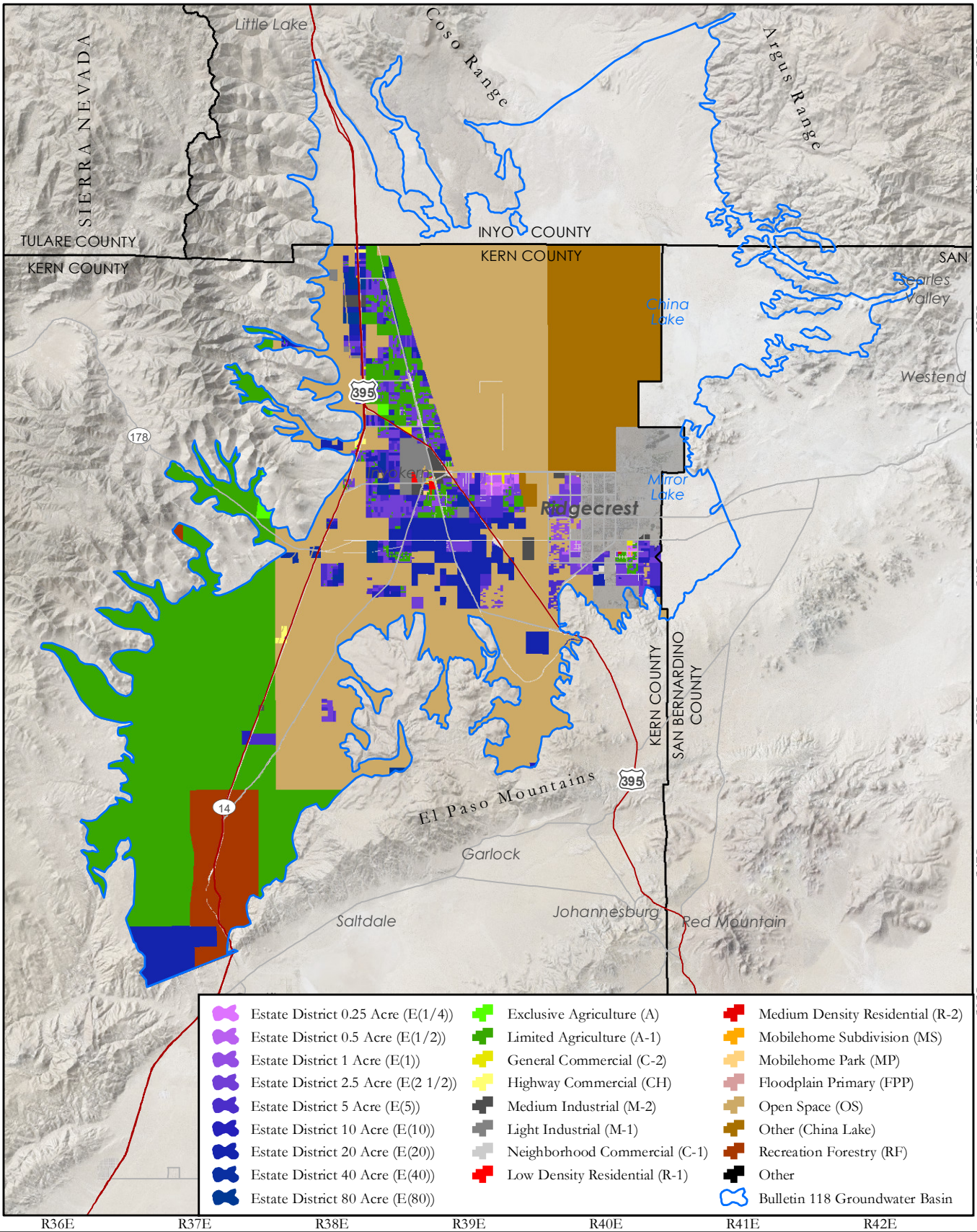
STETSON ENGINEERS INC.

INTEGRATED REGIONAL WATER MANAGEMENT (IRWM) BOUNDARIES
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_IRWM_Boundaries.mxd



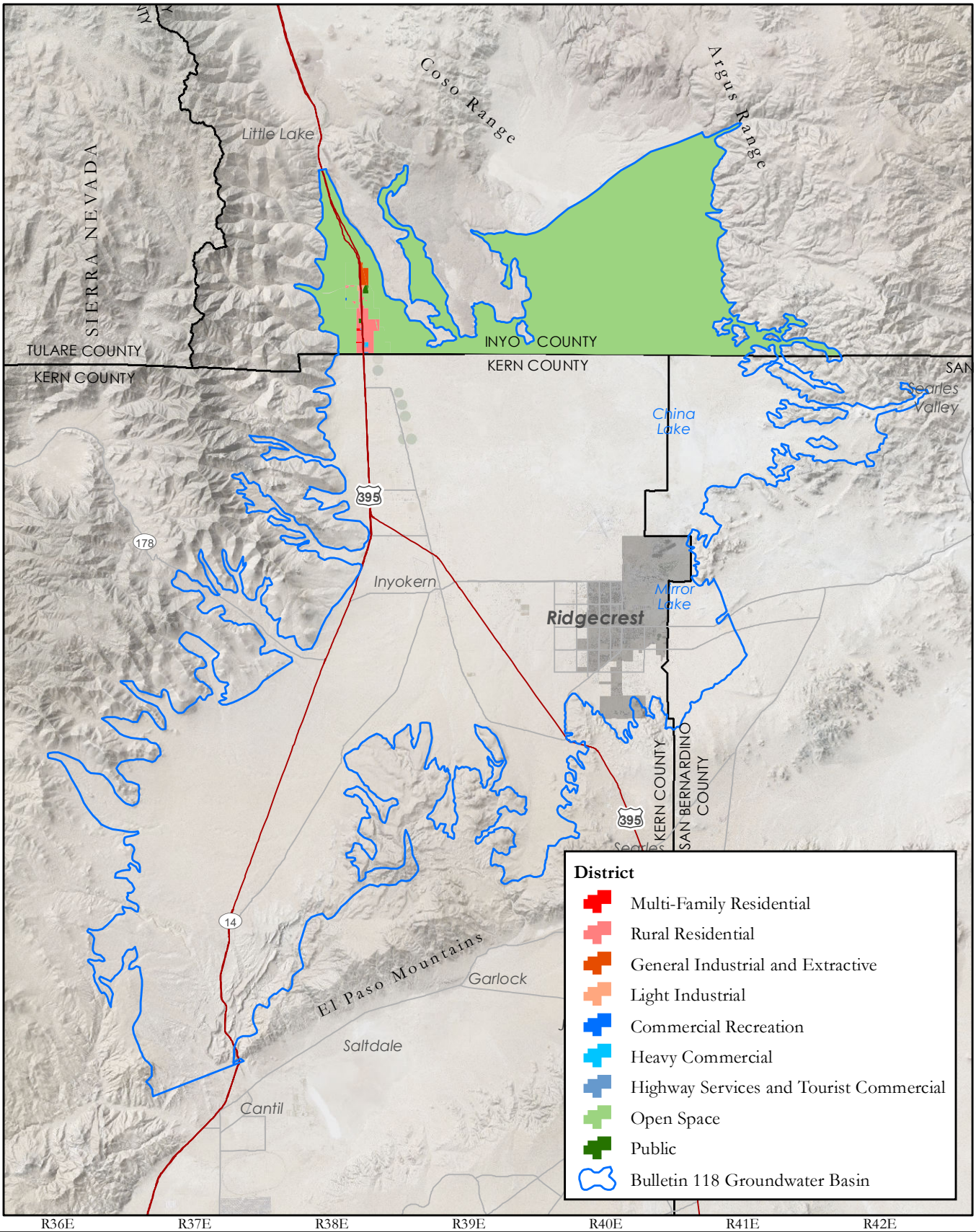
Document Path: J:\jn2652\IWV_Sec2_Kern_Zoning.mxd

STETSON ENGINEERS INC.

ZONING DISTRICTS (KERN COUNTY)
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles



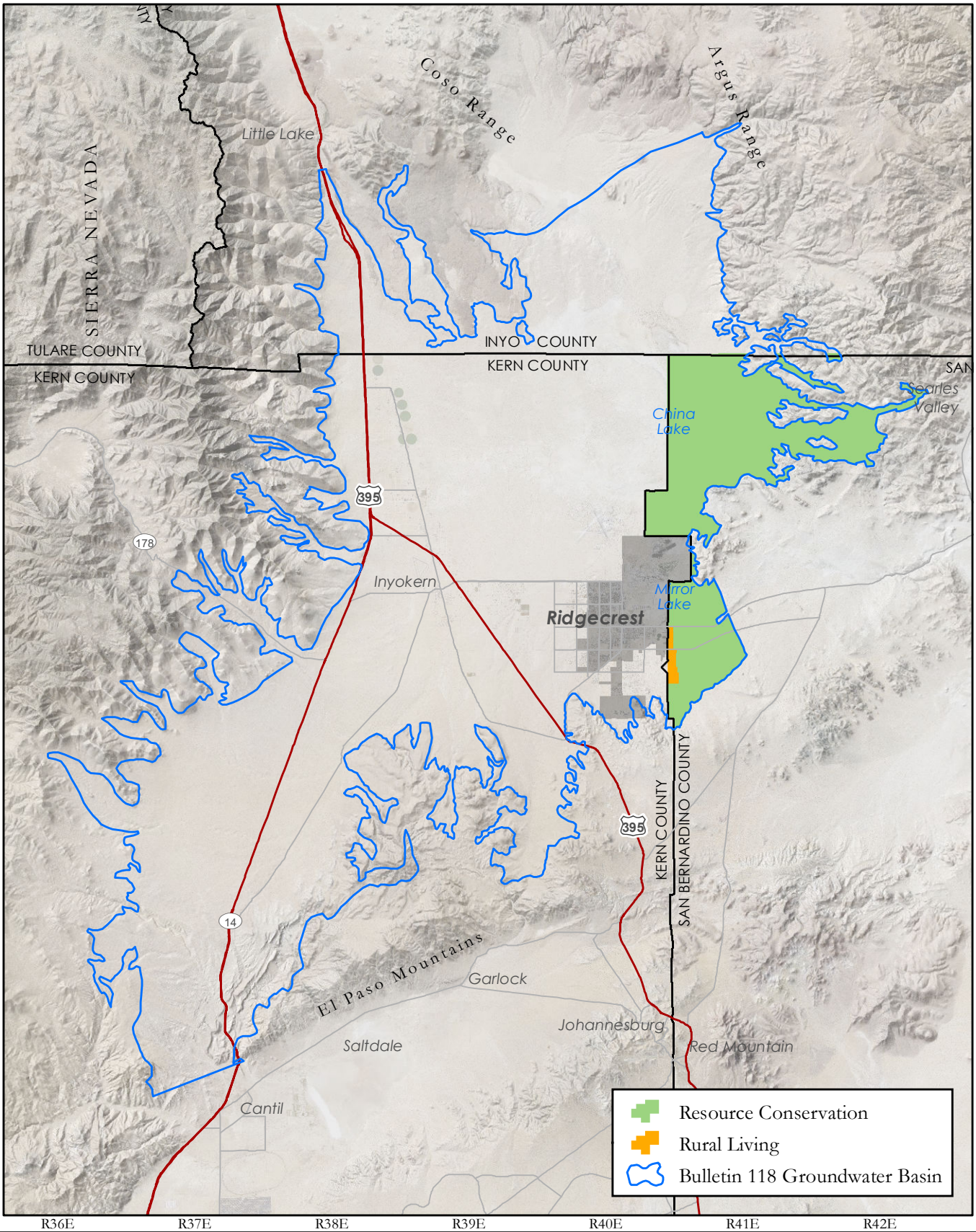
ZONING DISTRICTS (INYO COUNTY)
INDIAN WELLS VALLEY GROUNDWATER BASIN

STETSON ENGINEERS INC.

N

0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_Inyo_Zoning.mxd



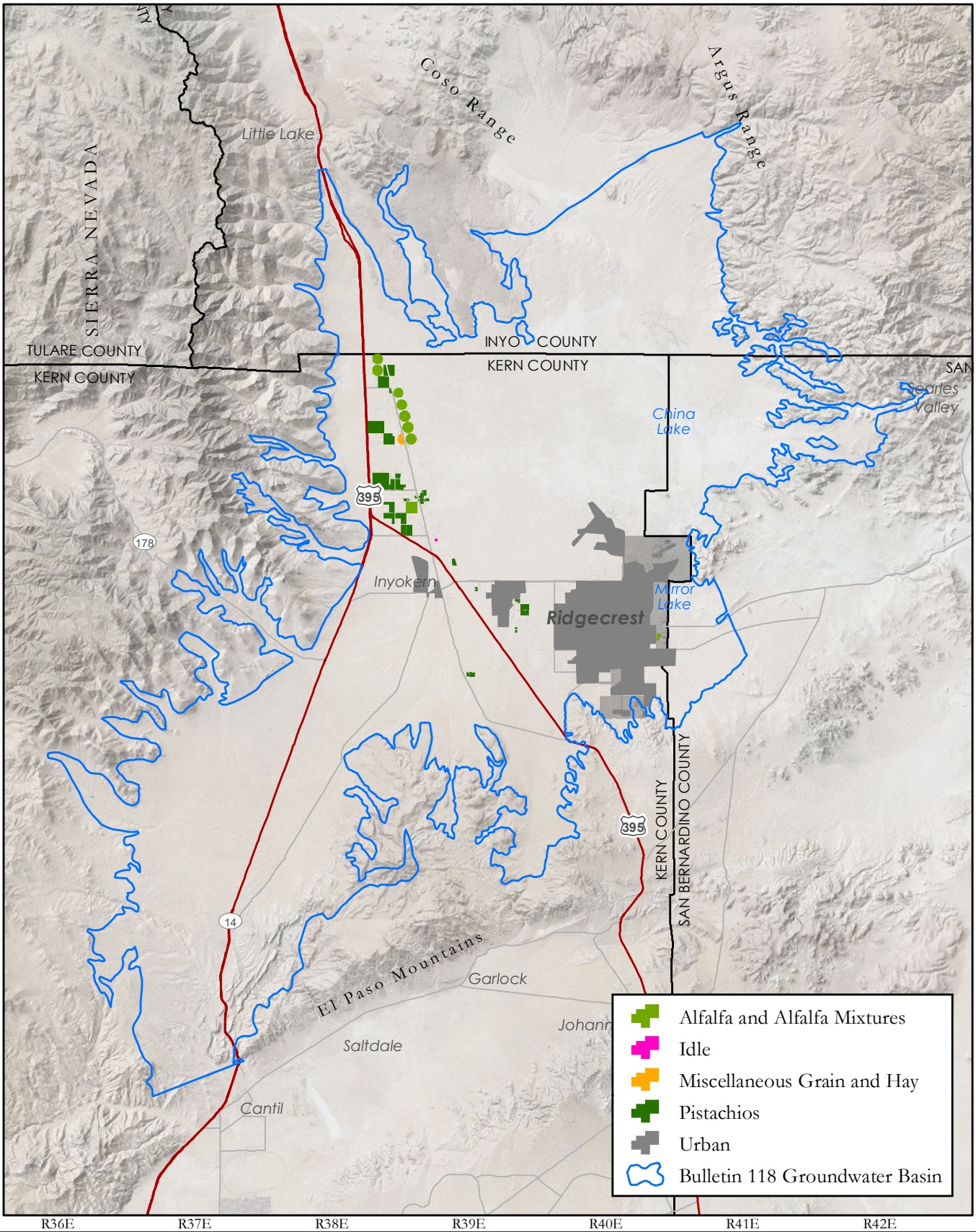
STETSON ENGINEERS INC.

ZONING DISTRICTS (SAN BERNARDINO COUNTY)
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_San_Bernardino_Zoning.mxd



STETSON ENGINEERS INC.

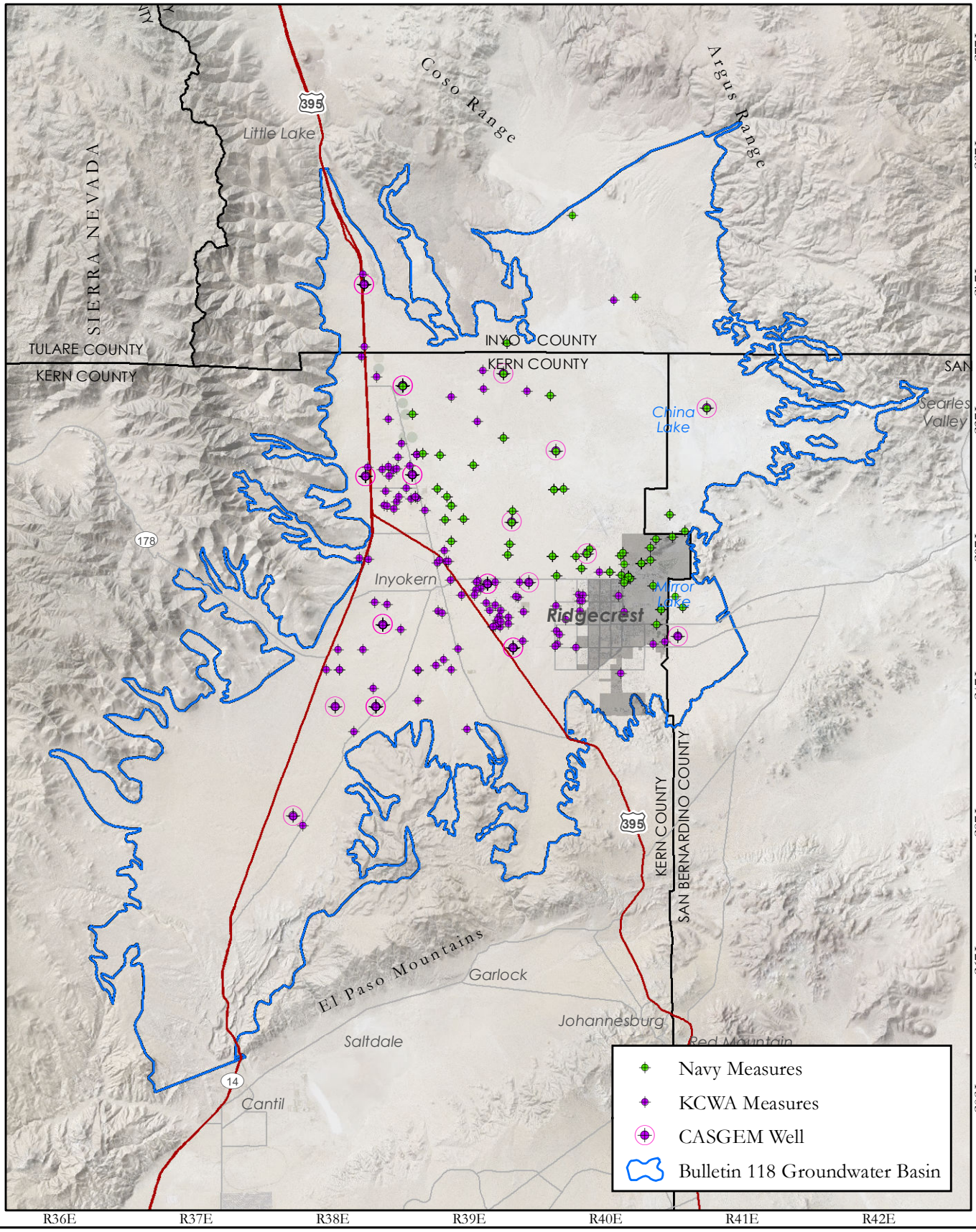
ACTIVE AGRICULTURAL LANDS
INDIAN WELLS VALLEY GROUNDWATER BASIN

Source: DWR State Crop Mapping 2014; https://data.cnra.ca.gov/dataset/crop-mapping-2014

N

0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_Active_Ag.mxd



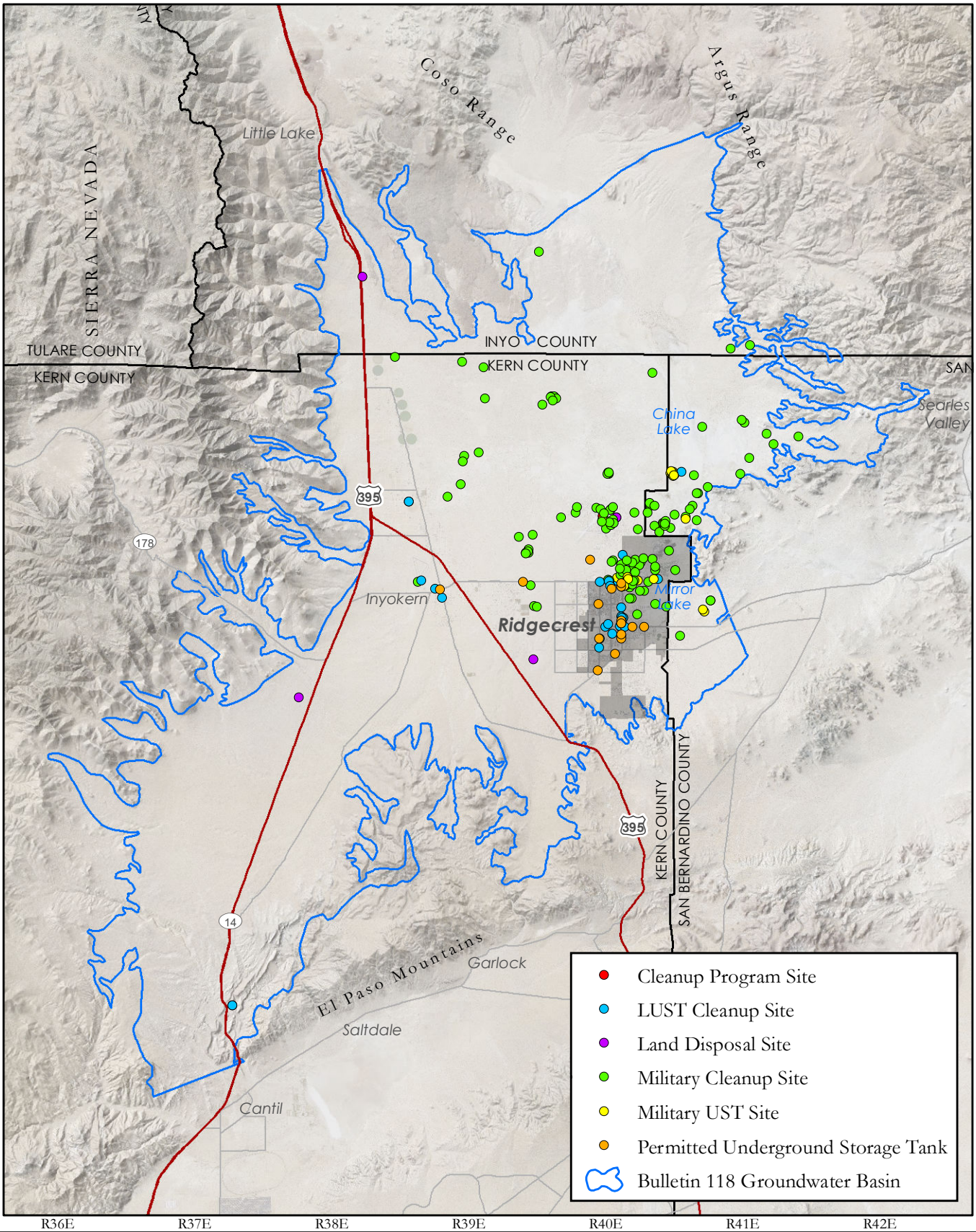
STETSON ENGINEERS INC.

LOCATIONS OF MONITORING WELLS
INDIAN WELLS VALLEY GROUNDWATER BASIN

N

0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_Monitoring_Wells.mxd



STETSON ENGINEERS INC.

LOCATIONS OF GROUNDWATER CONTAMINATION CLEANUP SITES INDIAN WELLS VALLEY GROUNDWATER BASIN

N

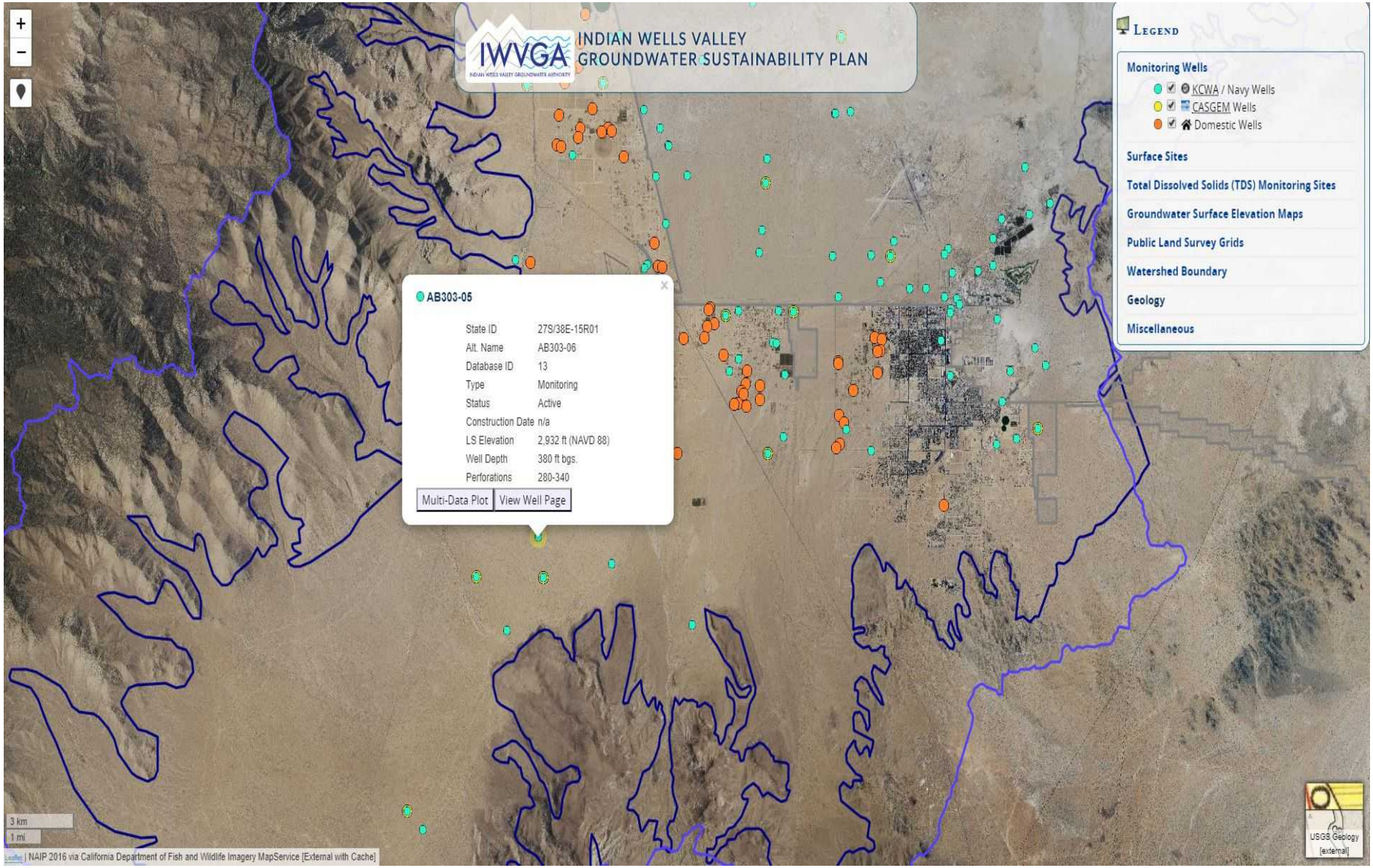
0 2 4 Miles

Document Path: J:\jn2652\IWV_Sec2_Cleanup_Sites.mxd

STETSON ENGINEERS INC.

Screenshot of the Data Management System Login Page

FIGURE 2-15

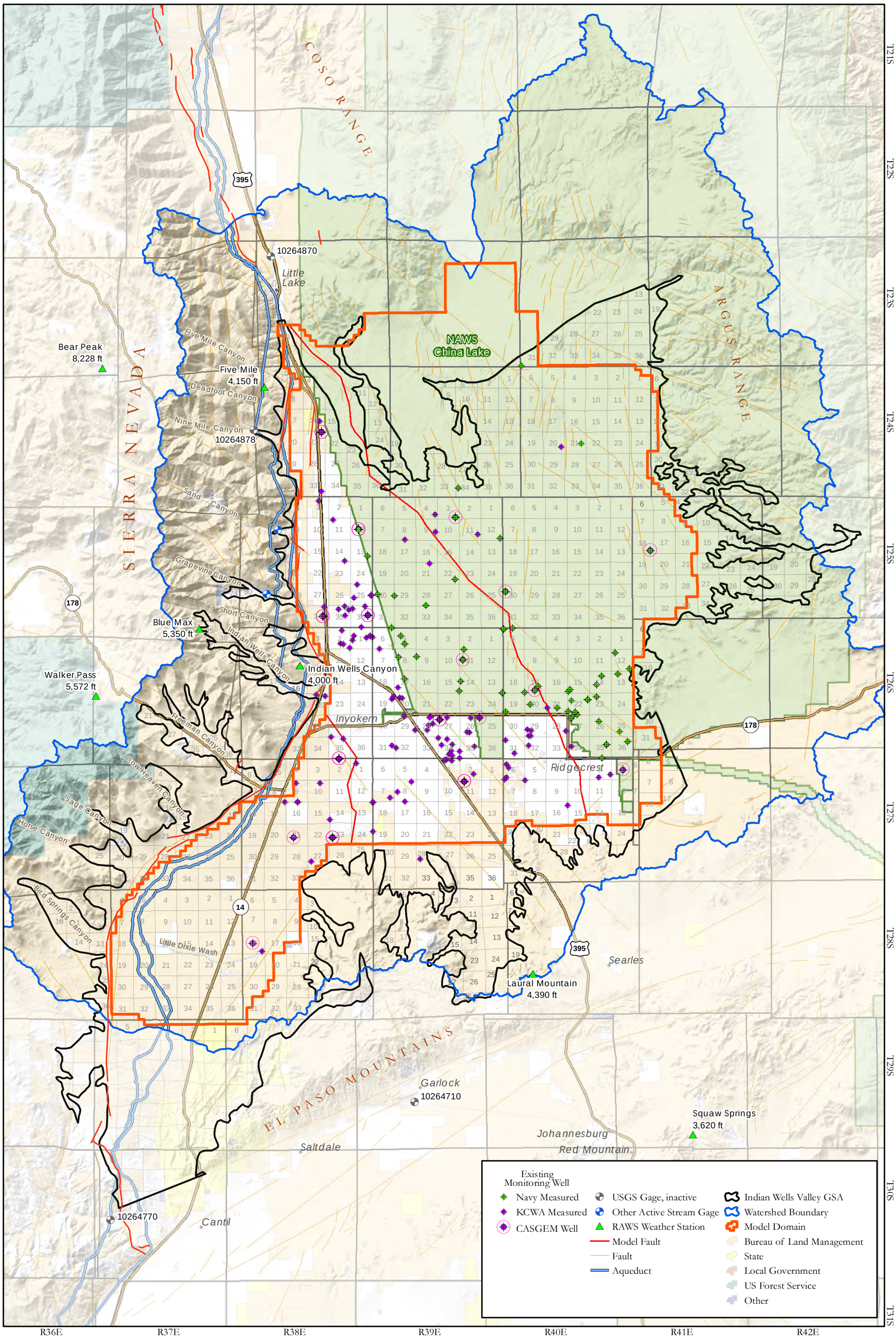


STETSON ENGINEERS INC.

Screenshot of the Data Management System Map Page

FIGURE 2-16

Document Path: J:\jn2652\IndianWellsValley_locationmap.mxd



STETSON ENGINEERS INC.

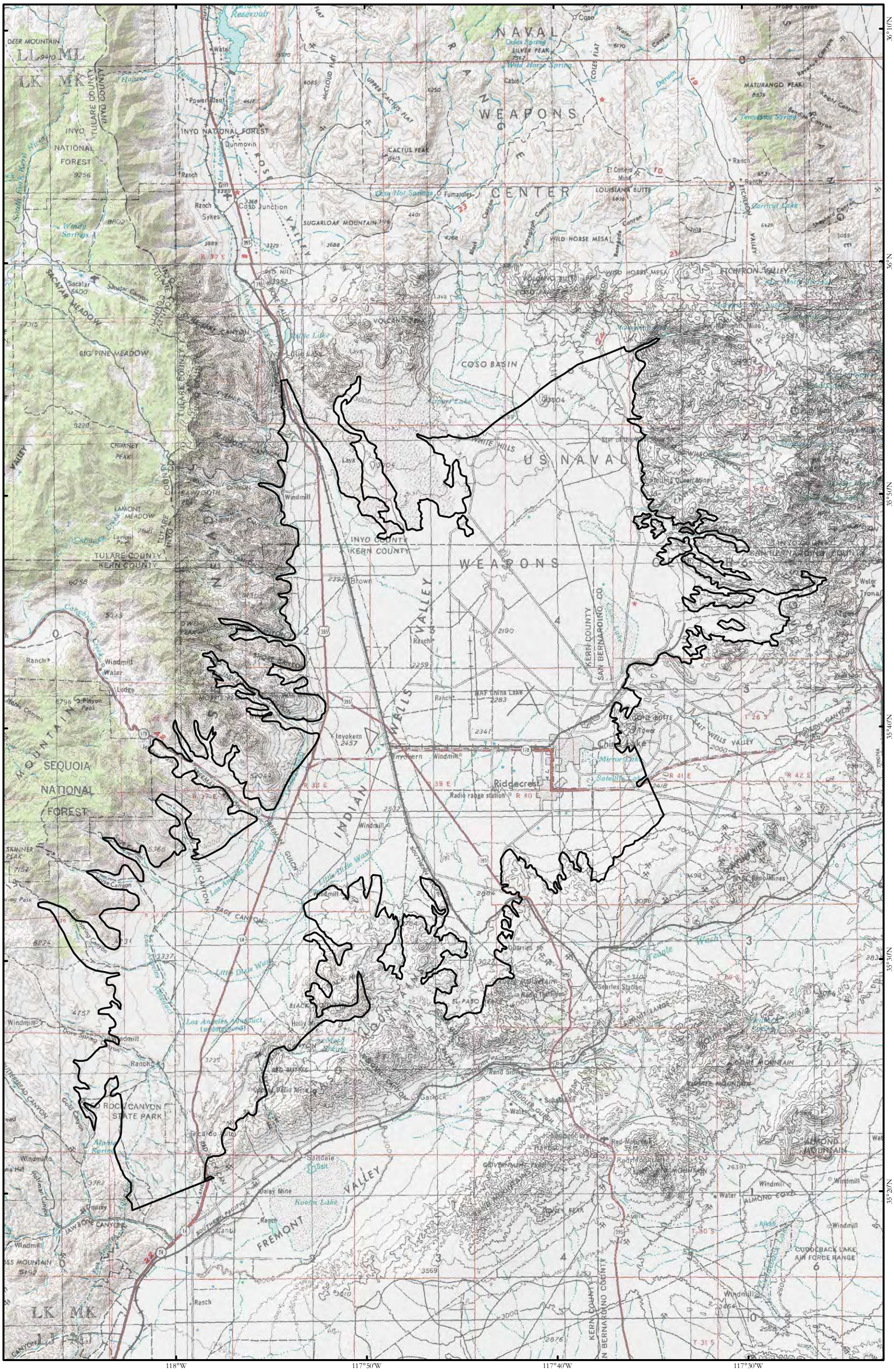
LOCATION MAP
INDIAN WELLS VALLEY
DRAFT 12/10/2019

0 2 4 Miles

N

FIGURE 3-1

Document Path: J:\jn2652\IndianWellsValley_topomap.mxd



Indian Wells Valley GSA

TOPOGRAPHIC MAP
INDIAN WELLS VALLEY
DRAFT 10/17/2019

USGS 250k Topographic Quads: Fresno (1966), Death Valley (1965), Bakersfield (1966), and Trona (1960).

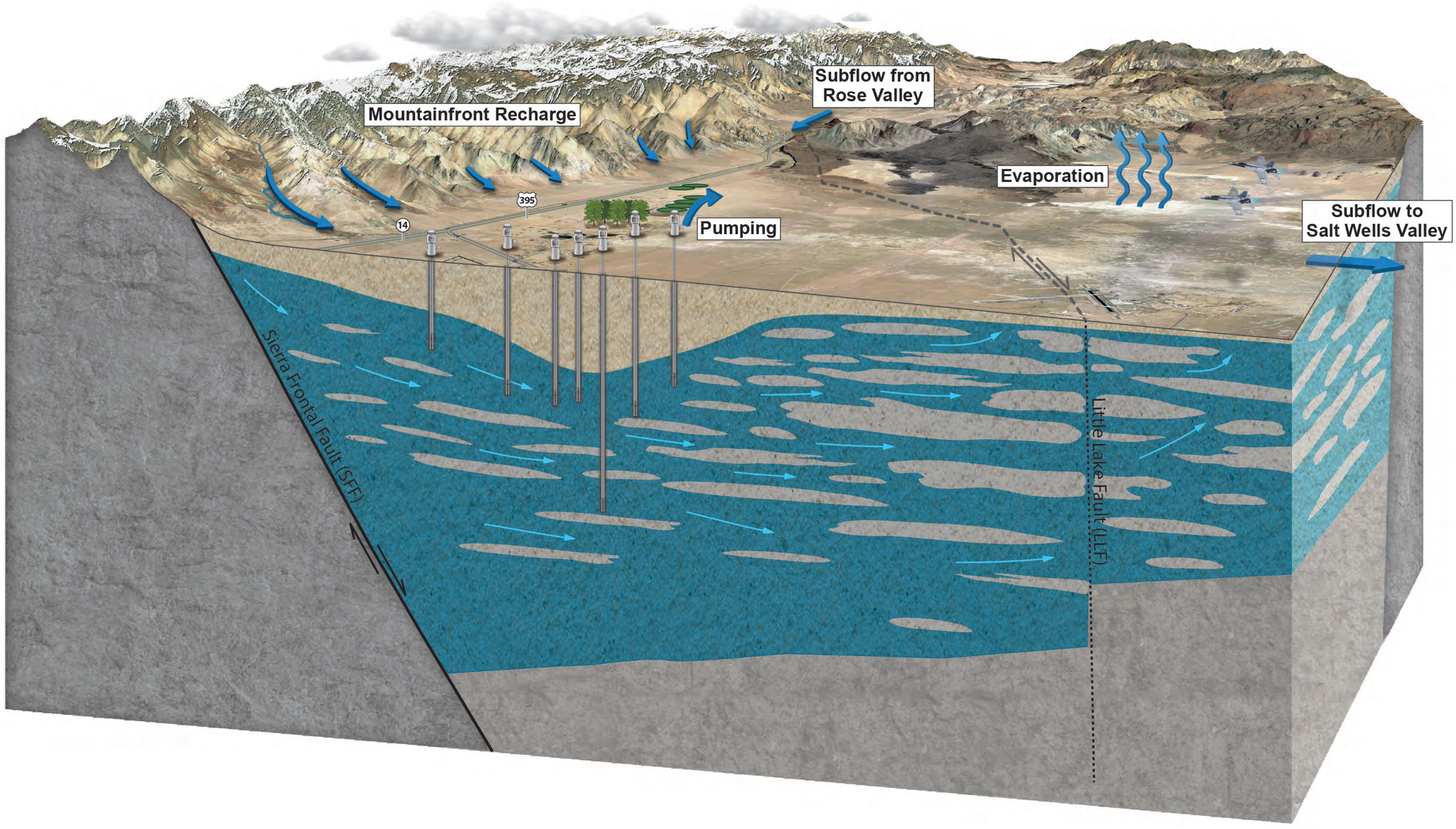
STETSON ENGINEERS INC.

N

0 2.5 5 Miles

FIGURE 3-2

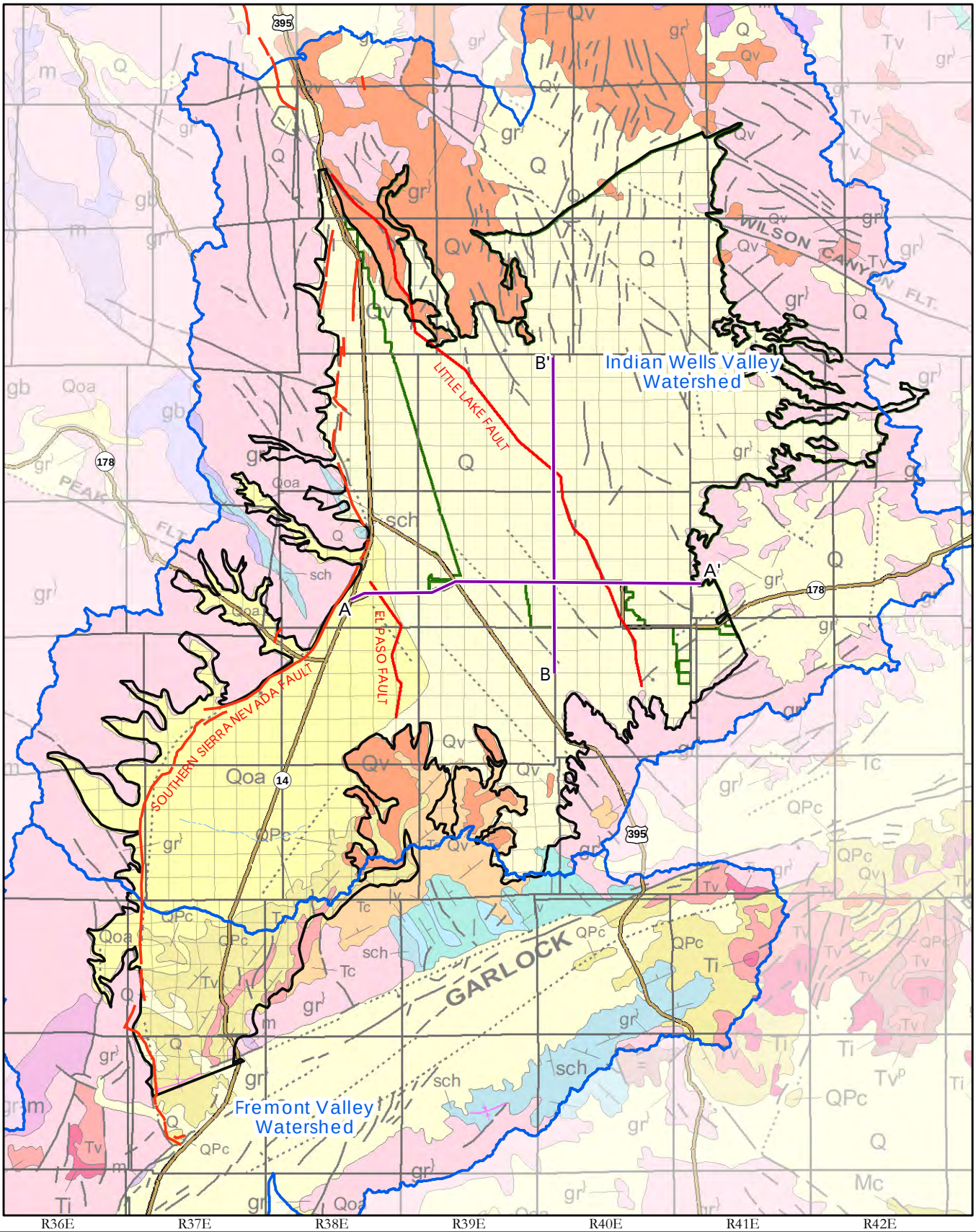
Document Path- C:/Job Folder/2652/Hydrologic Conceptual Model_8x11_1b.ai



STETSON ENGINEERS INC.

HYDROGEOLOGIC CONCEPTUAL MODEL
INDIAN WELLS VALLEY GROUNDWATER BASIN

FIGURE 3-3



GEOLOGY MAP
INDIAN WELLS VALLEY
DRAFT 12/10/2019

STETSON ENGINEERS INC.

Geology
California Geological Survey, Geologic Data Map No. 2 (2010)

Document Path: J:\jn2652\IndianWellsValley_geology_v3.mxd

Legend

- Cross Section (Berenbrock & Martin, 1991)
- Road
- Watershed Boundary
- Indian Wells Valley GSA
- Military Installation
- Township/Range
- Section

Faults

- contact, certain
- Regional Faults (Garner, 2017)
- fault, approx. located
- fault, certain
- fault, concealed
- fault, concealed, queried
- thrust fault, certain
- normal fault, certain
- normal fault, concealed

Quaternary

- Q — Alluvium, lake, playa and terrace deposits
- Qoa — Older alluvium, lake, playa and terrace deposits
- QPc — Sandstone, shale and gravel deposits
- Qv — Volcanic deposits

Tertiary

- Tc — Undivided sandstone (nonmarine), shale, conglomerate & breccia deposits
- Mc — Sandstone (nonmarine), shale, conglomerate & fanglomerate deposits
- Tv — Volcanic flow deposits
- Tvp — Pyroclastic & volcanic mudflow deposits
- Ti — Intrusive rocks

Mesozoic

- sch — Schists
- gr-m — Granitic & metamorphic rocks
- mv — Undivided metavolcanic rocks
- gr^{Mz} — Granite & qtz-rich igneous rocks
- gb — Gabbro & dark dioritic rocks

Paleozoic

- Pz — Undivided metasedimentary rocks
- m — Undivided metasedimentary and metavolcanic rocks
- pzv — Undivided metavolcanic rocks

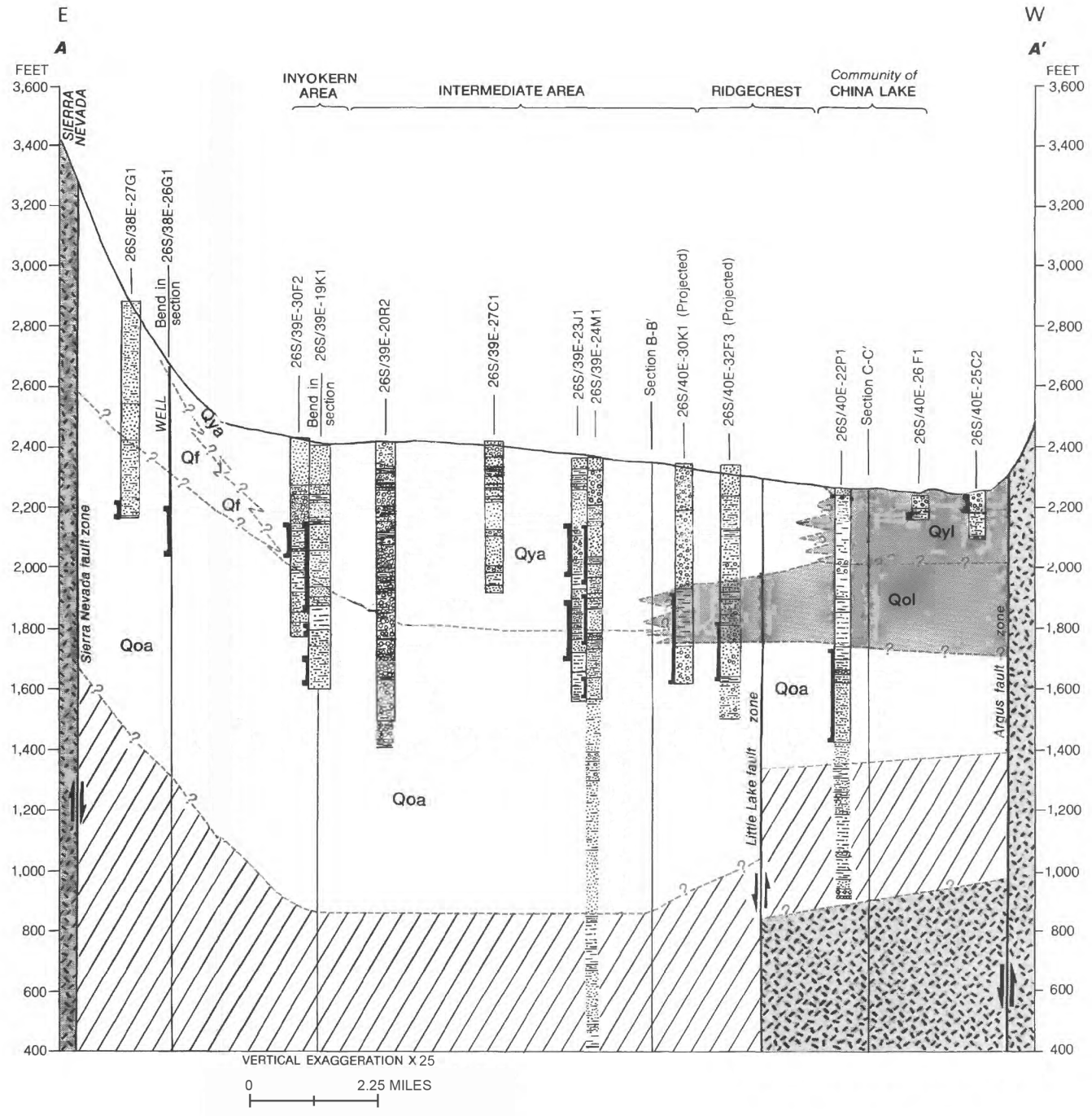
Pre-Cambrian

- pC — Sedimentary and metamorphic basement

C:\\WorkFolder/2652-001\08\03/GEOLOGY MAP LEGEND_1a.ai

STETSON ENGINEERS INC.

GEOLOGY MAP LEGEND
INDIAN WELLS VALLEY

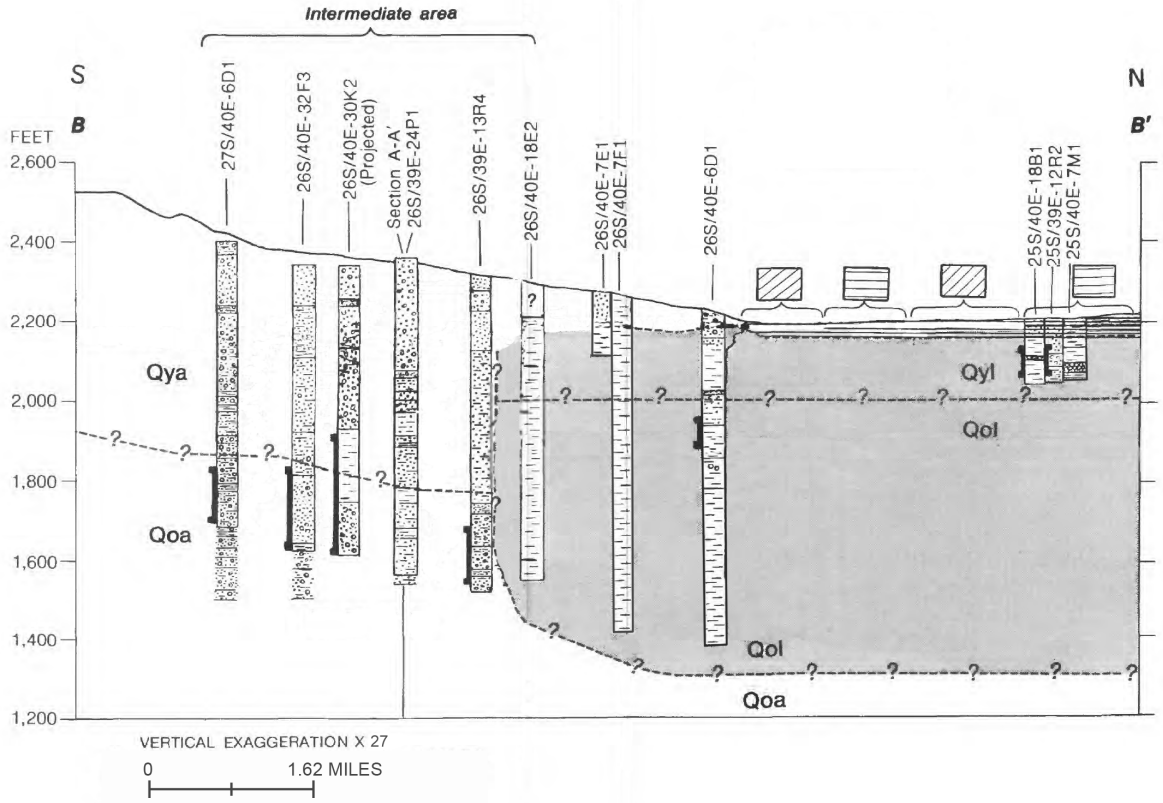


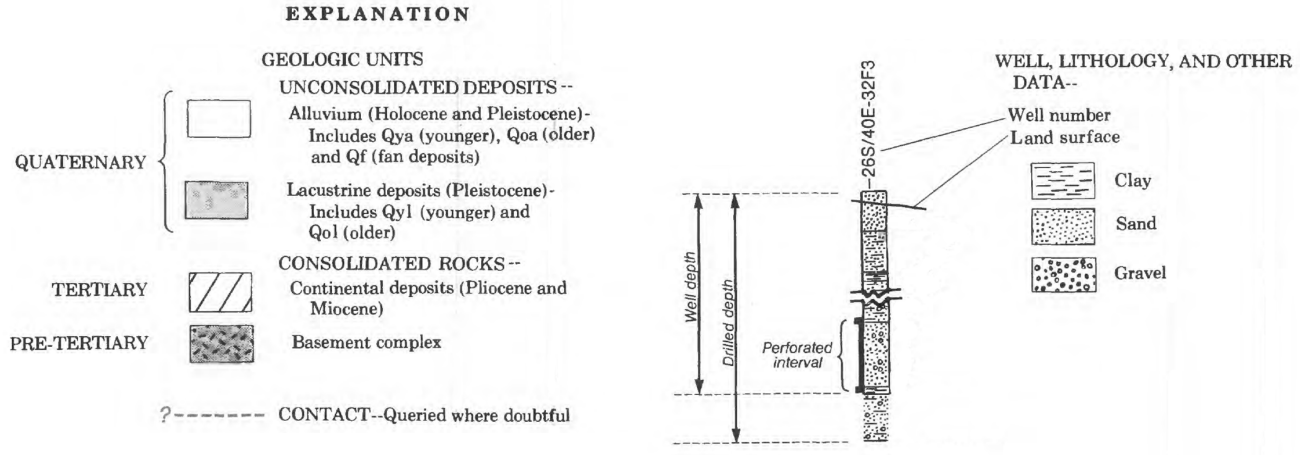
Modified from Berenbrock and Martin (1991, Figure 3); Kunkel and Chase (1969, Figure 3)

CROSS-SECTION A TO A'
INDIAN WELLS VALLEY

STETSON ENGINEERS INC.

C:\WorkFolder\2652-001\08\03\CrossSectA-A_PAGE_Portrait_1a.ai





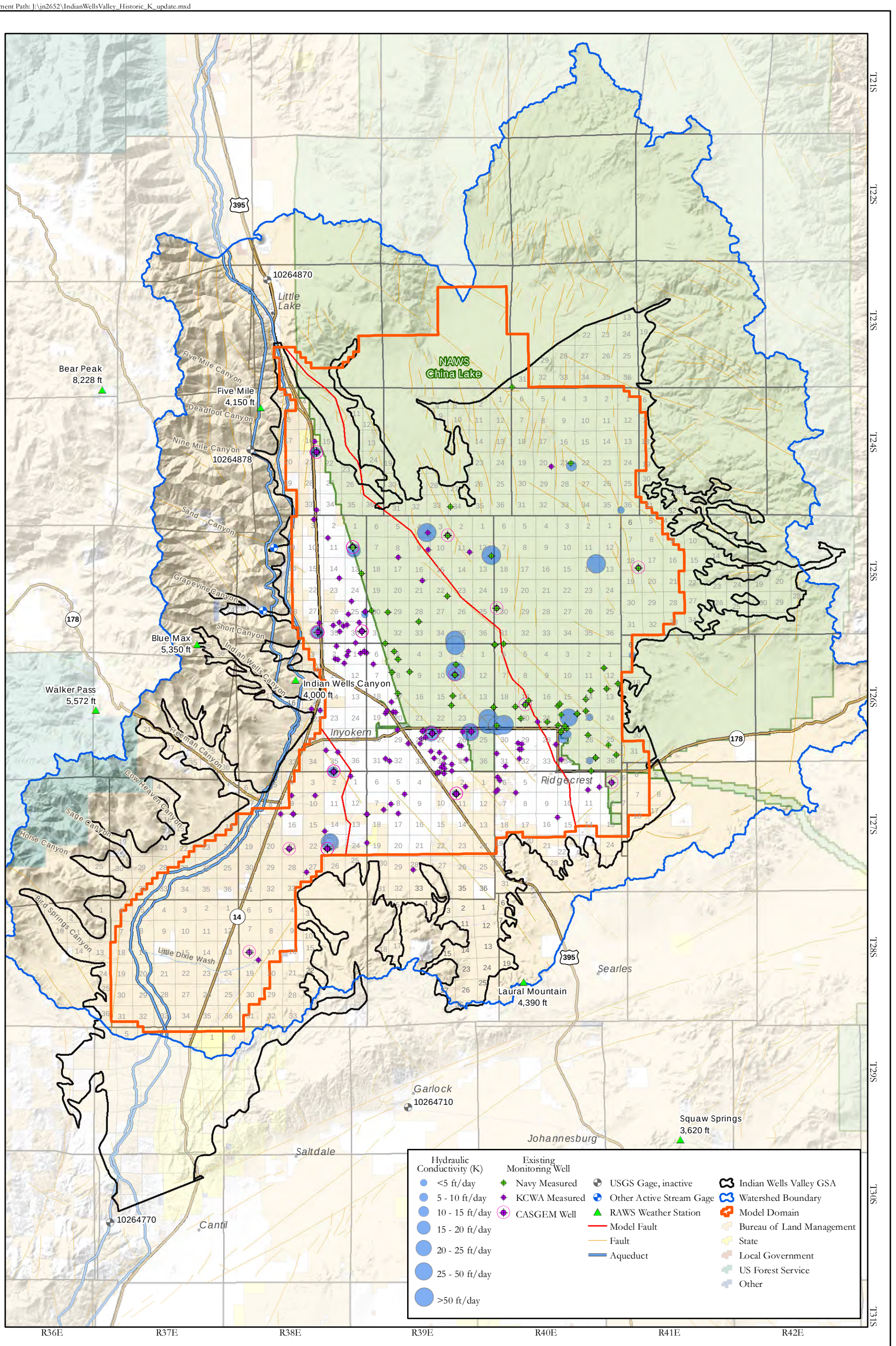
Modified from Berenbrock and Martin (1991, Figure 3); Kunkel and Chase (1969, Figure 3)

CROSS-SECTION B TO B'
INDIAN WELLS VALLEY

STETSON ENGINEERS INC.

C:\WorkFolder\2652-001\98\03\CrossSectB-B_PAGE_Portrait_1a.ai

Document Path: J:\jn2652\IndianWellsValley_Historic_K_update.mxd



STETSON ENGINEERS INC.

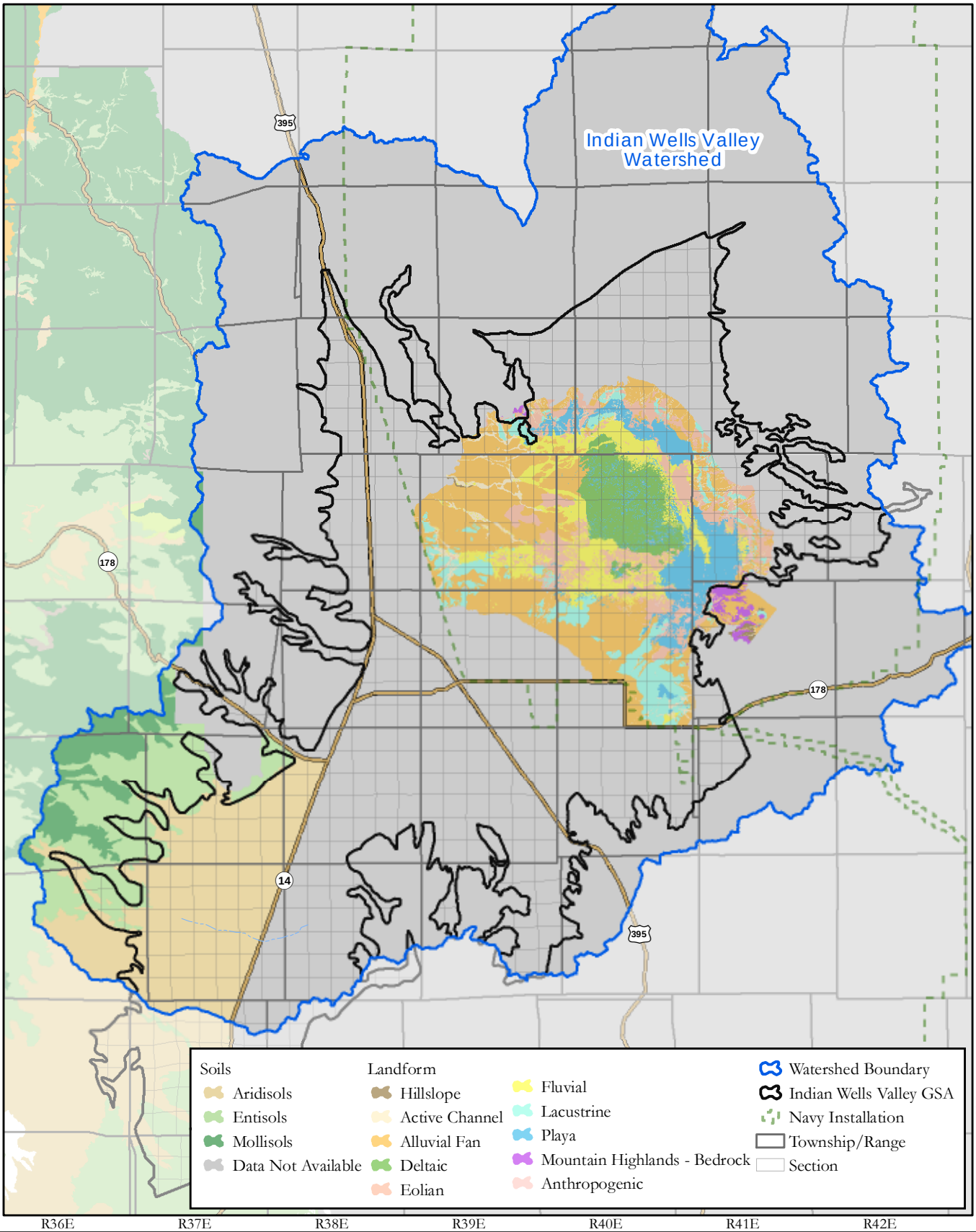
HISTORICAL AQUIFER TEST LOCATIONS

INDIAN WELLS VALLEY
DRAFT 12/10/2019

0 2 4 Miles

N

FIGURE 3-6



STETSON ENGINEERS INC.

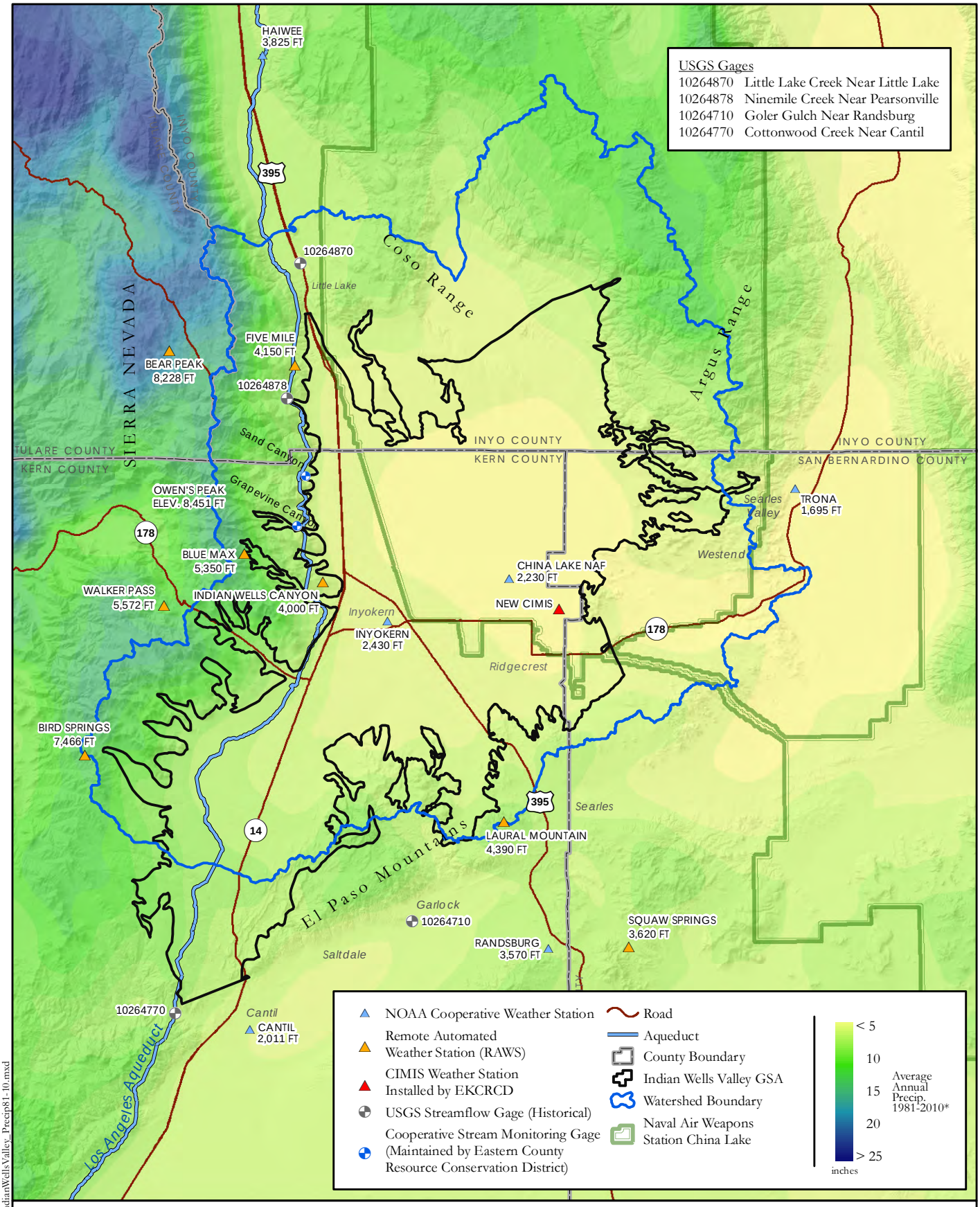
Soils
NRCS SSURGO (2018)
Landforms
Bullard, Bacon, Adams, and Decker, May 2019.
Prepared by DRI for Navy, China Lake.

SOILS AND LANDFORMS
INDIAN WELLS VALLEY
DRAFT 12/10/2019

N

0 3 6
Miles

Document Path: J:\jn2652\IndianWellsValley_soils.mxd



WEATHER STATIONS, STREAM GAGES, AND AVERAGE ANNUAL PRECIPITATION

INDIAN WELLS VALLEY

DRAFT 12/10/2019

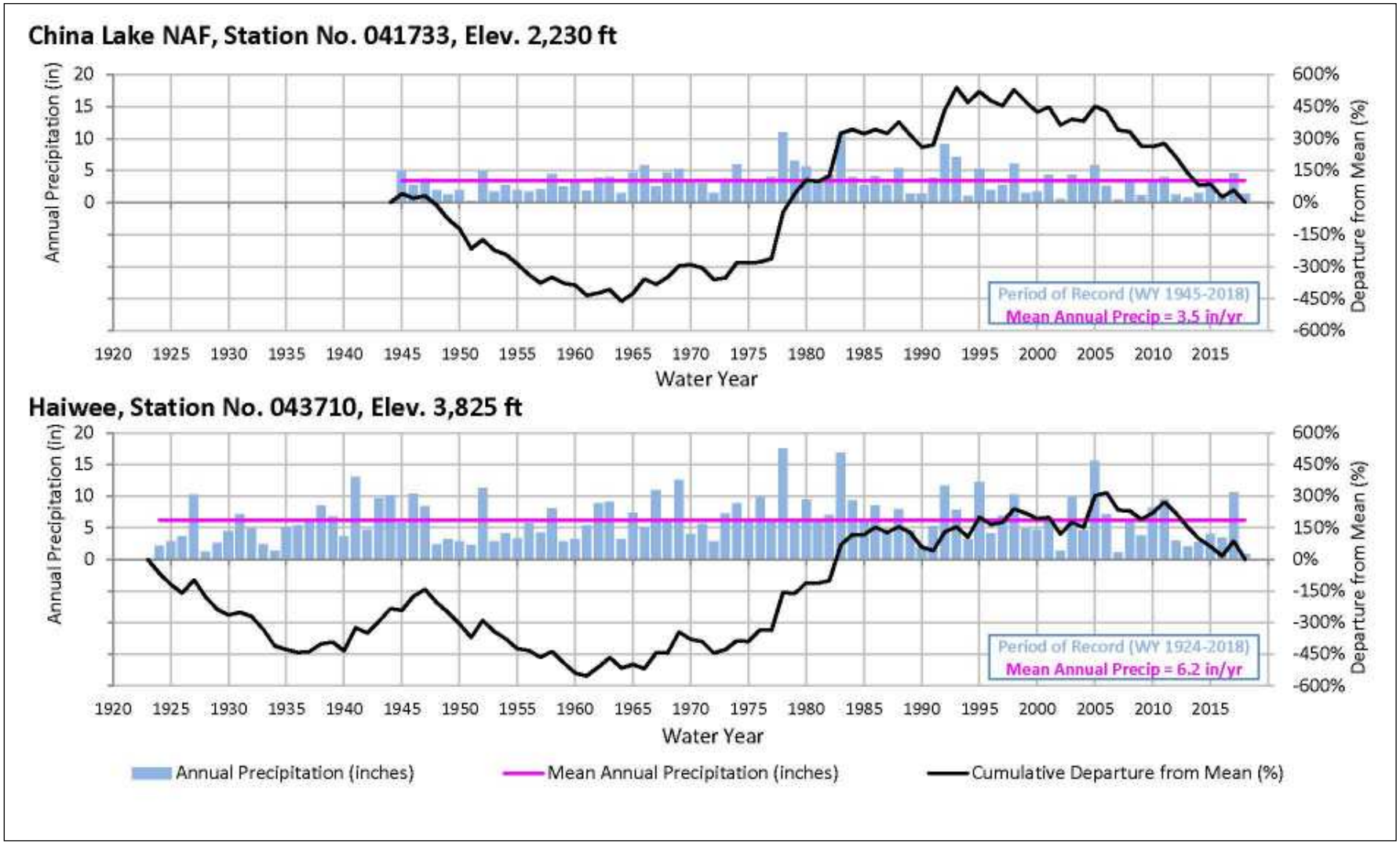
STETSON ENGINEERS INC.

N

0 4 8 Miles

* OREGON STATE PRISM CLIMATE GROUP, CLIMATE NORMALS FOR 1981-2010

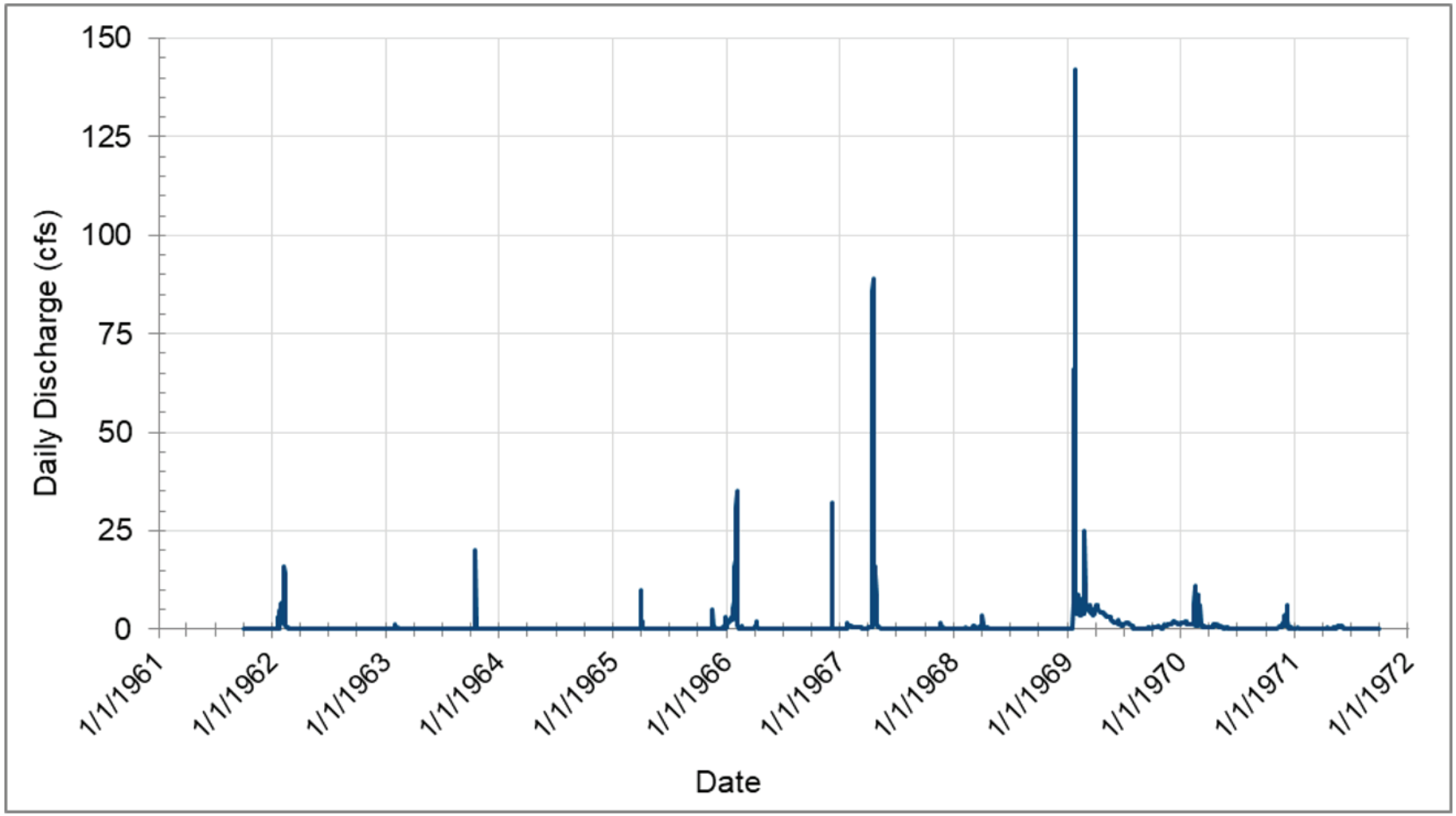
Document Path: J:\jn2652\IndianWellsValley_Precip81-10.mxd



STETSON ENGINEERS INC.

ANNUAL PRECIPITATION AND CUMULATIVE DEPARTURE FROM MEAN AT STATIONS WITHIN/NEAR INDIAN WELLS VALLEY GROUNDWATER BASIN

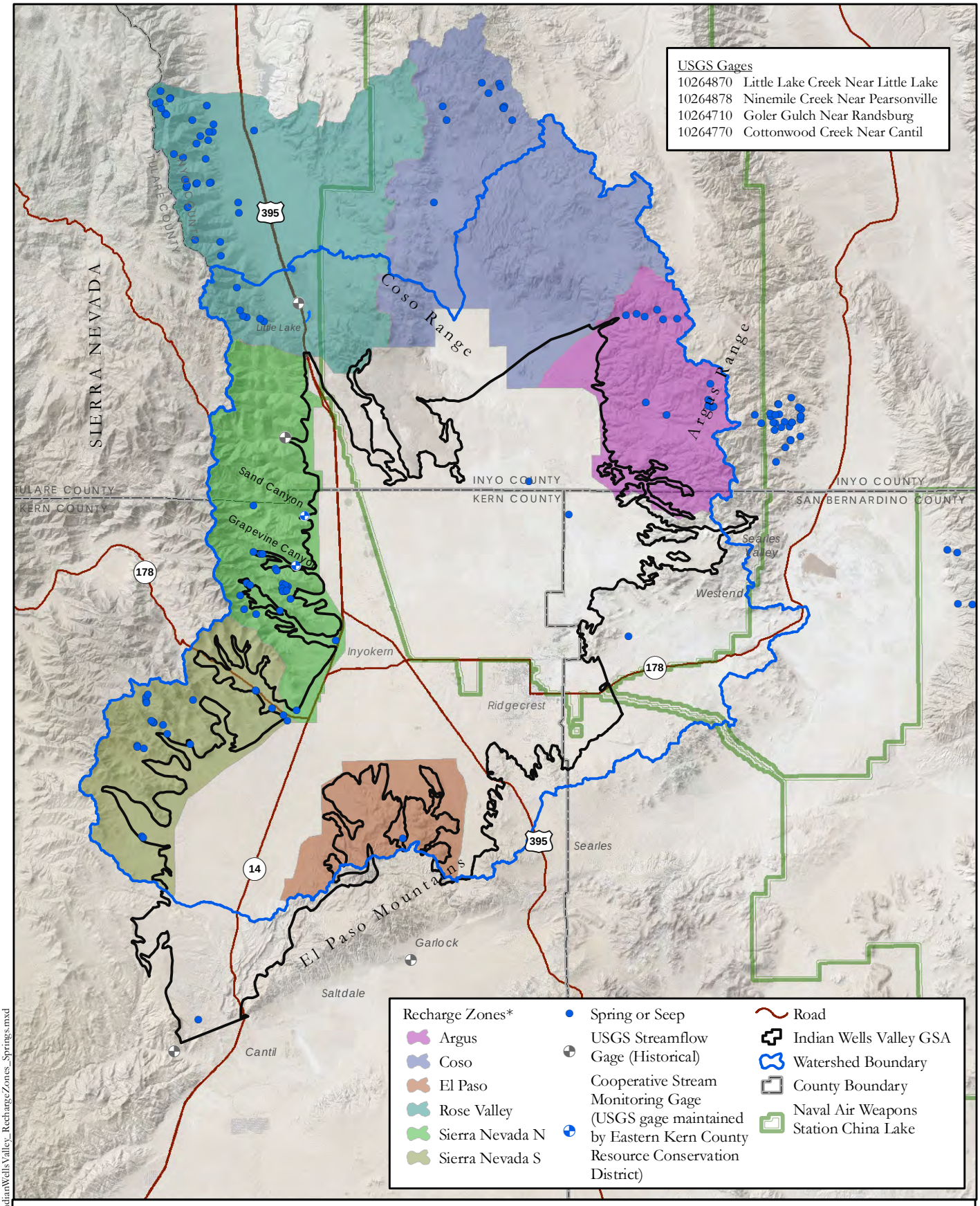
FIGURE 3-9



STETSON ENGINEERS INC.

HYDROGRAPH OF DAILY DISCHARGE AT NINEMILE CREEK NEAR PEARSONVILLE, USGS GAGE 10264878, 1961-1971

FIGURE 3-10



STETSON ENGINEERS INC.

RECHARGE ZONES AND SPRINGS
INDIAN WELLS VALLEY
DRAFT 12/10/2019

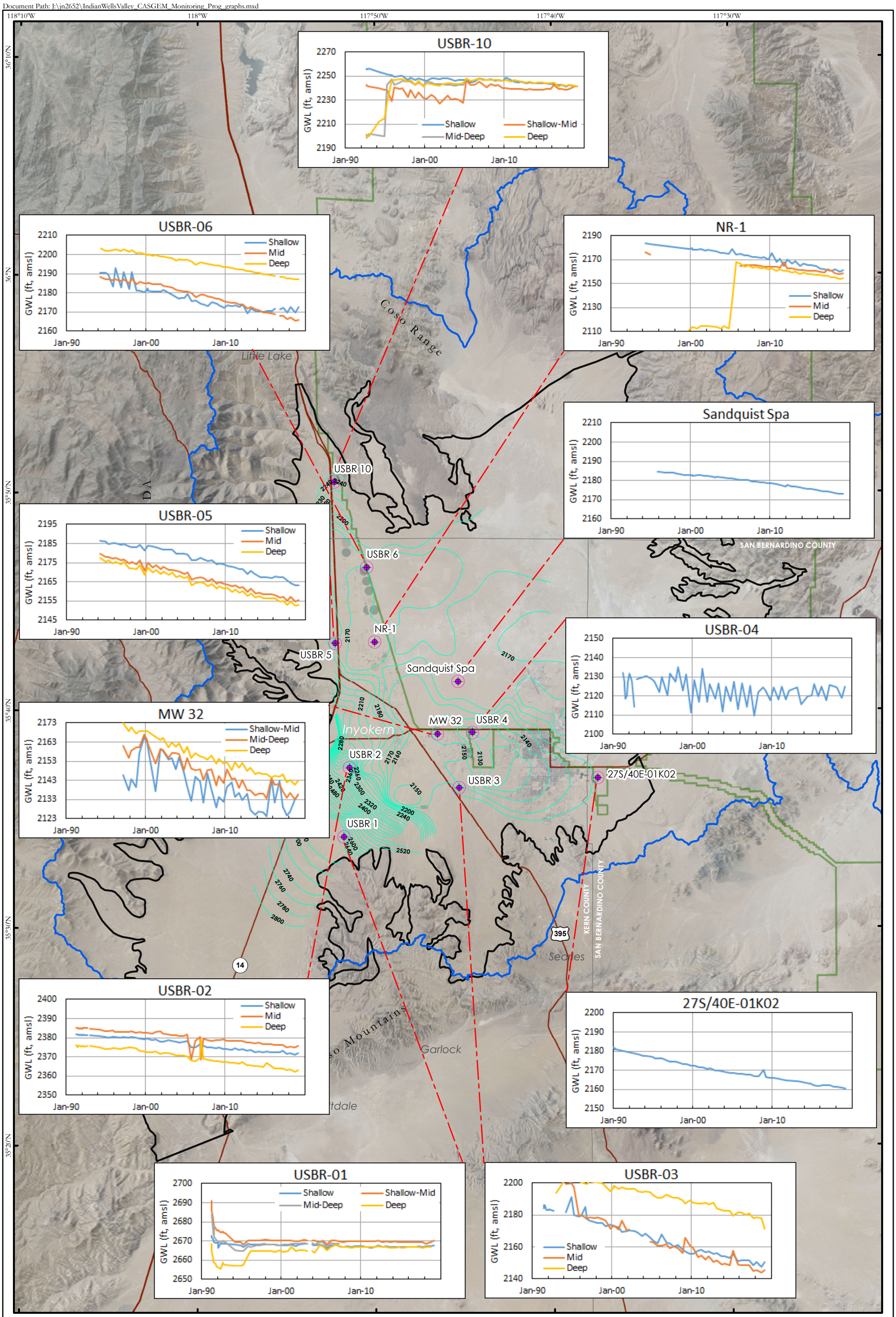
*Recharge zones as developed by Desert Research Institute (McGraw et al, 2016)

N

0 4 8 Miles

Document Path: J:\jn2652\IndianWellsValley_RechargeZones_Springs.mxd

Document Path: J:\jn2652\IndianWellsValley_CASGEM_Monitoring_Prog_graphs.mxd



CASGEM Well
Spring 2015 GWL (KCWA)
Indian Wells Valley GSA
Watershed Boundary
Navy
County Boundary

STETSON ENGINEERS INC.

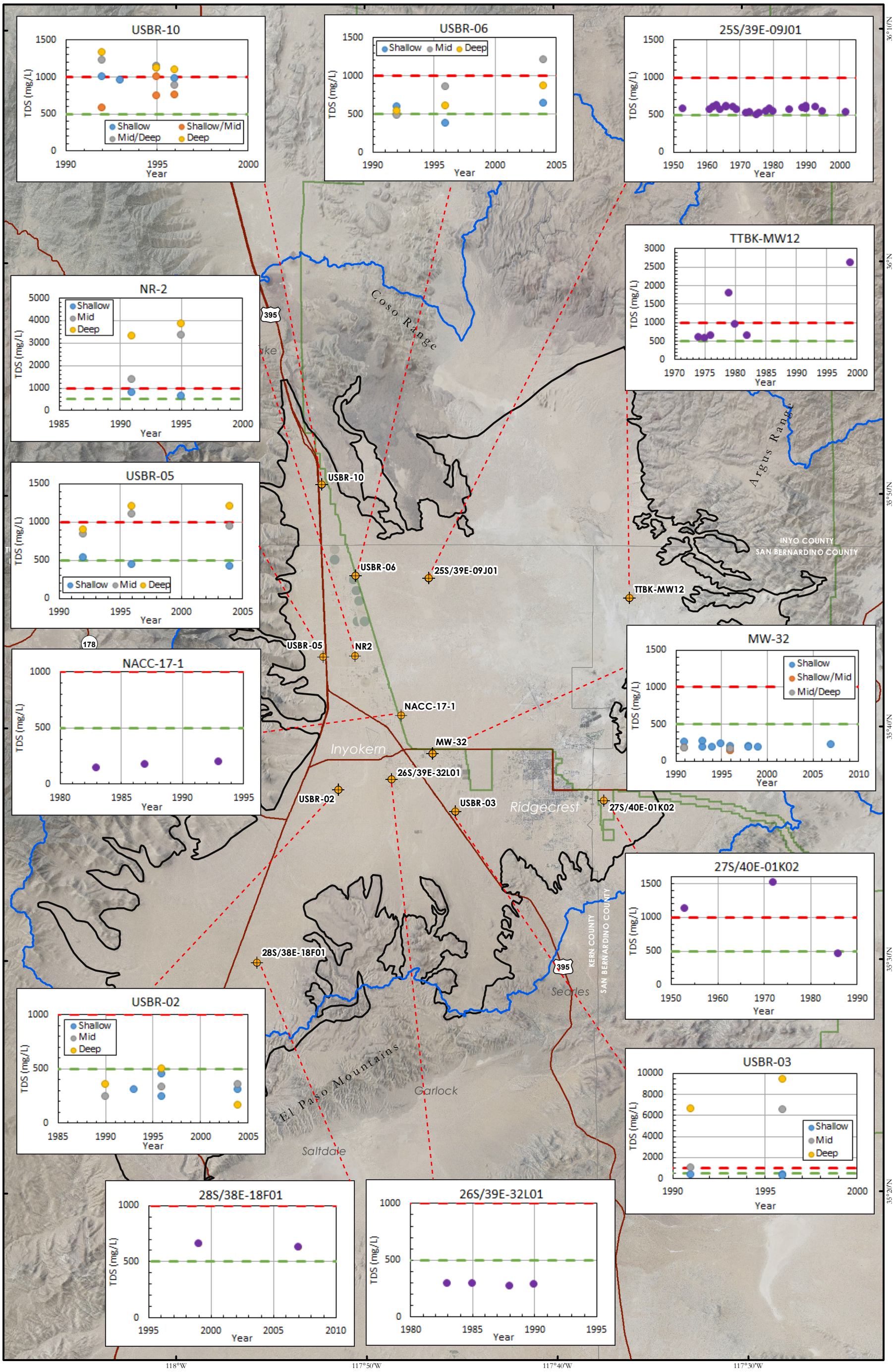
MULTI-LEVEL MONITORING WELLS
INDIAN WELLS VALLEY
DRAFT 6/27/2019

0 2.5 5 Miles

N

FIGURE 3-12

Document Path: J:\jn2652\IndianWellsValley_TDSTrends.mxd



Well
Indian Wells Valley GSA
Watershed Boundary
Navy
County Boundary

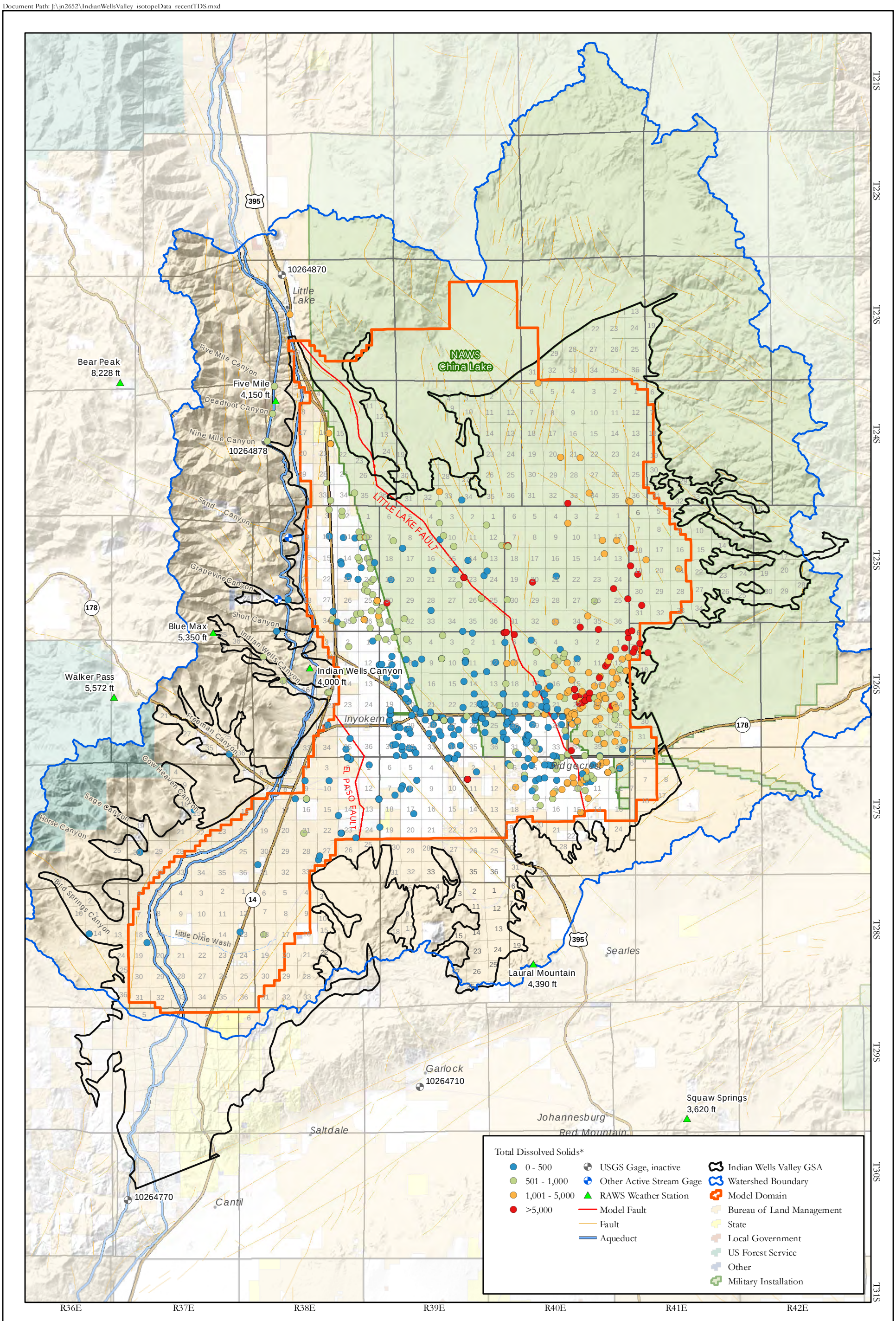
STETSON ENGINEERS INC.

TDS (MG/L) TRENDS
INDIAN WELLS VALLEY
DRAFT 10/18/2019

N
0 2.5 5
Miles

FIGURE 3-13

Document Path: J:\jn2652\IndianWellsValley_isotopeData_recentTDS.mxd



STETSON ENGINEERS INC.

MOST RECENT TDS (MG/L)
INDIAN WELLS VALLEY
DRAFT 12/10/2019

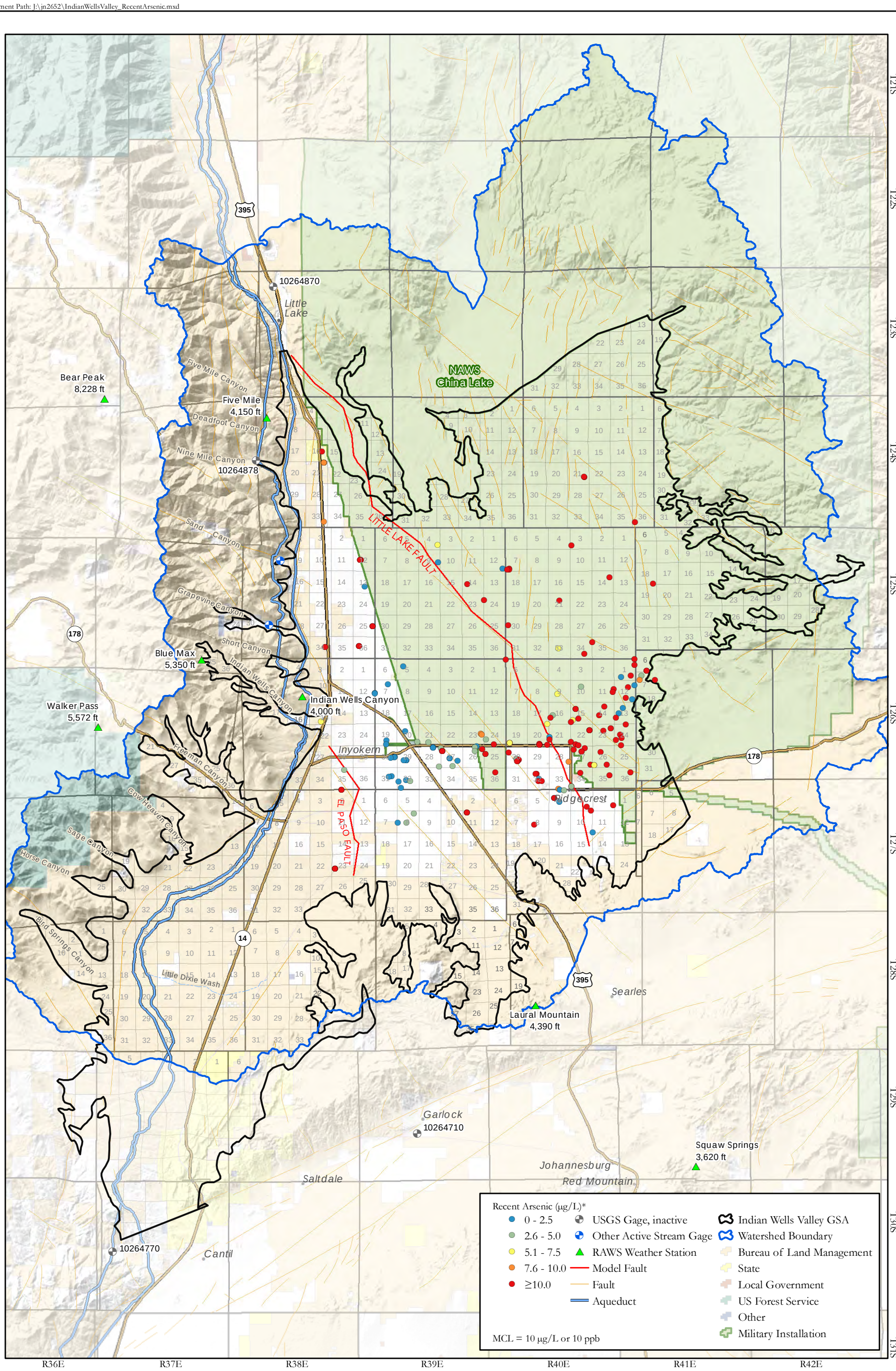
0 2 4 Miles

N

* Where multiple data points exist, the most recent data point was used.

FIGURE 3-14

Document Path: J:\jn2652\IndianWellsValley_RecentArsenic.mxd



STETSON ENGINEERS INC.

MOST RECENT ARSENIC (µg/L)

INDIAN WELLS VALLEY

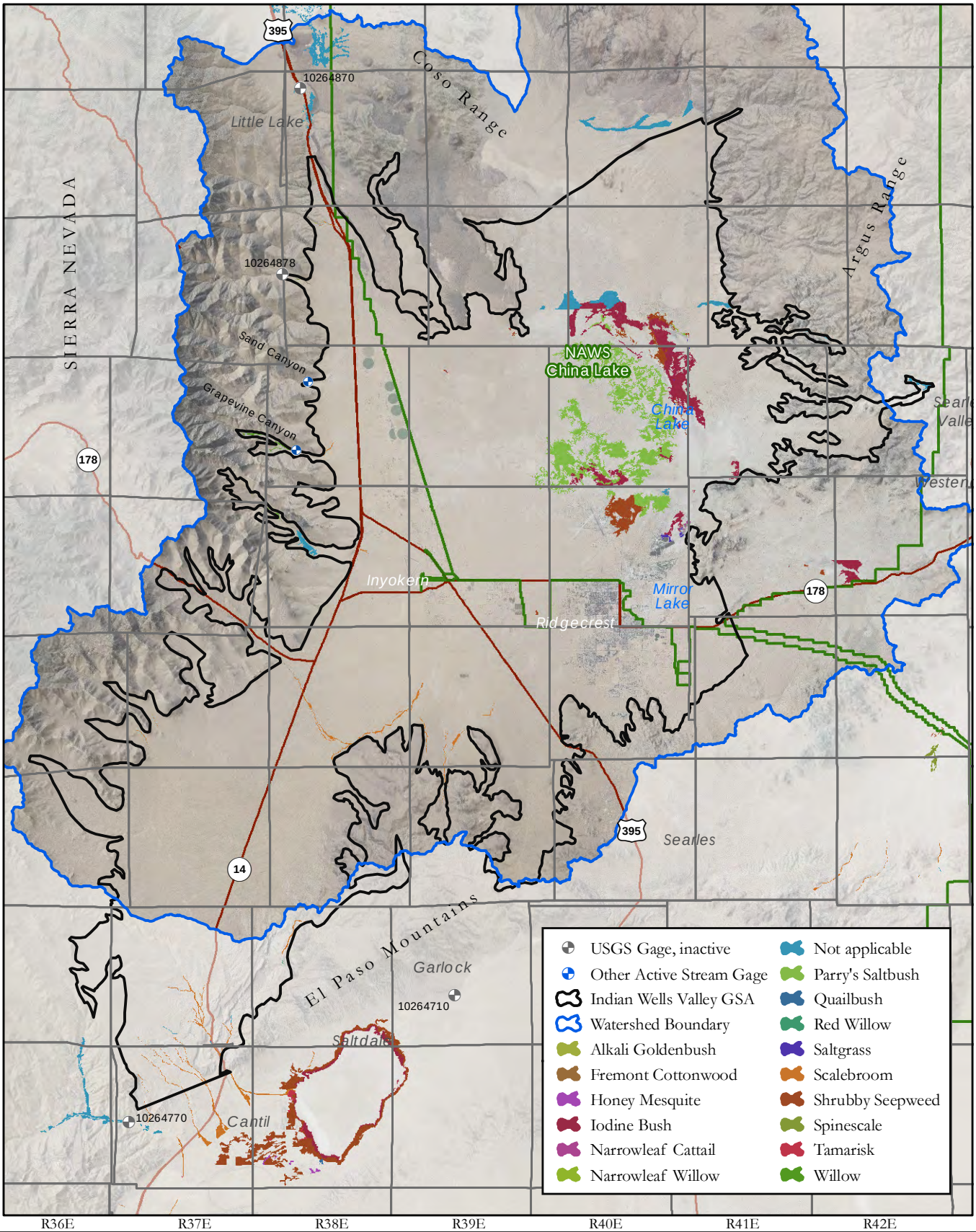
DRAFT 12/10/2019

0 2 4 Miles

N

* Where multiple arsenic data exist, the most recent data is posted.

FIGUR 3-15



GROUNDWATER DEPENDENT ECOSYSTEMS (GDE)

INDIAN WELLS VALLEY

DRAFT 10/15/2019

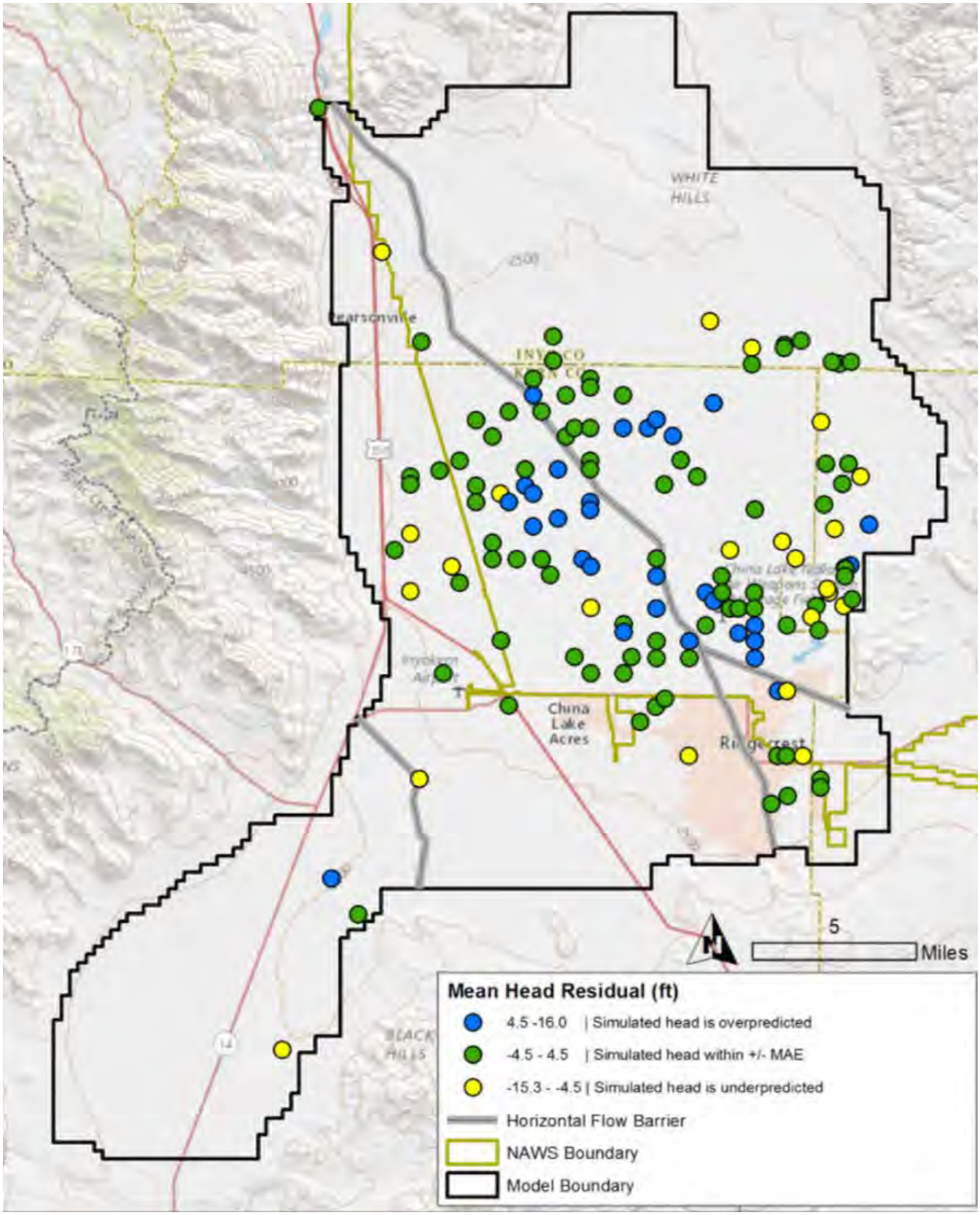
STETSON ENGINEERS INC.

Source: DWR Natural Communities Commonly Associated with Groundwater

N

0 3 6 Miles

Document Path: J:\jn2652\IWV_NCDataset_vegetation.mxd

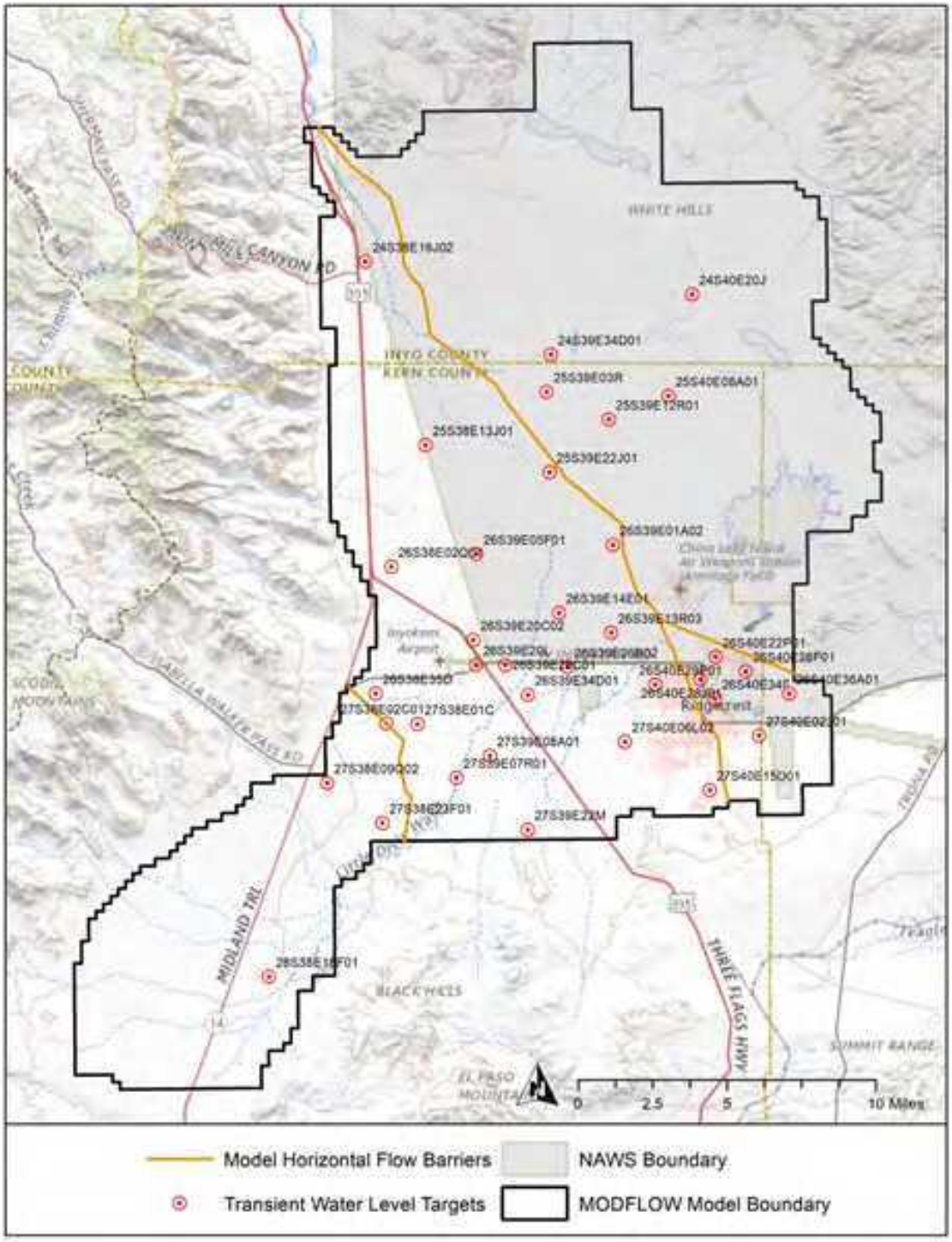


Source: Desert Research Institute

STETSON ENGINEERS INC.

CALIBRATION
SIMULATED - MEASURED RESIDUAL GROUNDWATER LEVELS
STEADY-STATE FLOW MODEL

Document Path: C:/Job Folder/2652/STEADY-STATE FLOW MODEL.ai



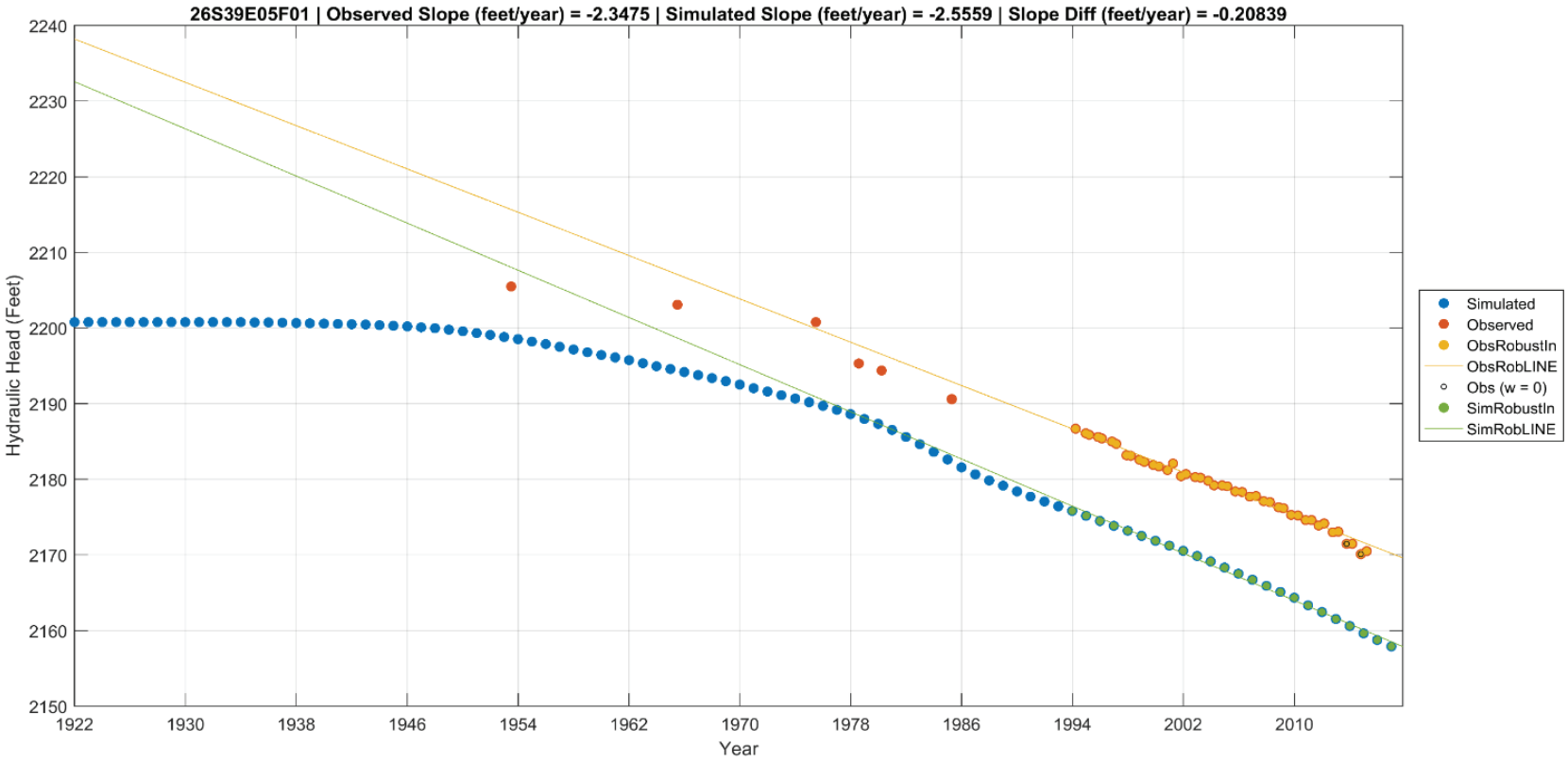
Source: Desert Research Institute

CALIBRATION
GROUNDWATER LEVEL TARGETS
TRANSIENT FLOW MODEL

STETSON ENGINEERS INC.

GARNER ET AL (2017)

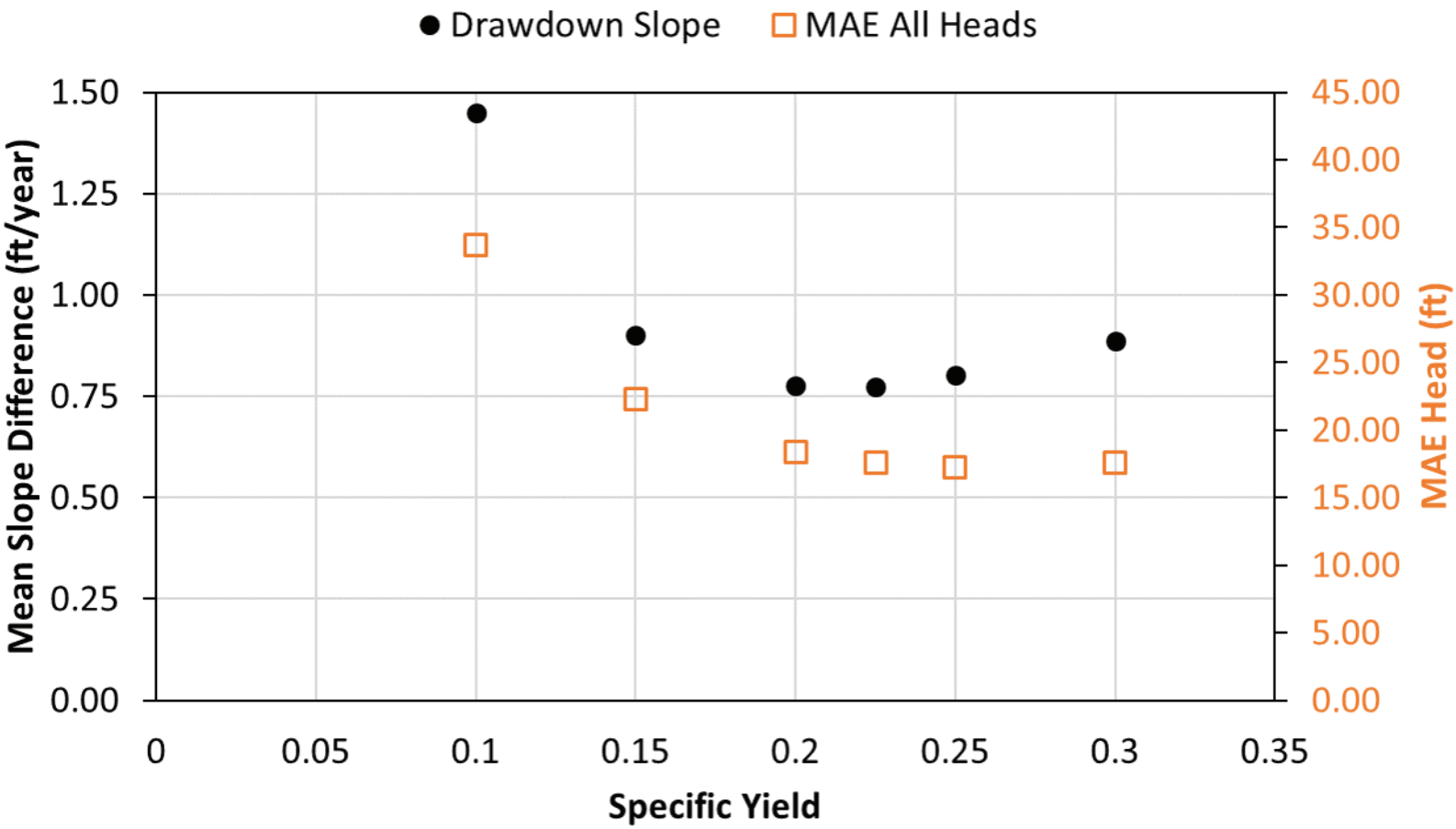
Document Path: C:/Job Folder/2652/GROUNDWATER LEVEL TARGETS.ai



Source: Desert Research Institute

STETSON ENGINEERS INC.

EXAMPLE
HYDROGRAPH AND SLOPE-FITTING METHOD USED FOR CALIBRATION TRANSIENT FLOW MODEL



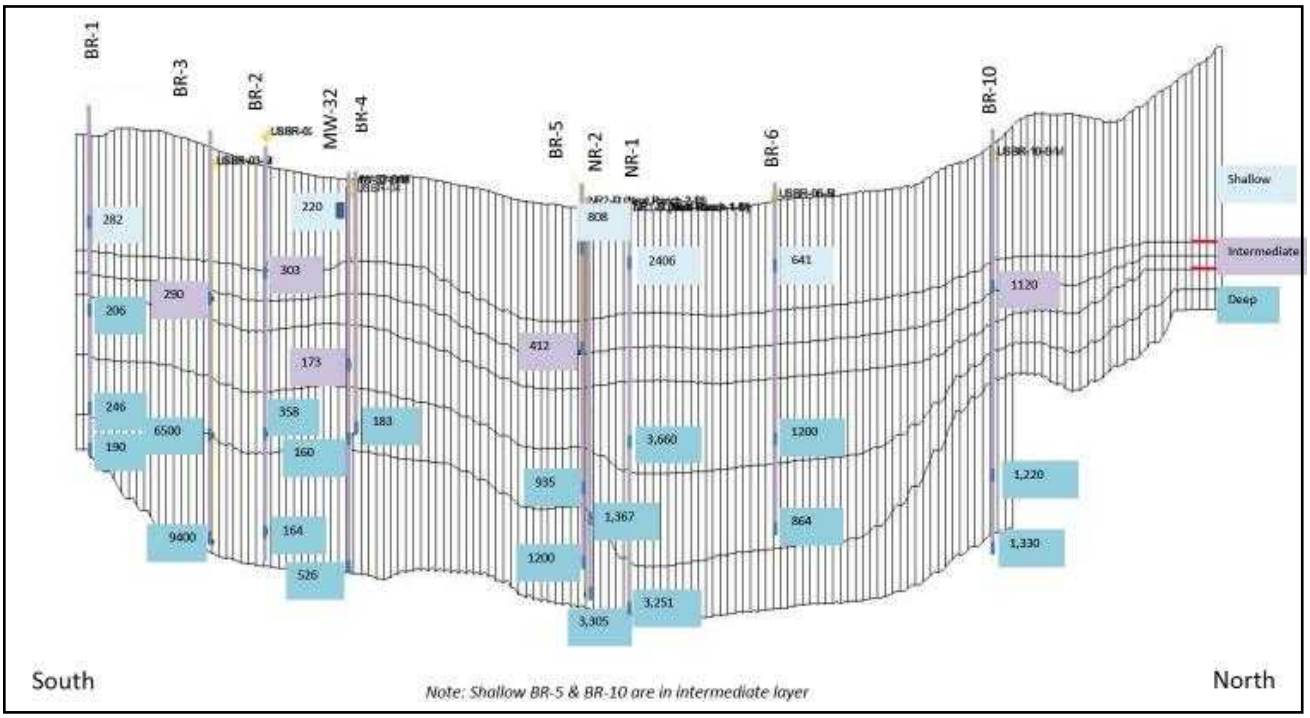
Source: Desert Research Institute

STETSON ENGINEERS INC.

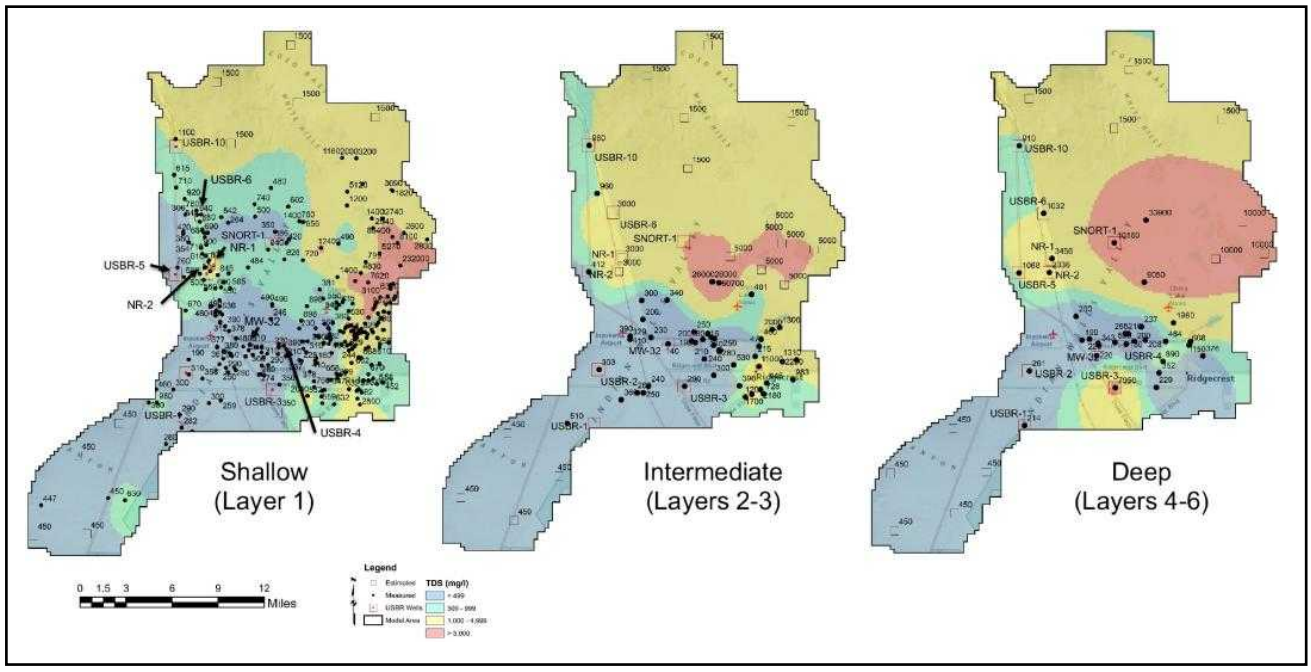
CALIBRATION
DRAWDOWN SLOPE AND MEAN ABSOLUTE ERROR (MAE) RESULTS
TRANSIENT FLOW MODEL

MODEL CALIBRATION WORKSHOP (2018-09-24)

FIGURE 3-20



An example North-South cross section through the transport model illustrating the relationship between of the Shallow, Intermediate, and Deep TDS zones to the six computational layers in the flow model. TDS measurements at selected well locations are also shown to illustrate the averaging of multiple values within a TDS zone. Measured TDS concentrations were interpolated to the transport model grid cells based on the TDS zone in which they fall.

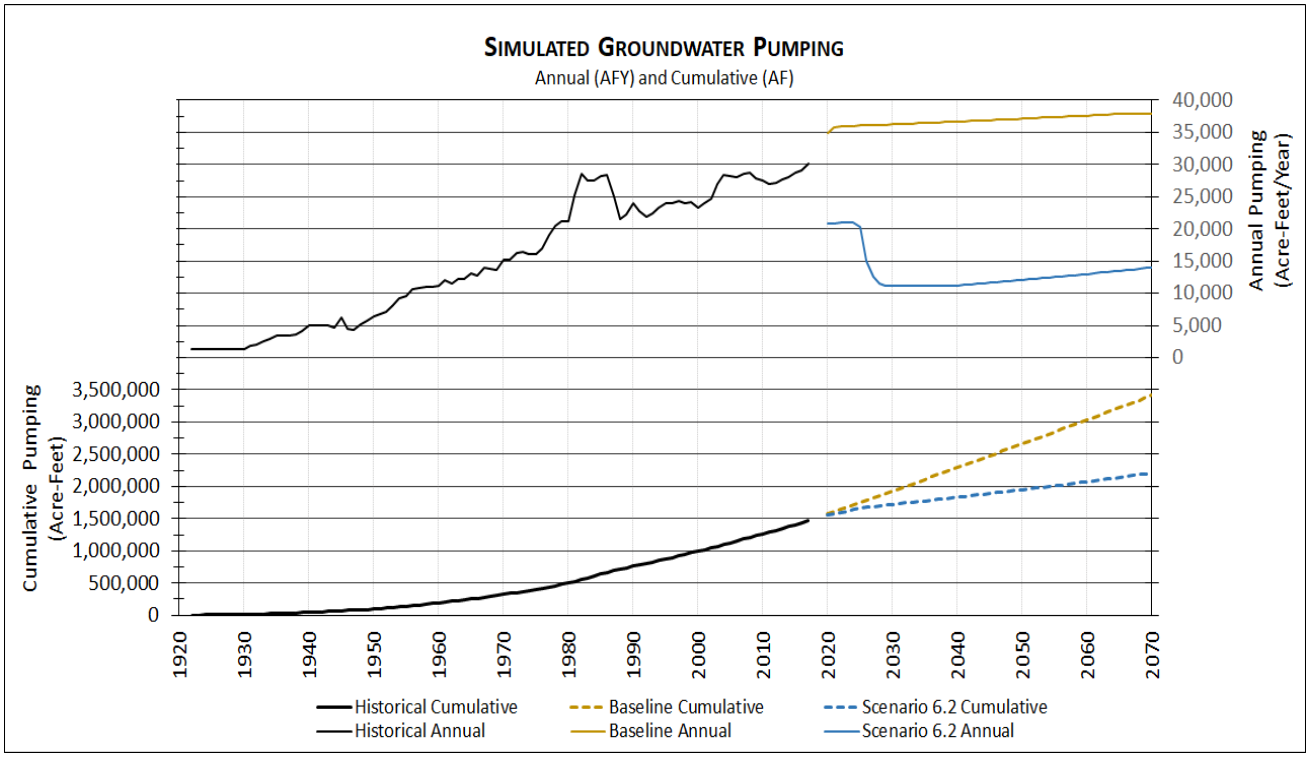


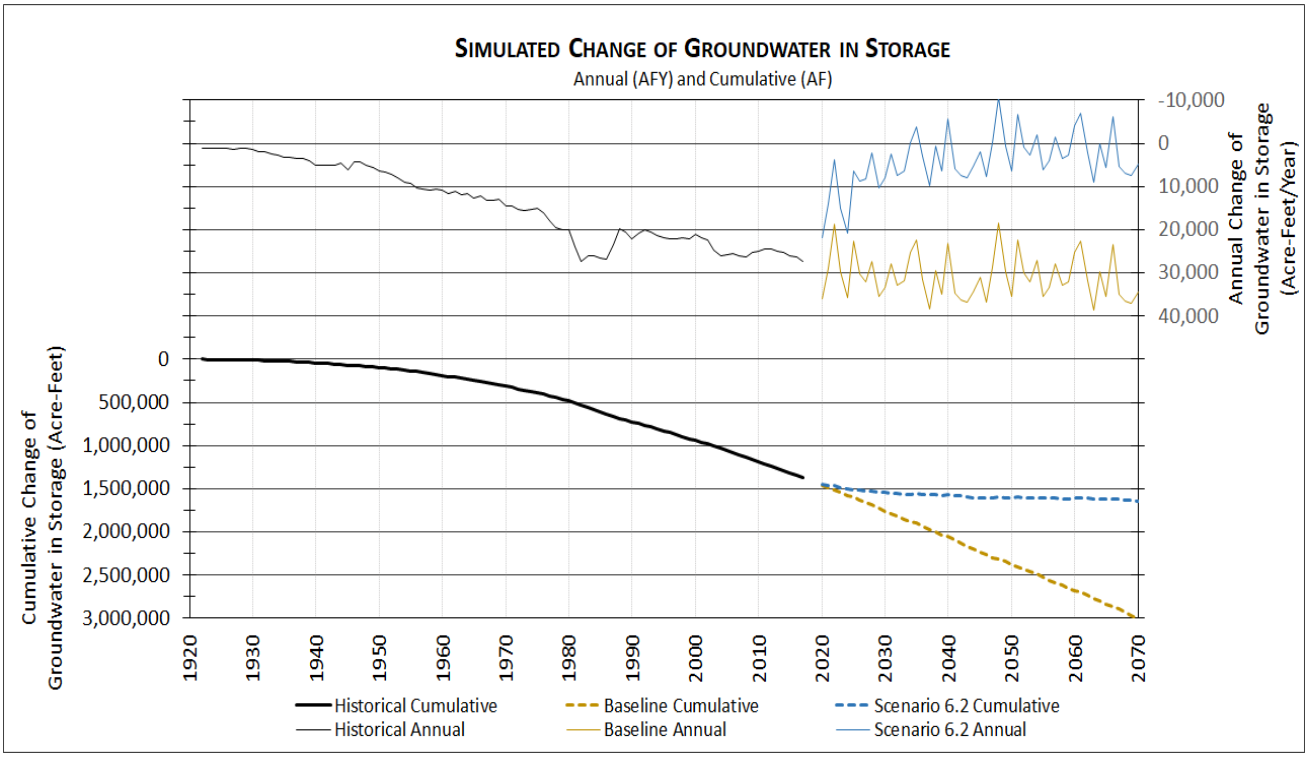
Spatial distributions of TDS concentration in the three TDS zones that are used for initial conditions in the transport model.

Source: Desert Research Institute

STETSON ENGINEERS INC.

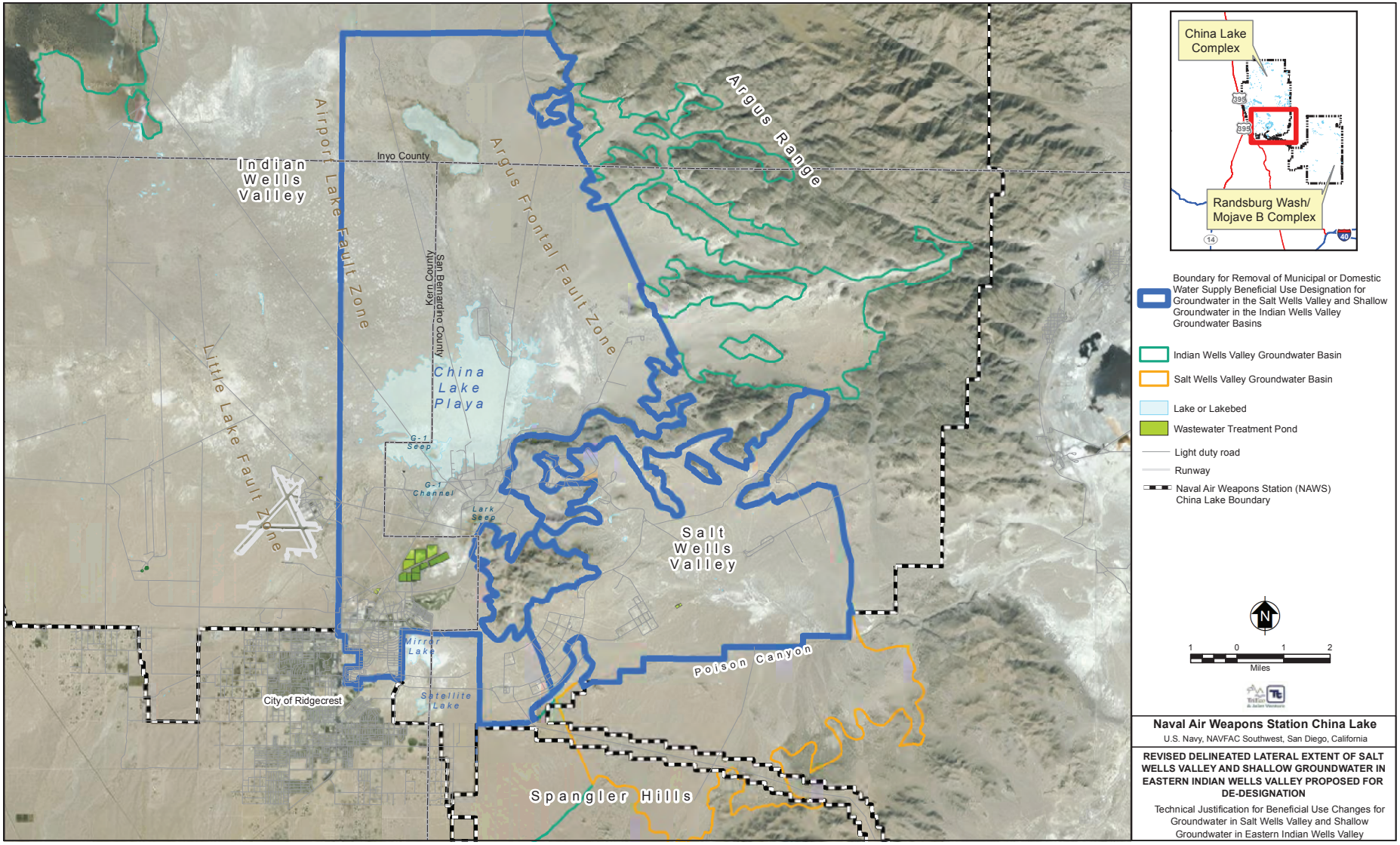
TRANSPORT MODEL
Indian Wells Valley





STETSON ENGINEERS INC.

SIMULATED PUMPING AND STORAGE
Historical, Baseline, and Scenario 6.2
Indian Wells Valley

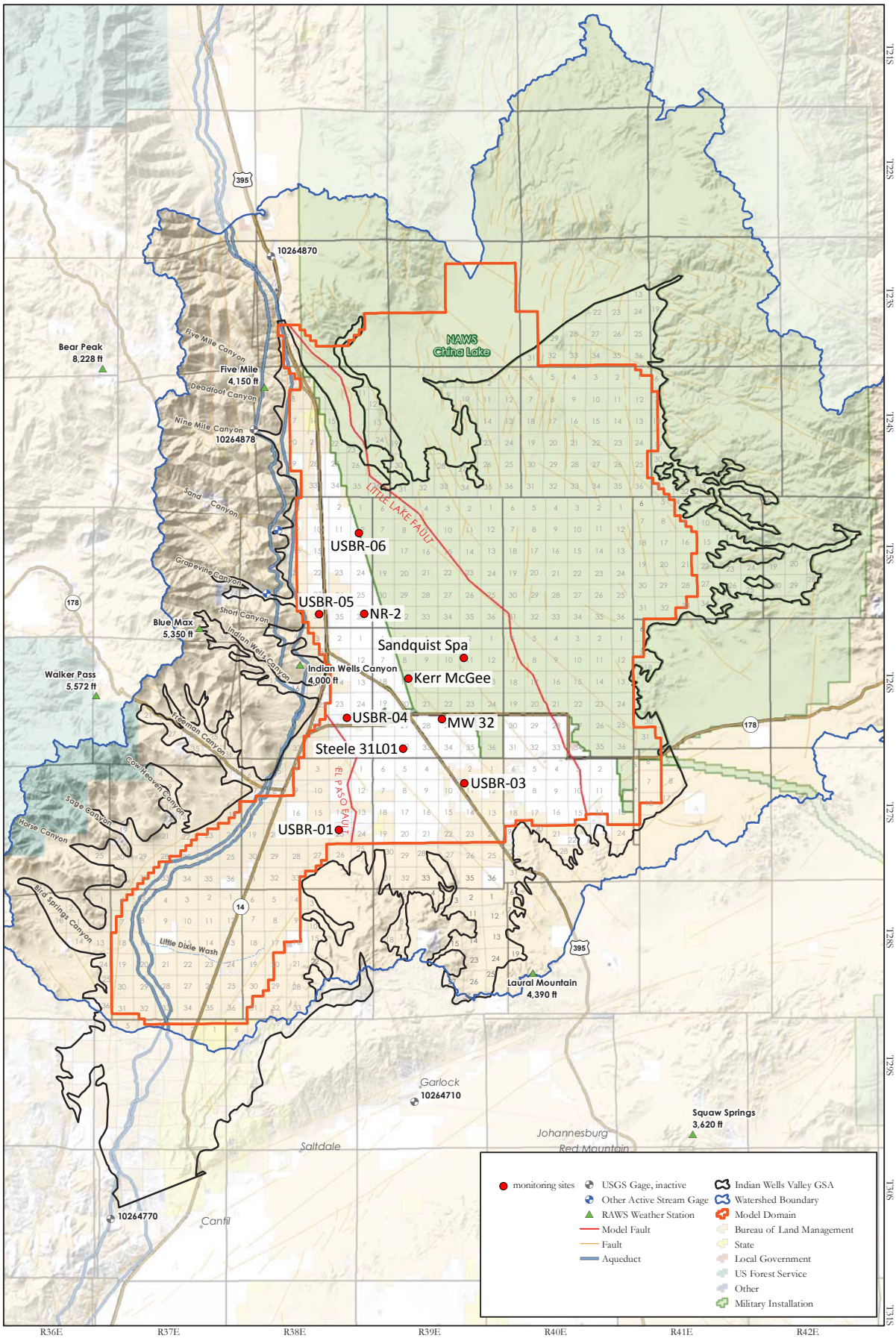


STETSON ENGINEERS INC.

NAWS CHINA LAKE AREA DE-DESIGNATED FOR MUNICIPAL/DOMESTIC USE

FIGURE 4-1

Document Path: J:\jn2652\IndianWellsValley_isotopeData_recentTDS.mxd



STETSON ENGINEERS INC.

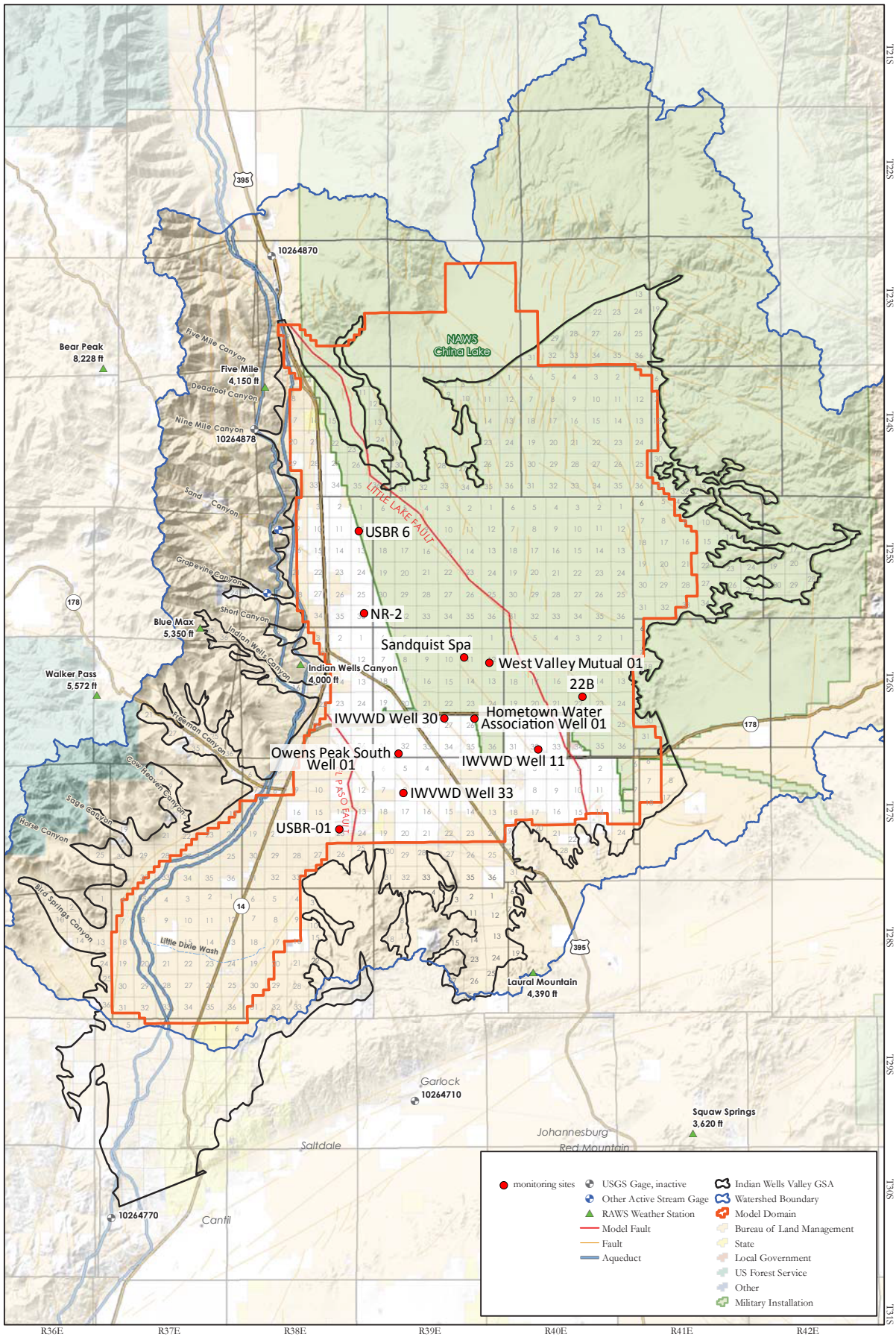
REPRESENTATIVE MONITORING SITES FOR CHRONIC LOWERING OF GROUNDWATER LEVELS

0 2 4 Miles

N

FIGURE 4-2

Document Path: J:\jn2652\IndianWellsValley_isotopeData_recentTDS.mxd



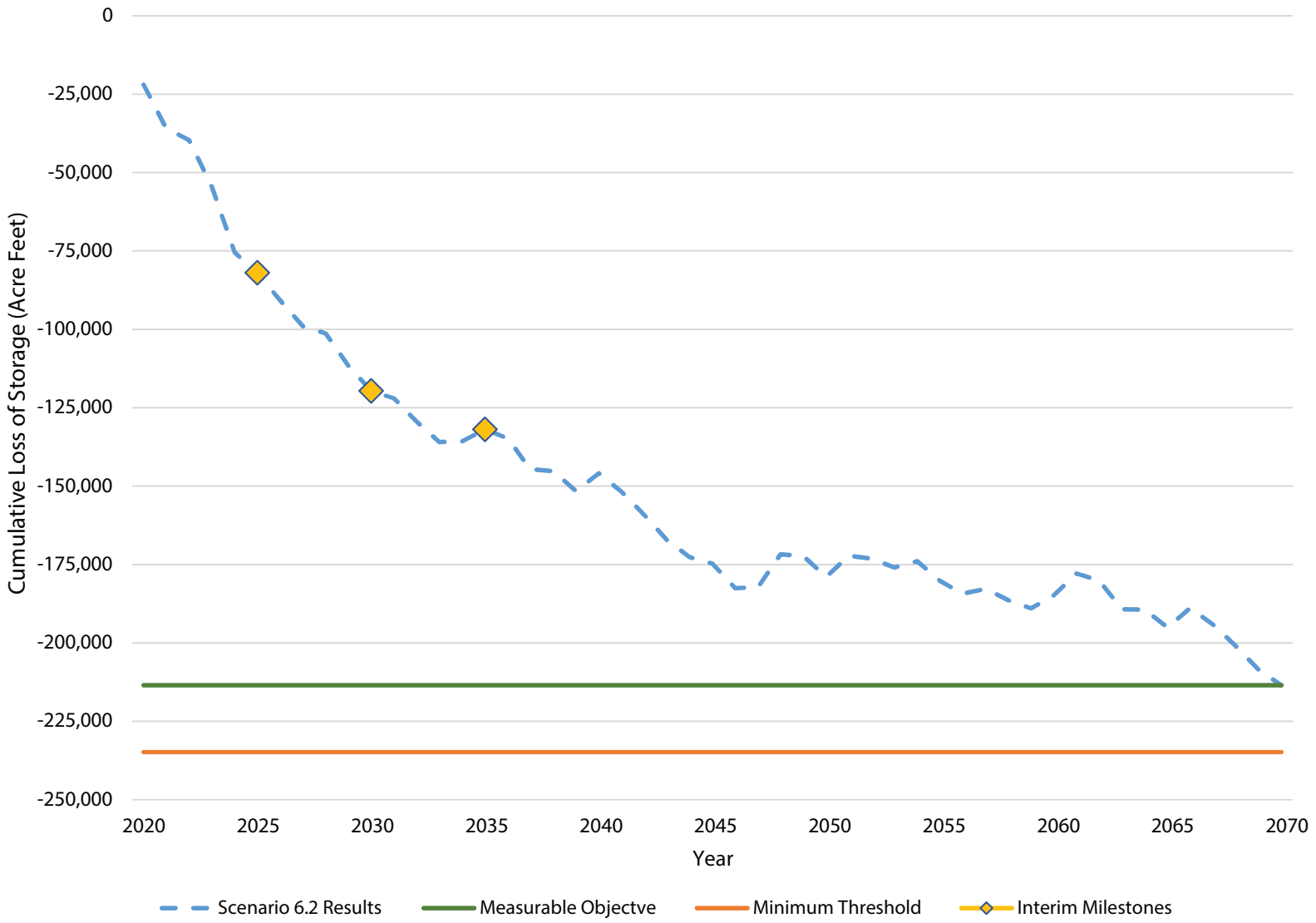
STETSON ENGINEERS INC.

REPRESENTATIVE MONITORING SITES FOR DEGRADED WATER QUALITY

0 2 4 Miles

N

FIGURE 4-3

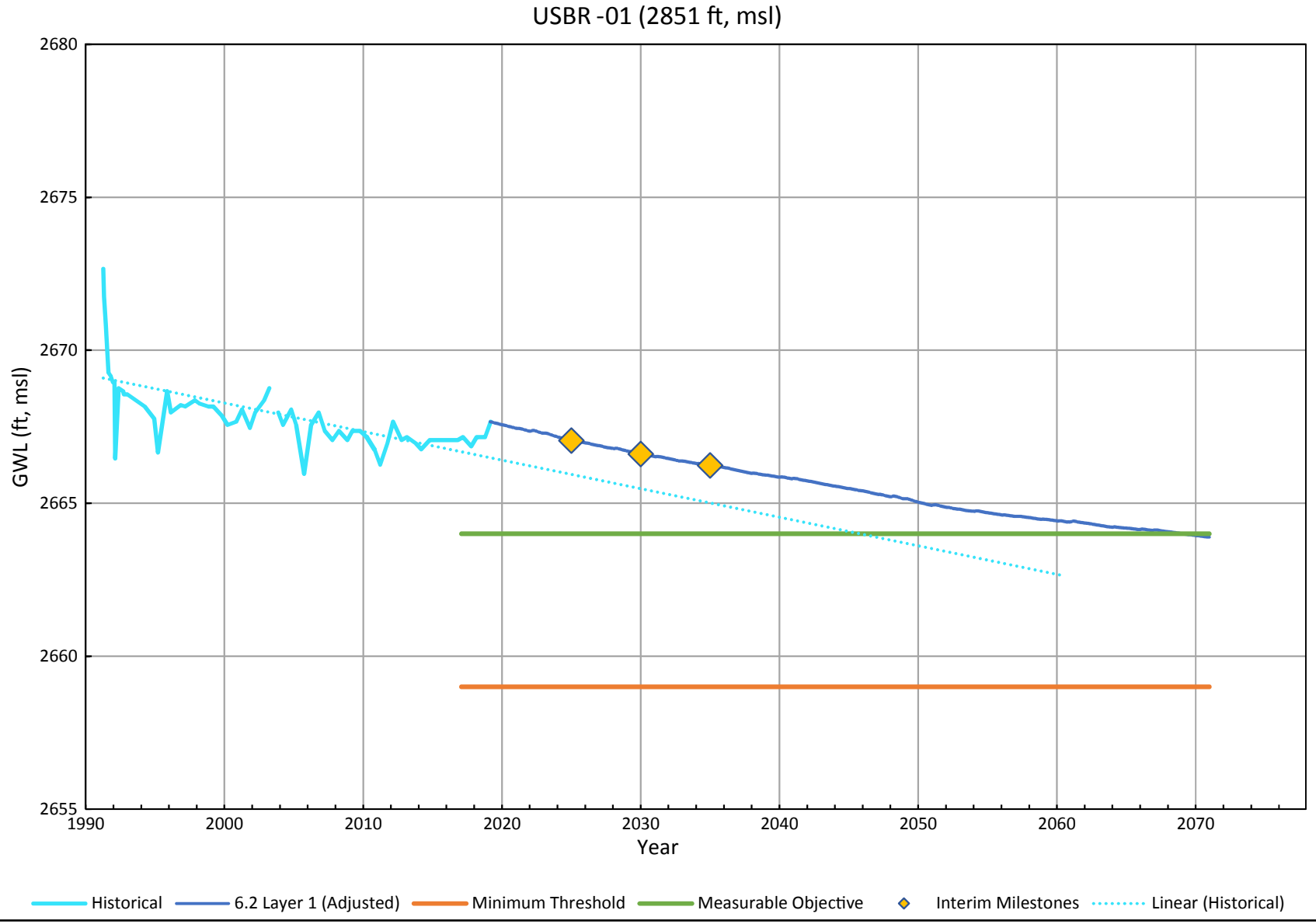


STETSON ENGINEERS INC.

SUSTAINABLE MANAGEMENT CRITERIA: GROUNDWATER REMOVED FROM STORAGE

FIGURE 4-4

C/JobFolder/2652-001:08.08

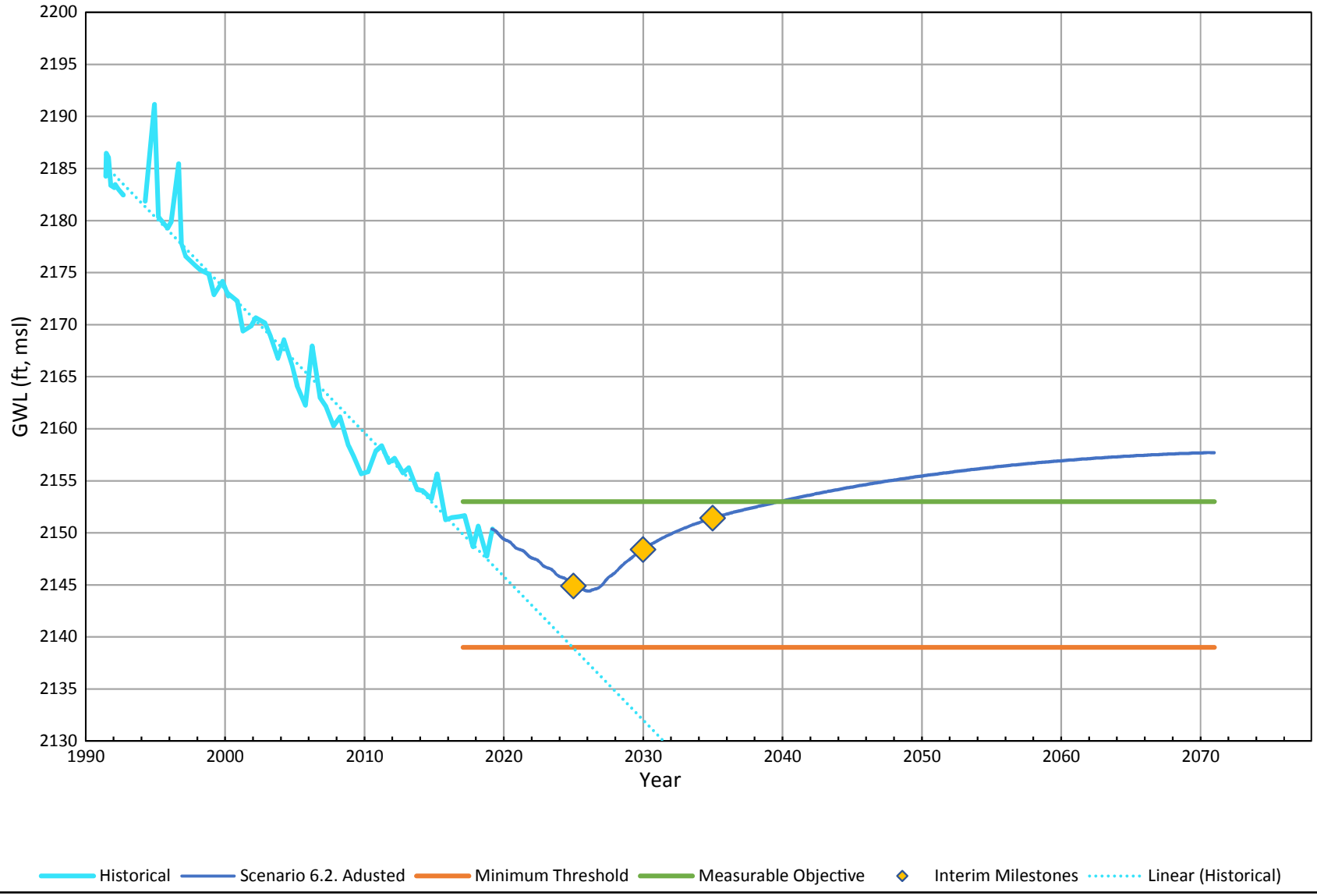


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5a

C/JobFolder/2652-001:08.08

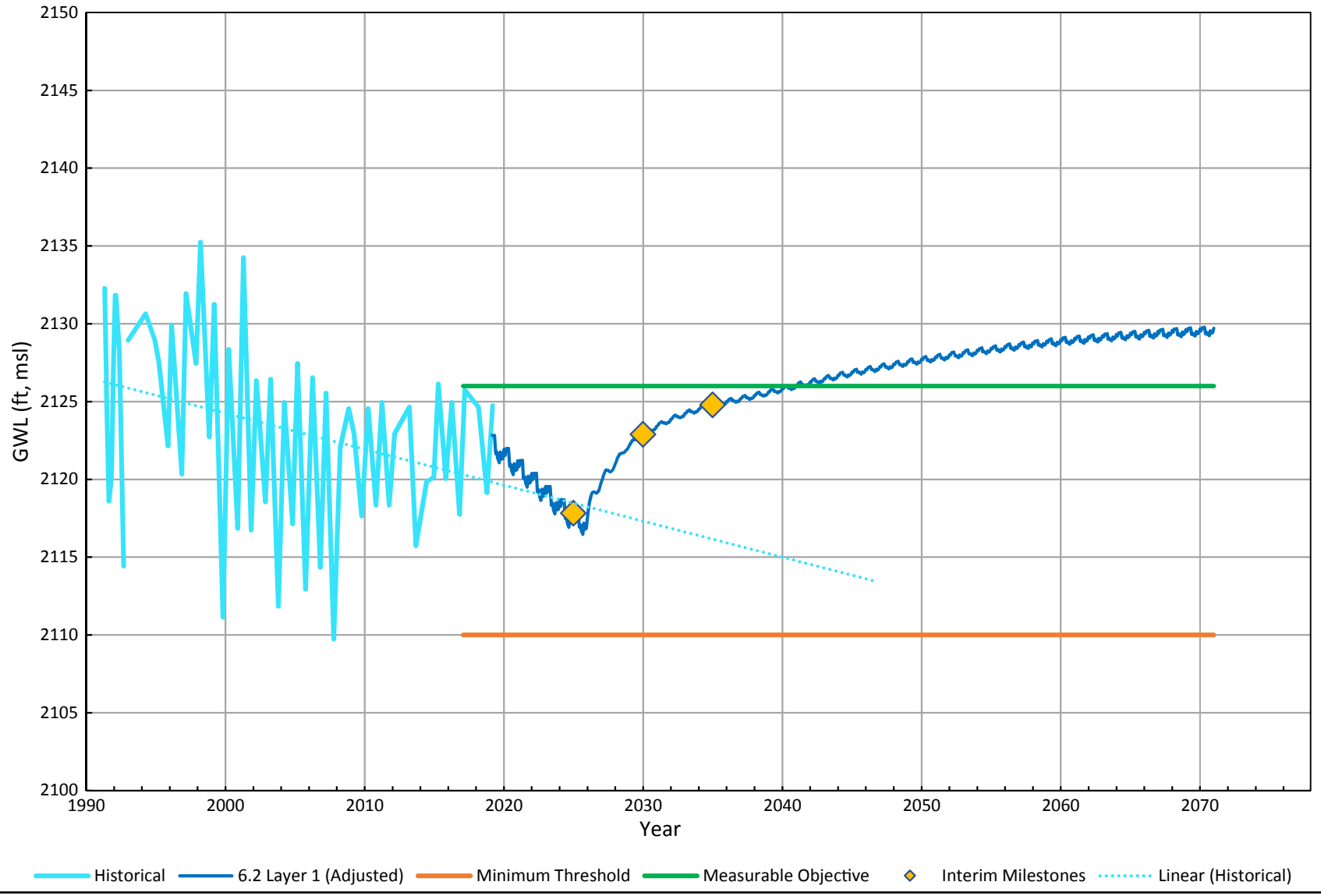


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5b

C/JobFolder/2652-001:08.08

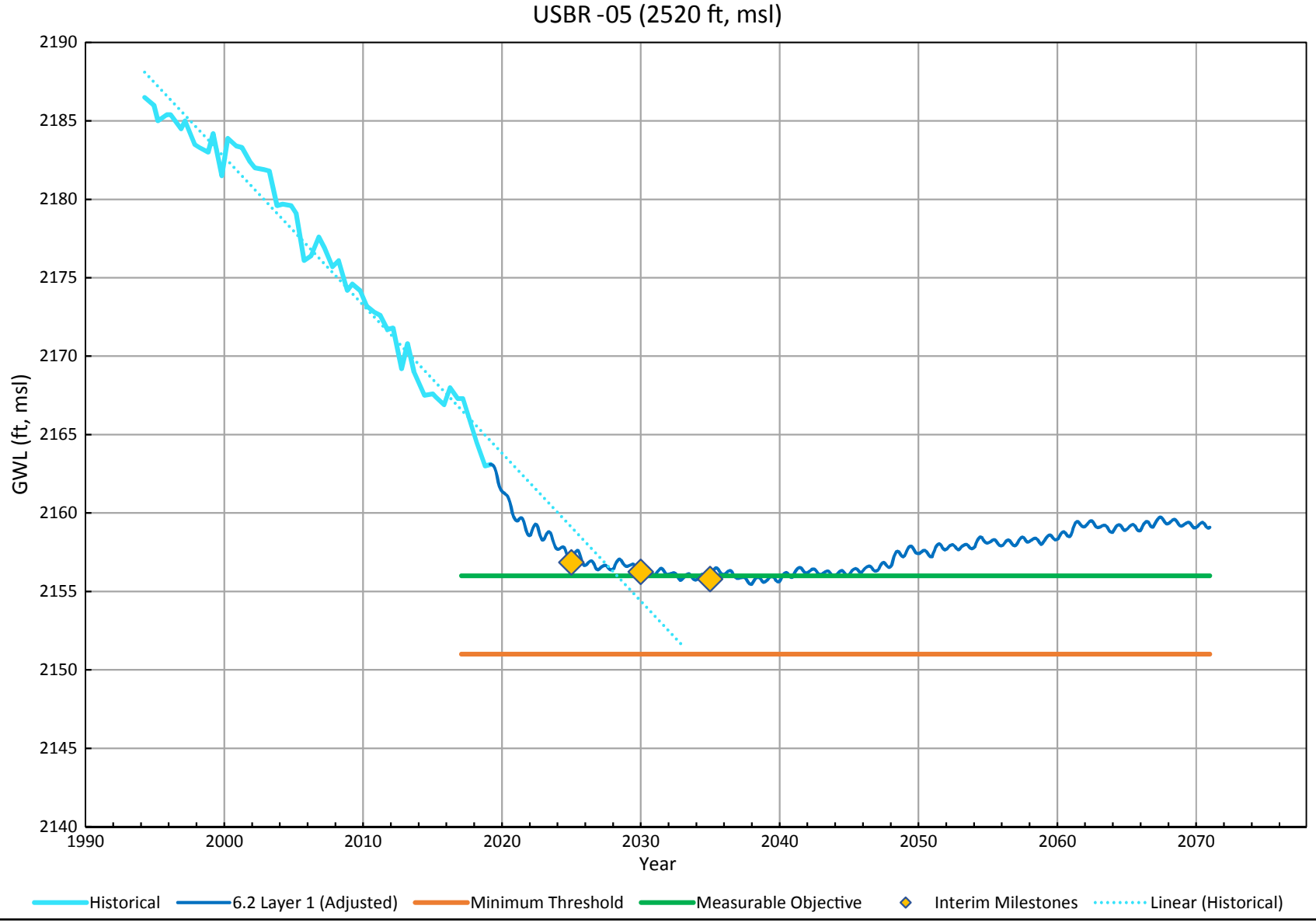


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5c

C/JobFolder/2652-001:08.08

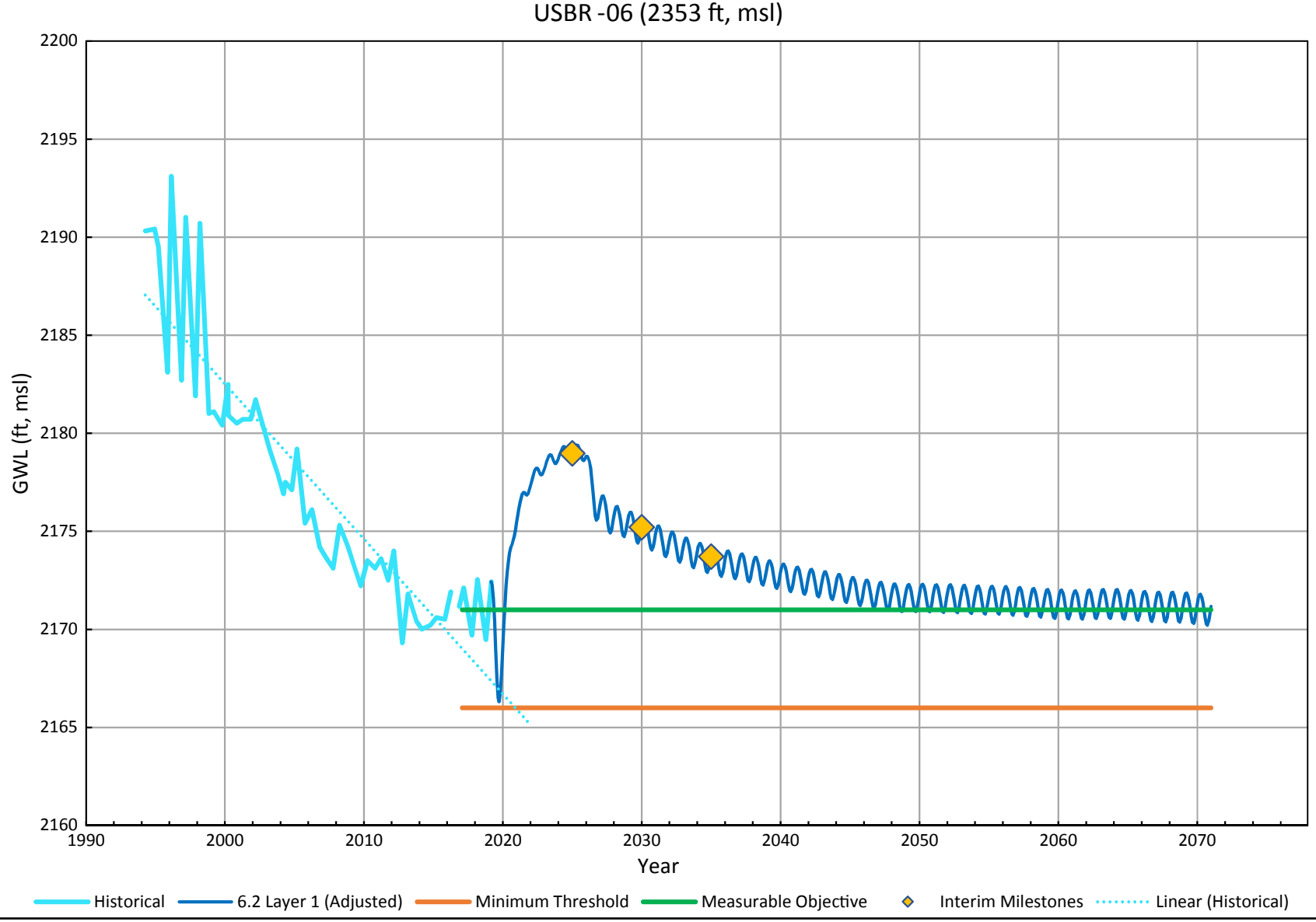


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5d

C/JobFolder/2652-001:08.08

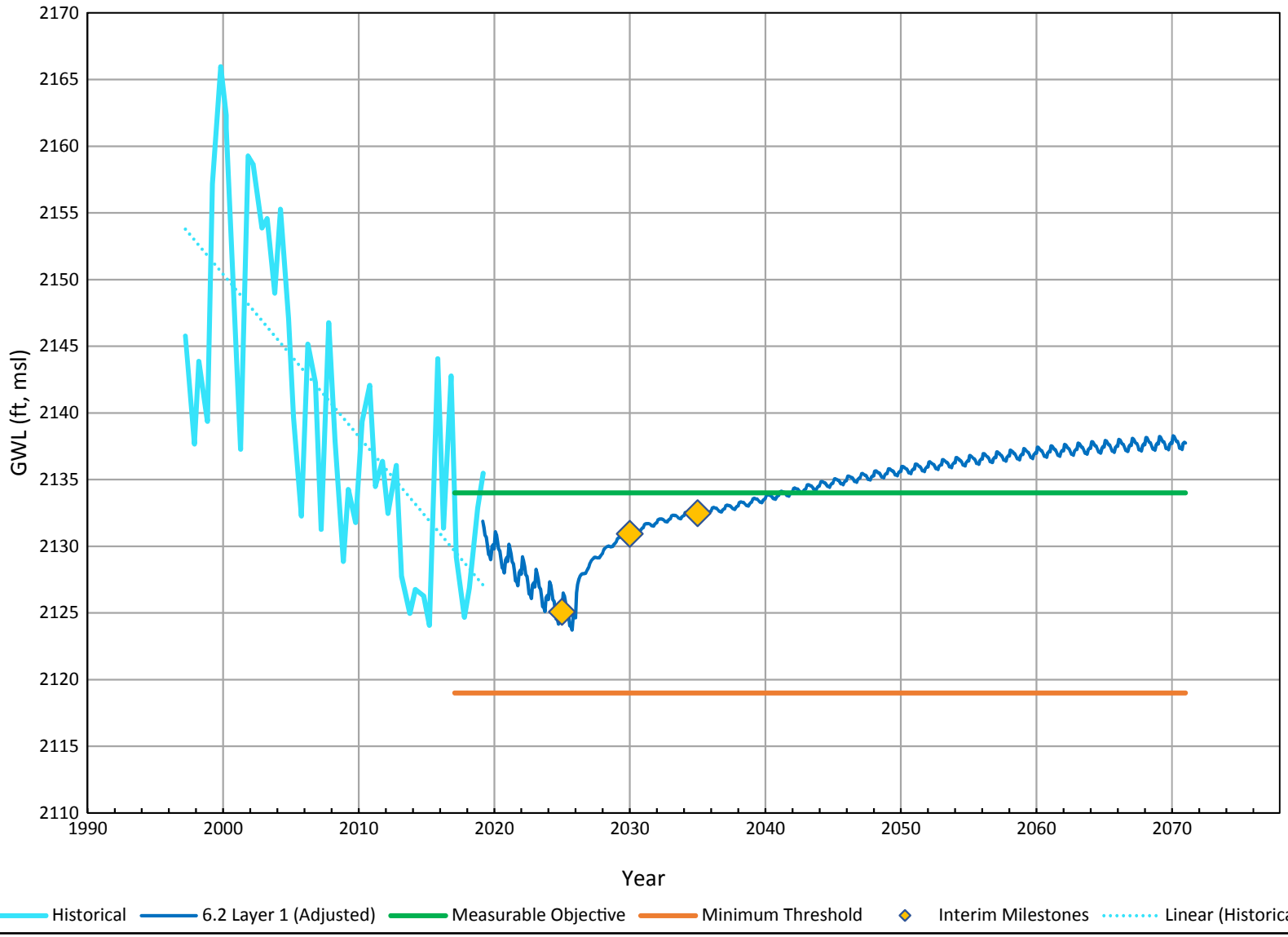


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5e

C/JobFolder/2652-001:08.08

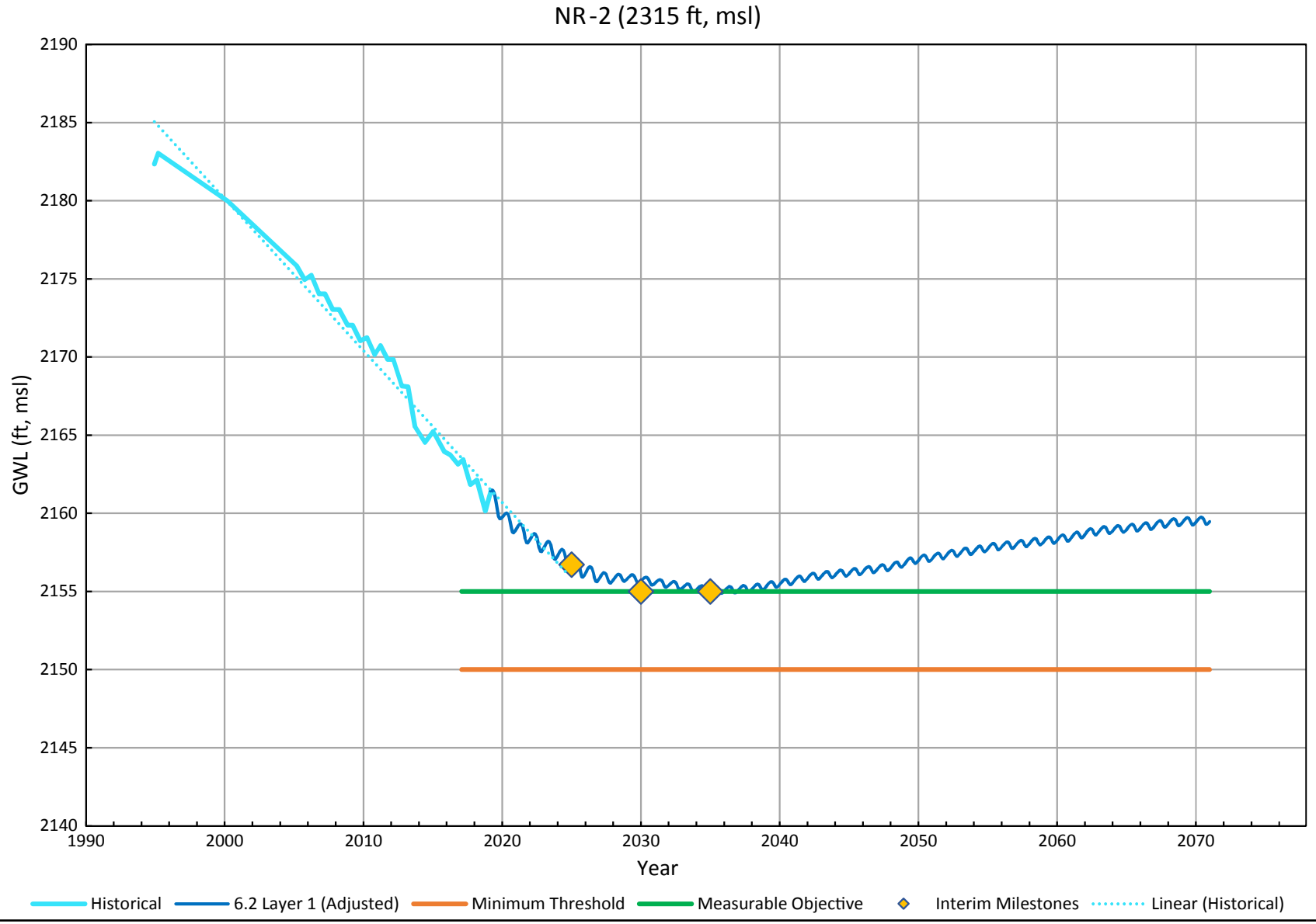


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5f

C/JobFolder/2652-001:08.08

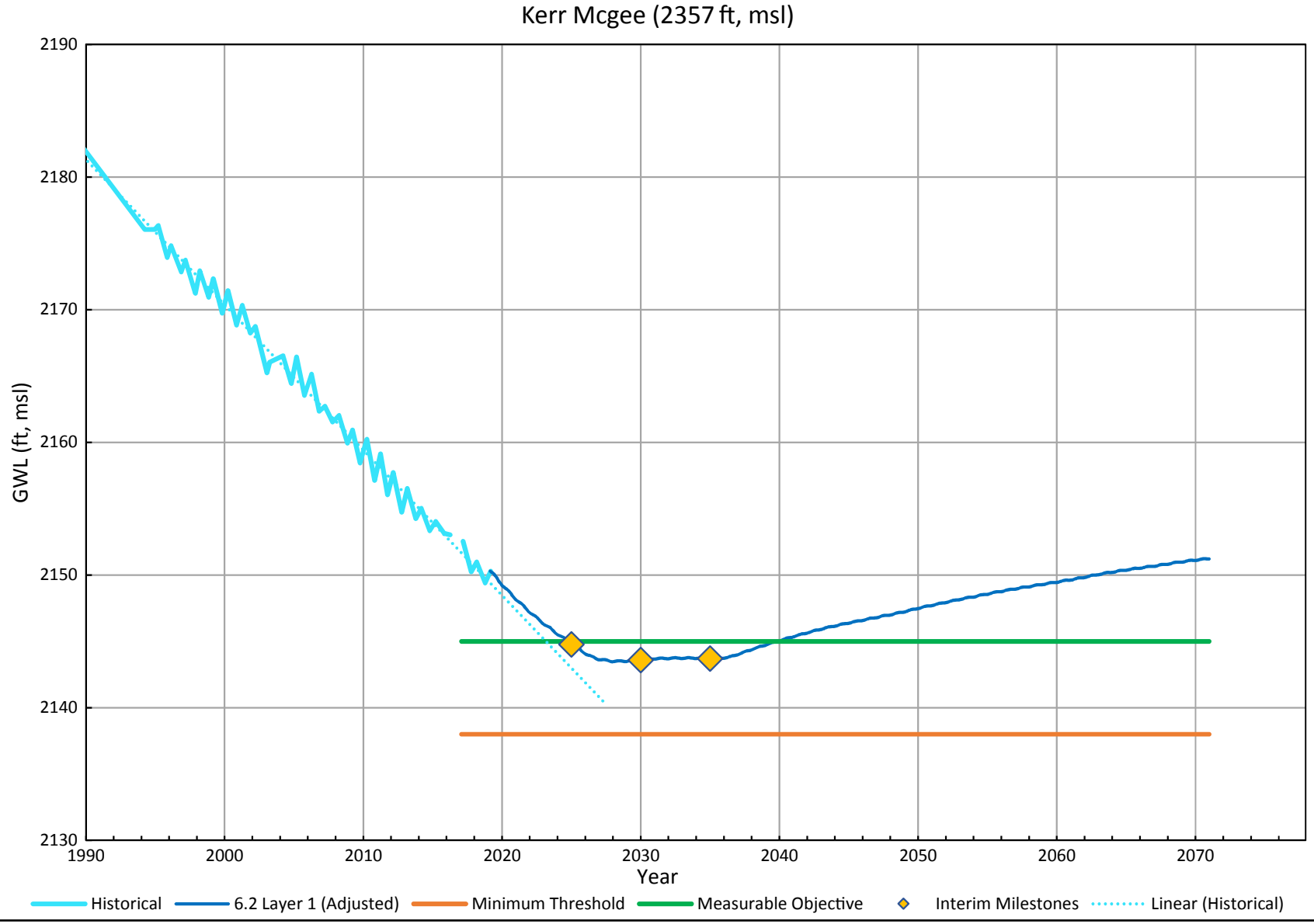


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5g

C/JobFolder/2652-001:08.08

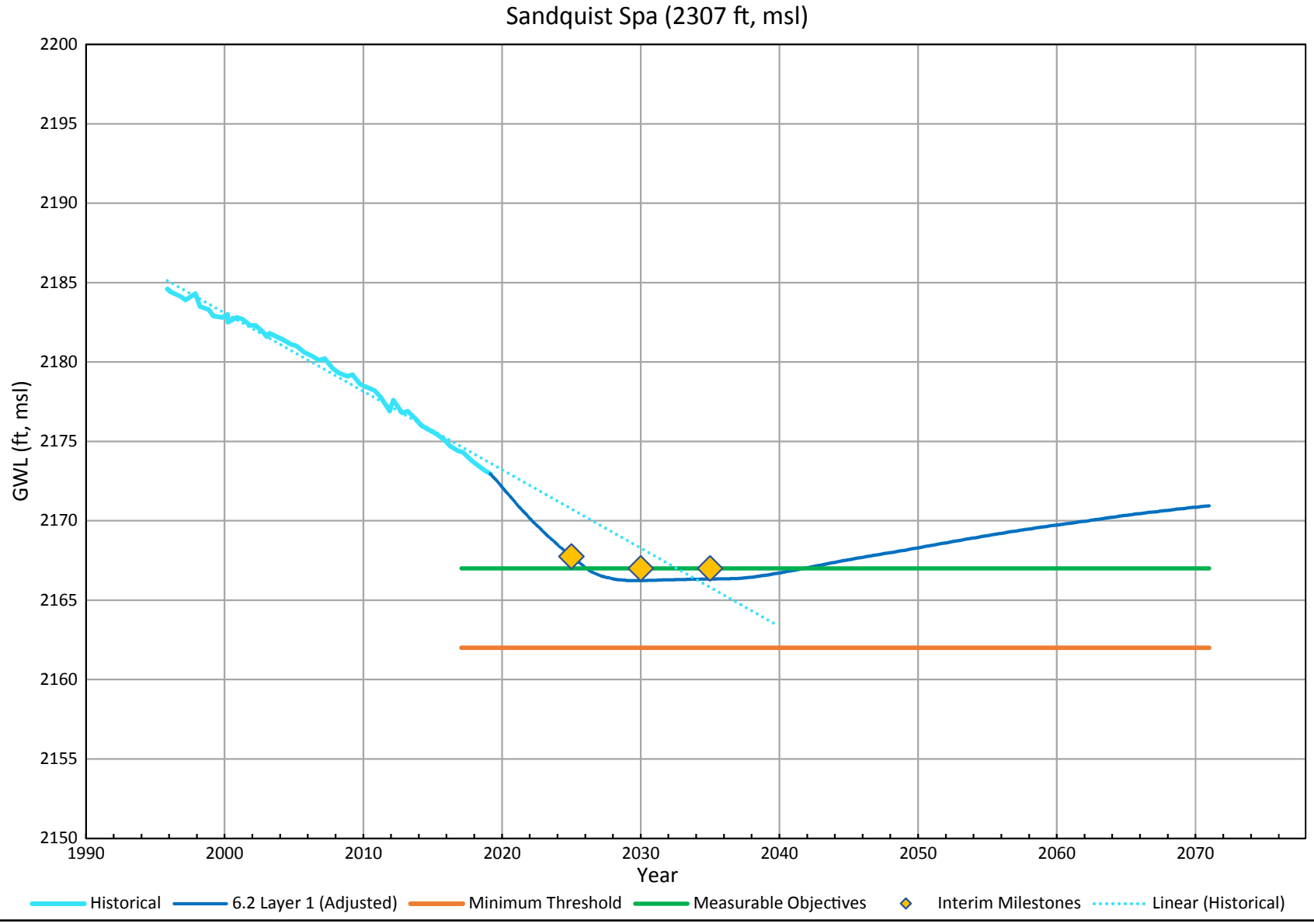


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5h

C/JobFolder/2652-001:08.08

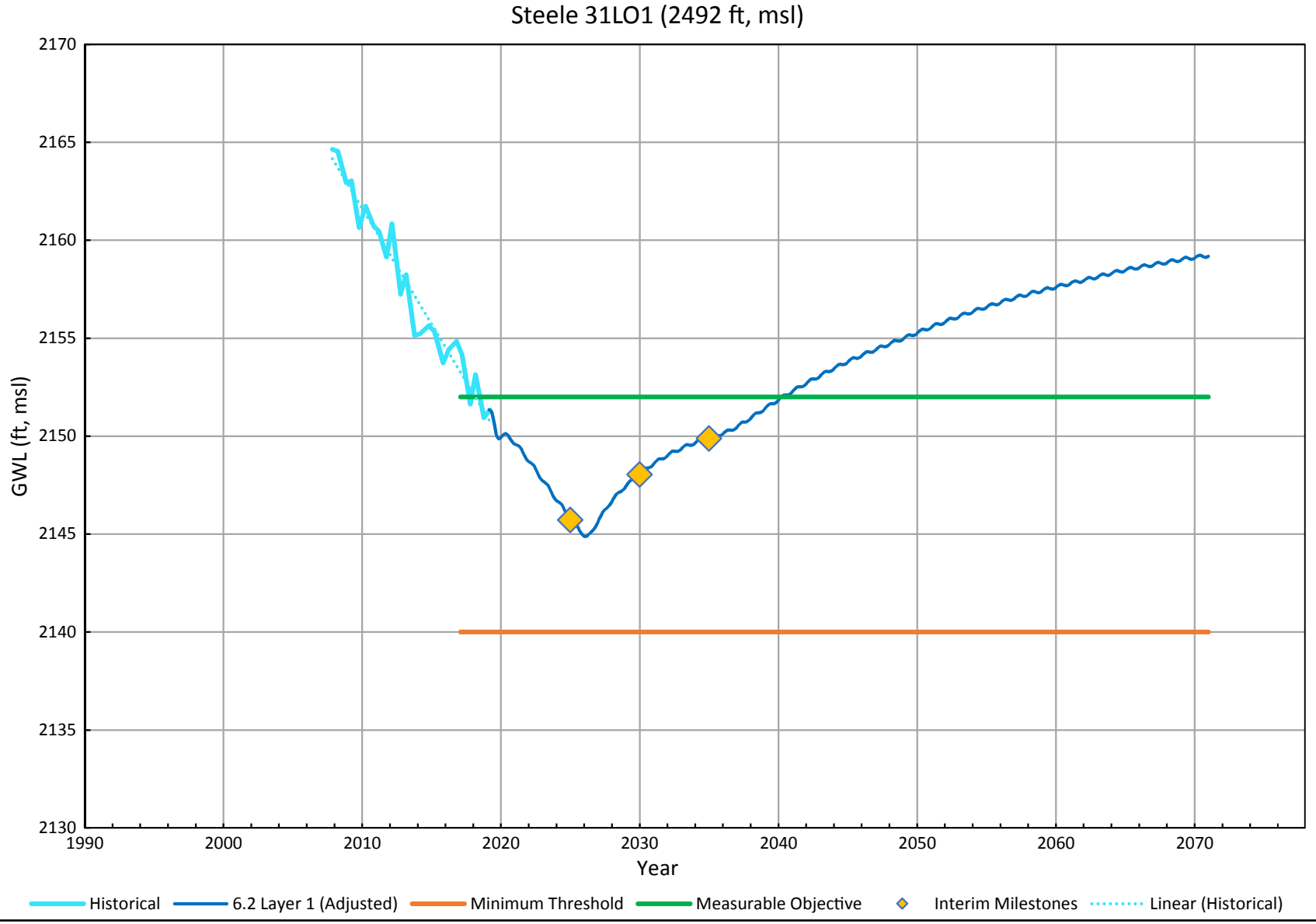


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5i

C/JobFolder/2652-001:08.08

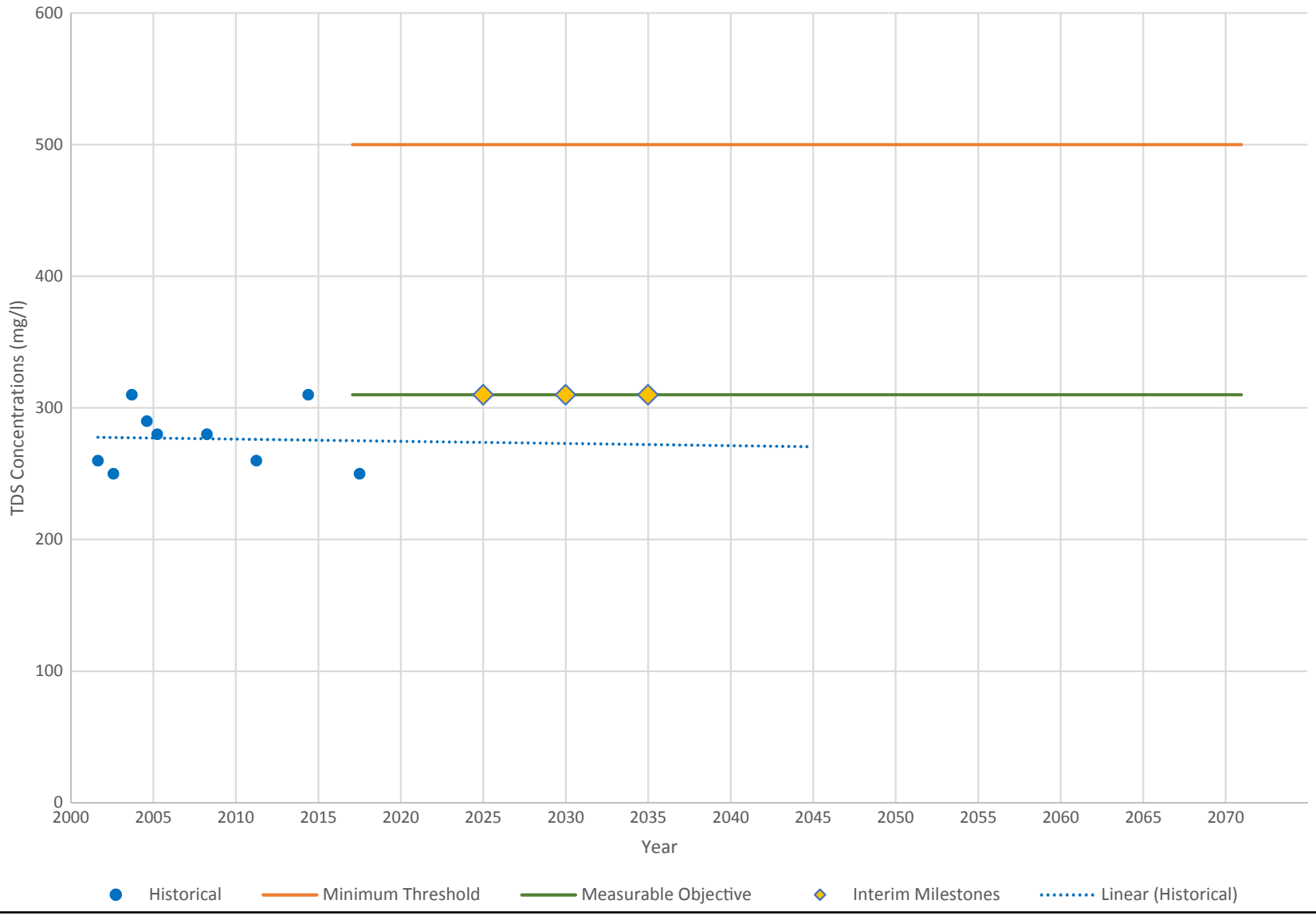


STETSON ENGINEERS INC.

Sustainable Management Criteria: Chronic Lowering of Groundwater Levels

FIGURE 4-5j

C/JobFolder/2652-001:08.08

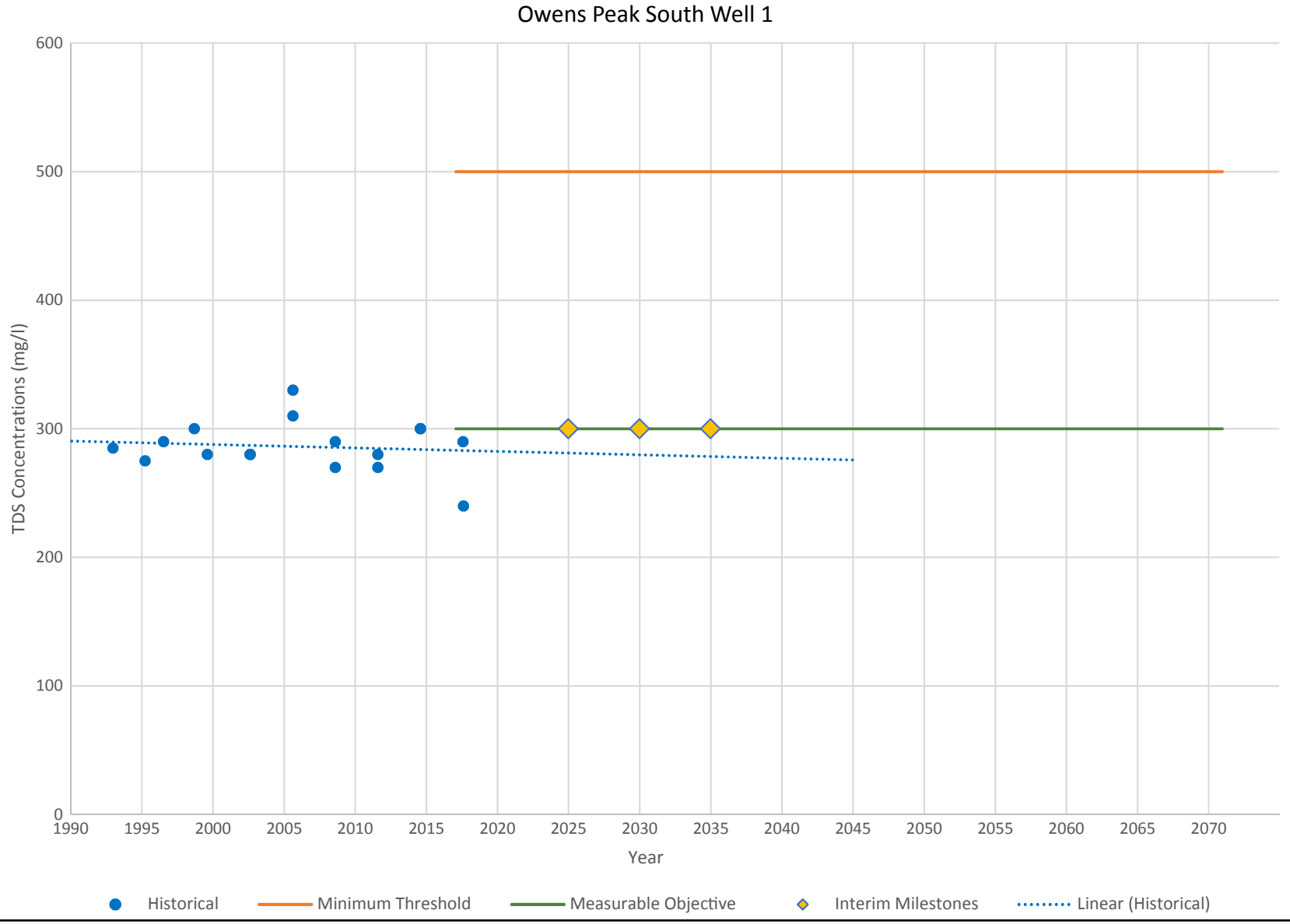


STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6a

C/JobFolder/2652-001:08.08

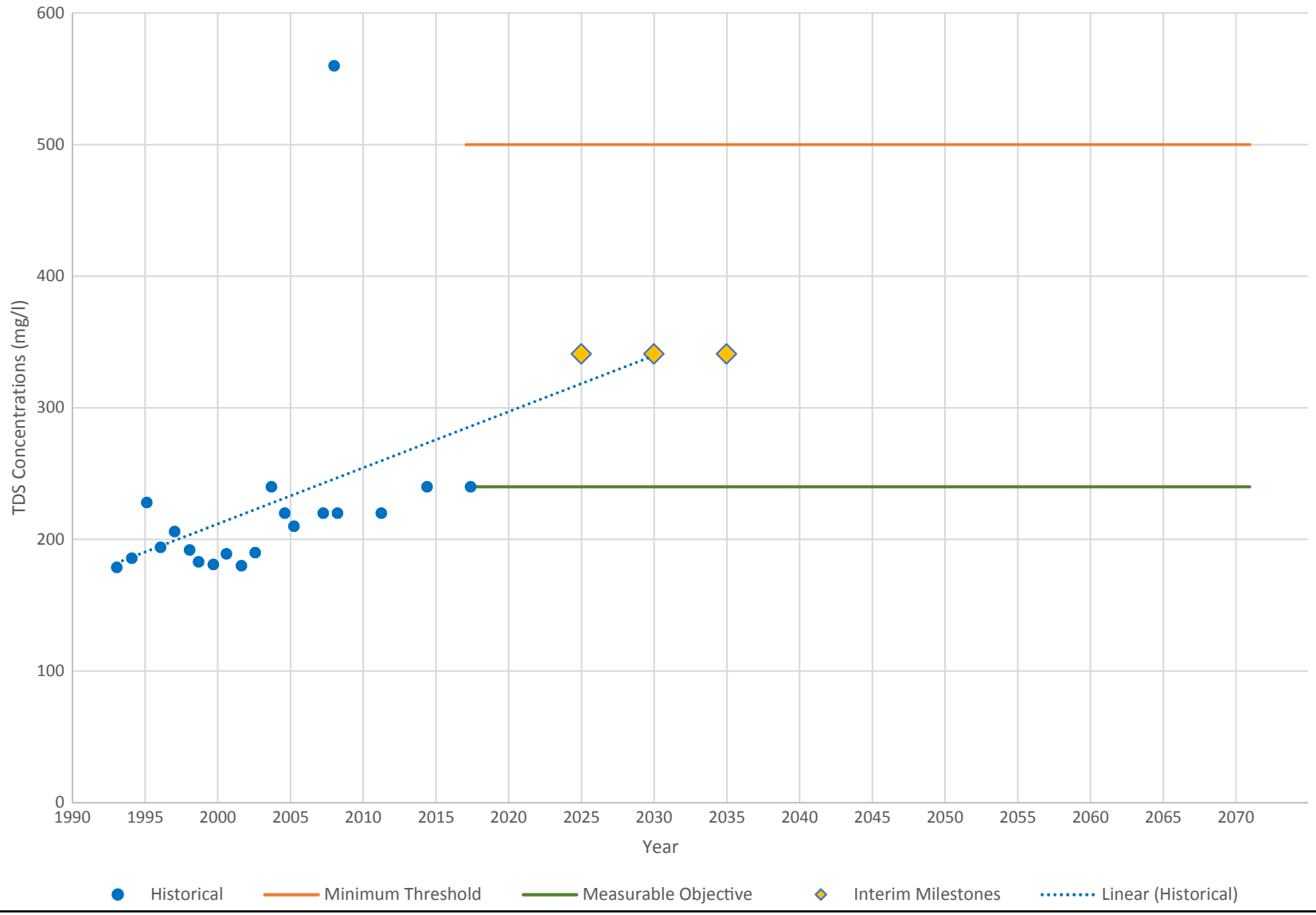


STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6b

C/JobFolder/2652-001:08.08

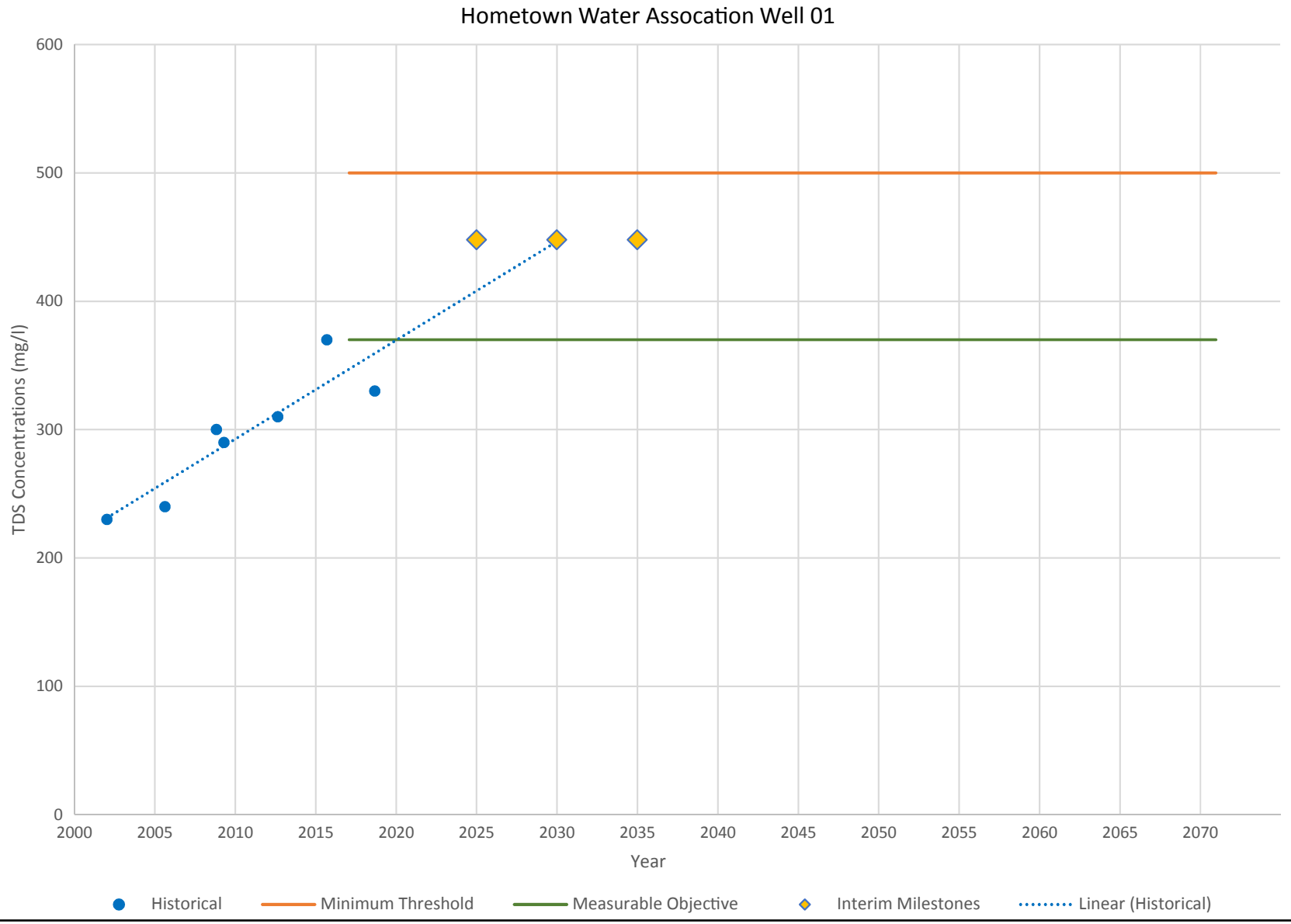


STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6c

C/JobFolder/2652-001:08.08

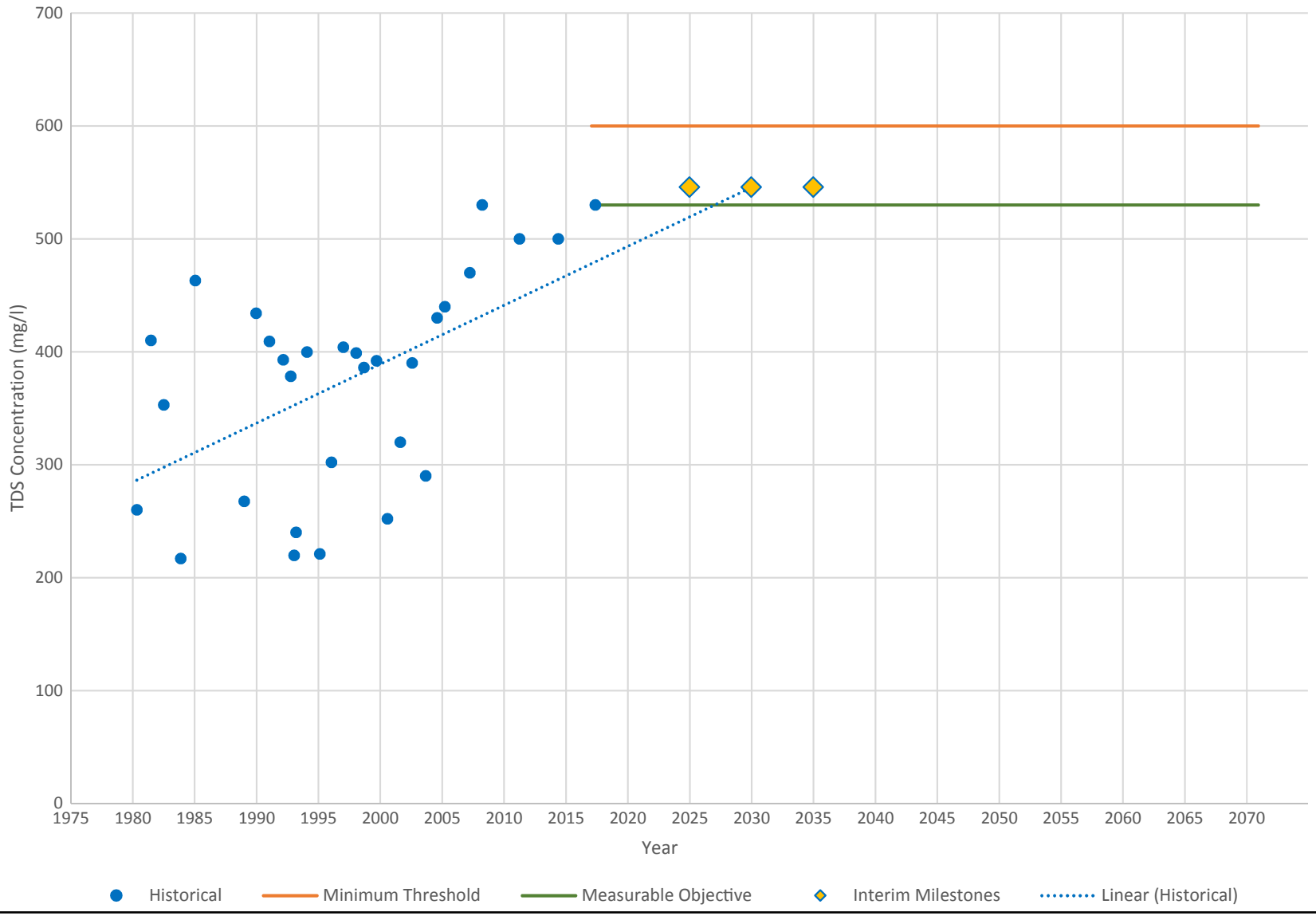


STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6d

C/JobFolder/2652-001:08.08

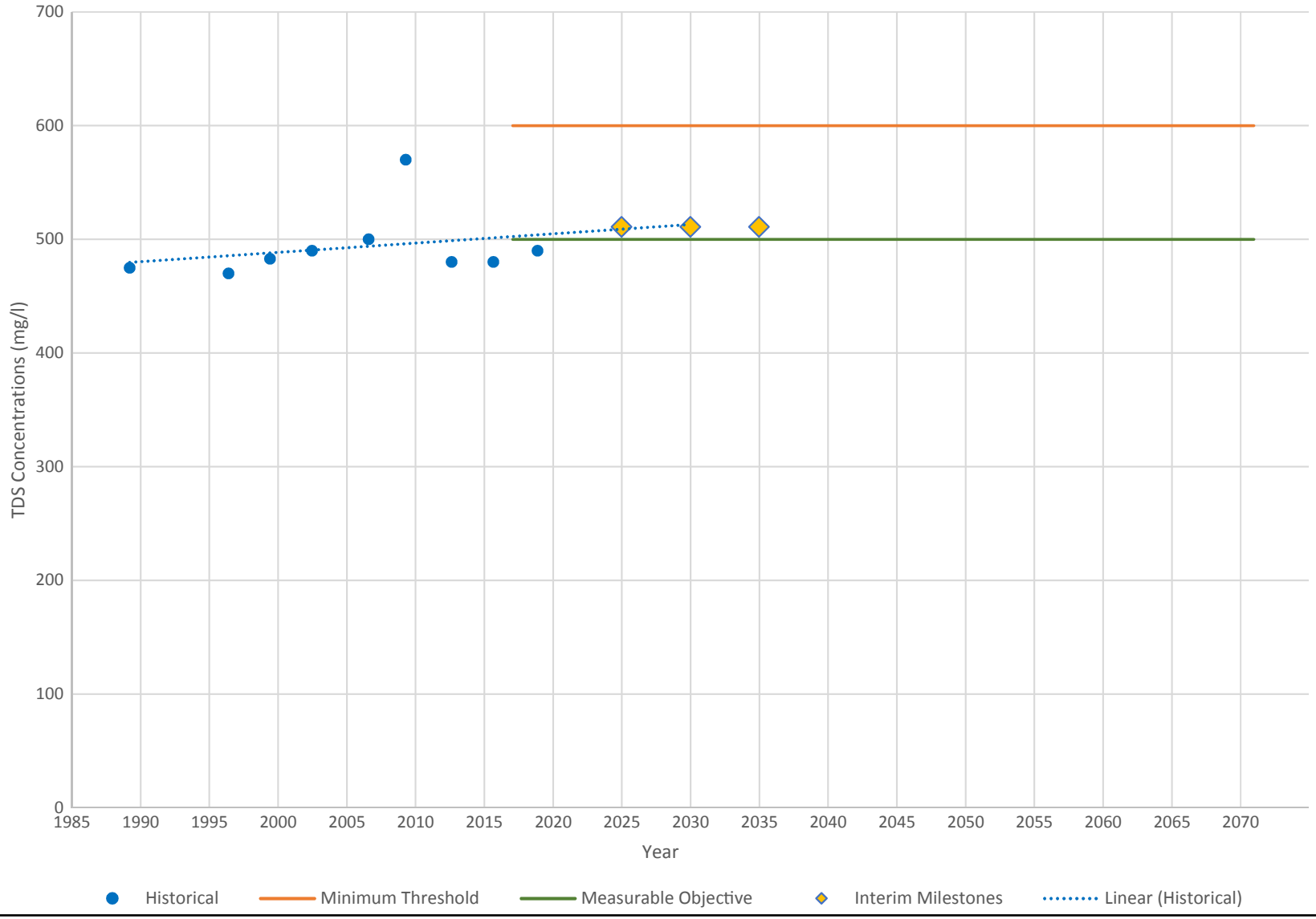


STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6e

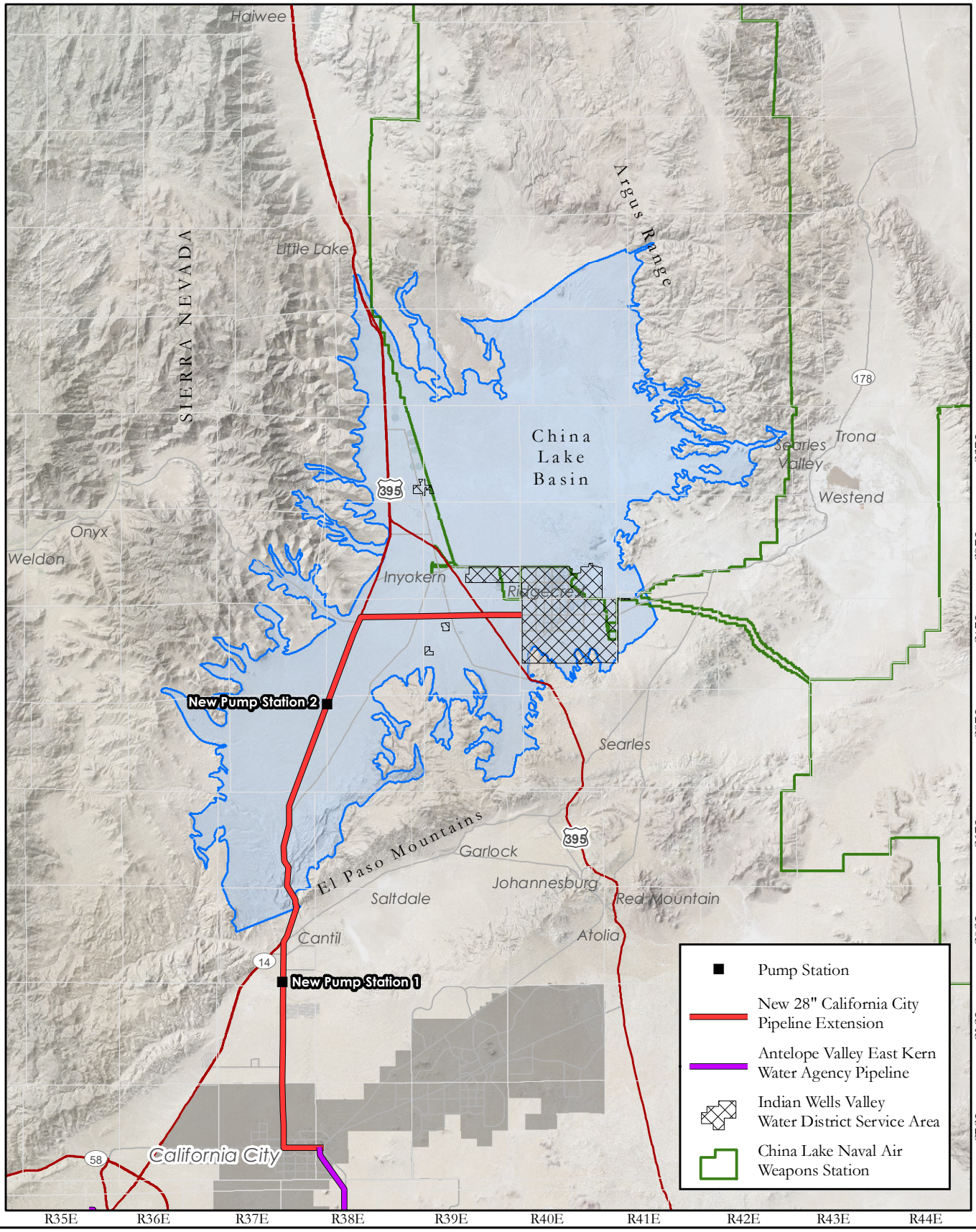
C/JobFolder/2652-001:08.08



STETSON ENGINEERS INC.

Sustainable Management Criteria: Degraded Water Quality

FIGURE 4-6f



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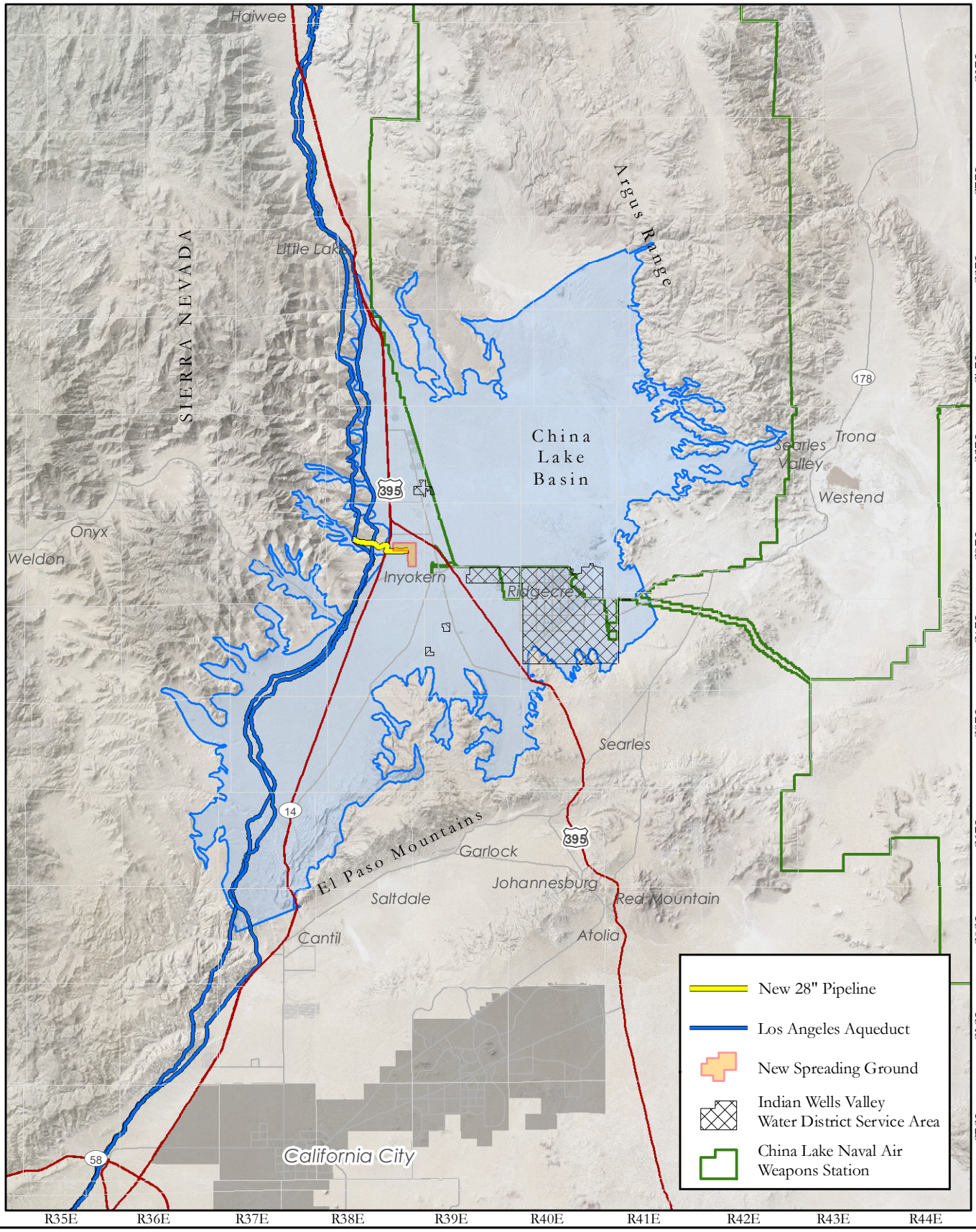
STETSON ENGINEERS INC.

IMPORTED WATER PROJECT 1 CONCEPTUAL MAP
DIRECT USE PROJECT WITH ANTELOPE VALLEY EAST KERN WATER AGENCY

N

0 3.5 7 Miles



IMPORTED WATER PROJECT 2 CONCEPTUAL MAP
GROUNDWATER RECHARGE PROJECT WITH
LOS ANGELES DEPARTMENT OF WATER AND POWER

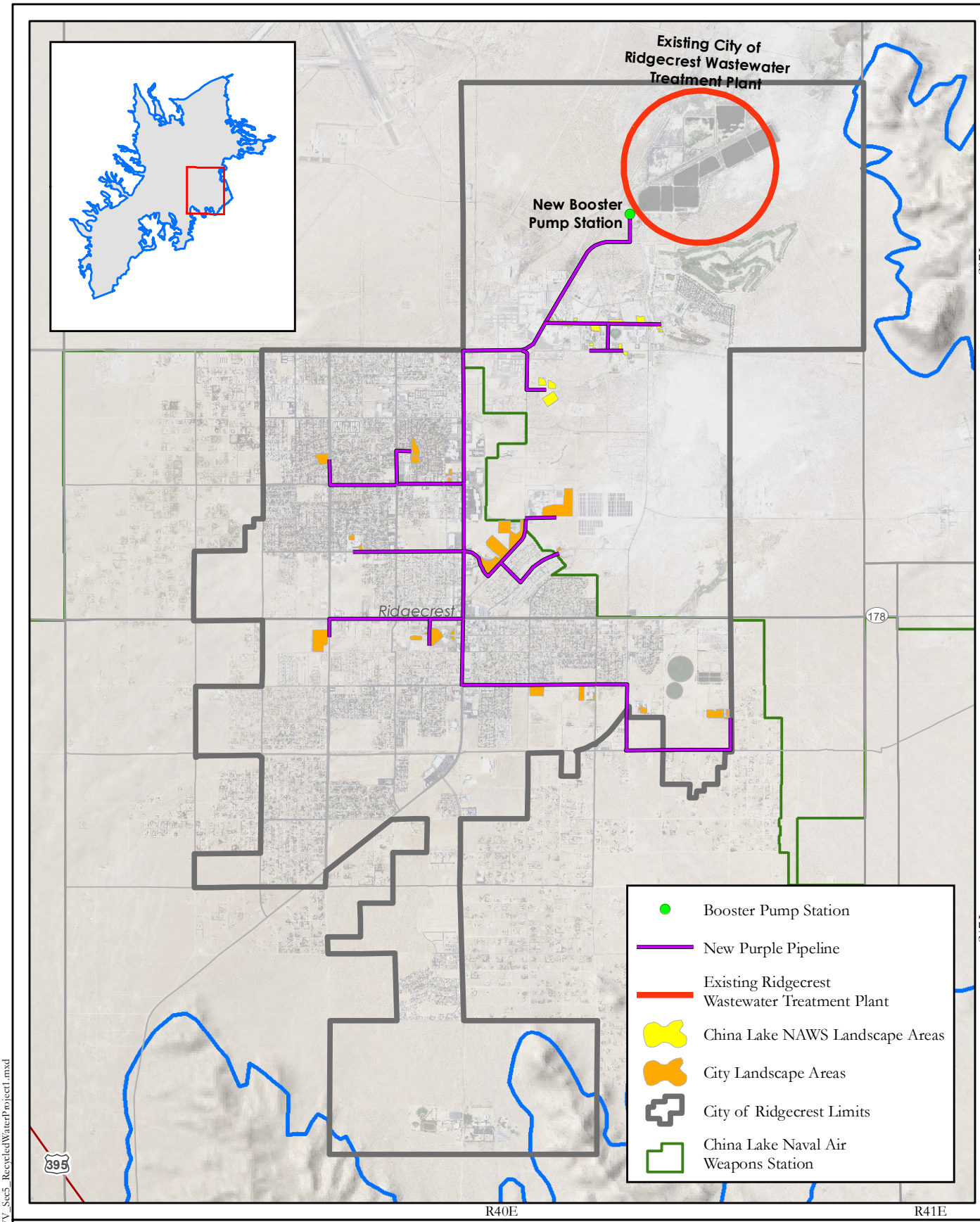
STETSON ENGINEERS INC.

N

0 3.5 7 Miles

Document Path: J:\jn2652\IWV_Sec5_ImportedWaterProject2.mxd

FIGURE 5-3



RECYCLED WATER PROJECT 1 CONCEPTUAL MAP
LANDSCAPE IRRIGATION IN THE CITY OF RIDGECREST AND CHINA LAKE NAWS

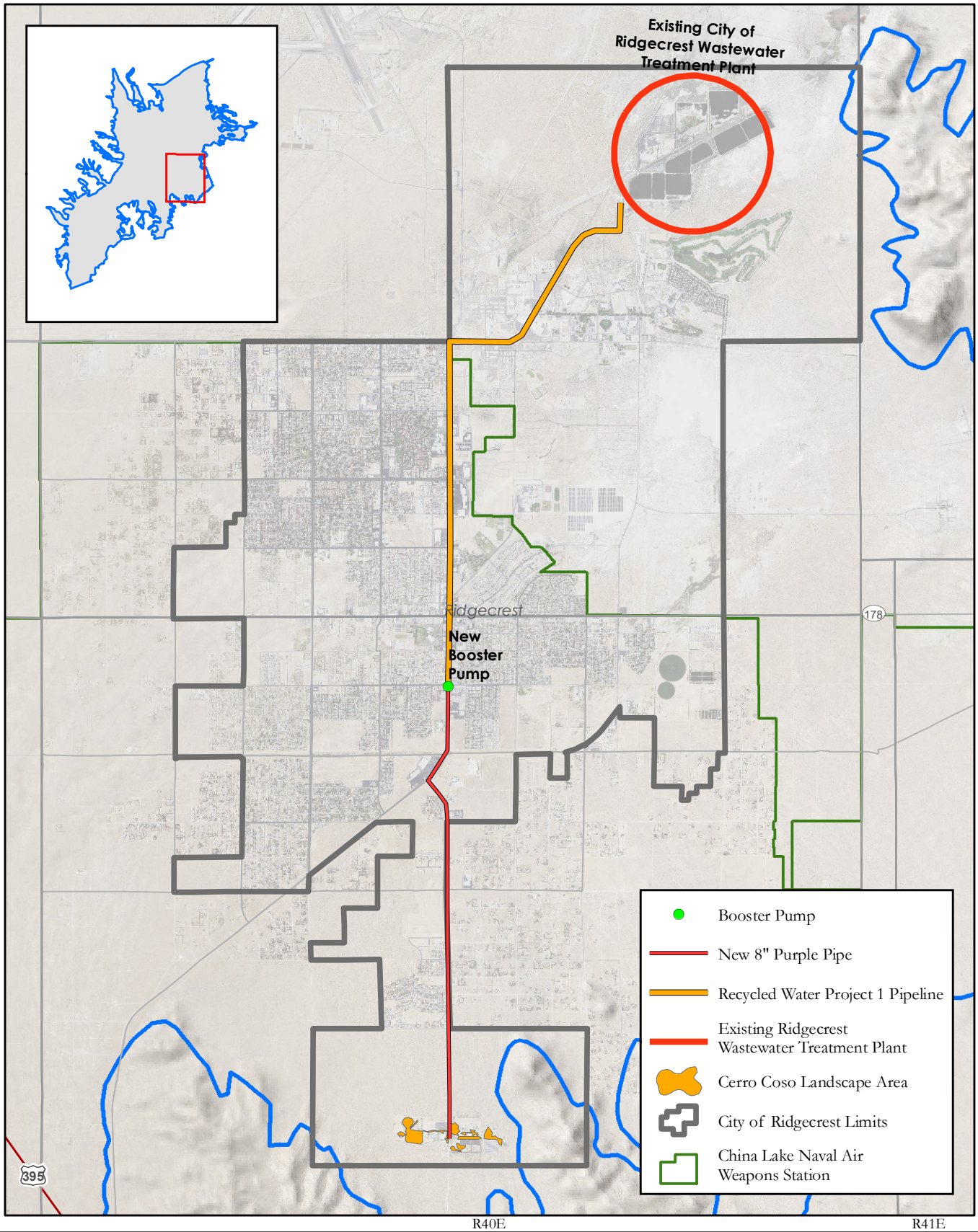
STETSON ENGINEERS INC.

N

0 0.4 0.8 Miles

Document Path: J:\jn2652\IWV_Sec5_RecycledWaterProject1.mxd

FIGURE 5-4



RECYCLED WATER PROJECT 1A CONCEPTUAL MAP
LANDSCAPE IRRIGATION
AT CERRO COSO COMMUNITY COLLEGE

STETSON ENGINEERS INC.

N

0 0.4 0.8 Miles

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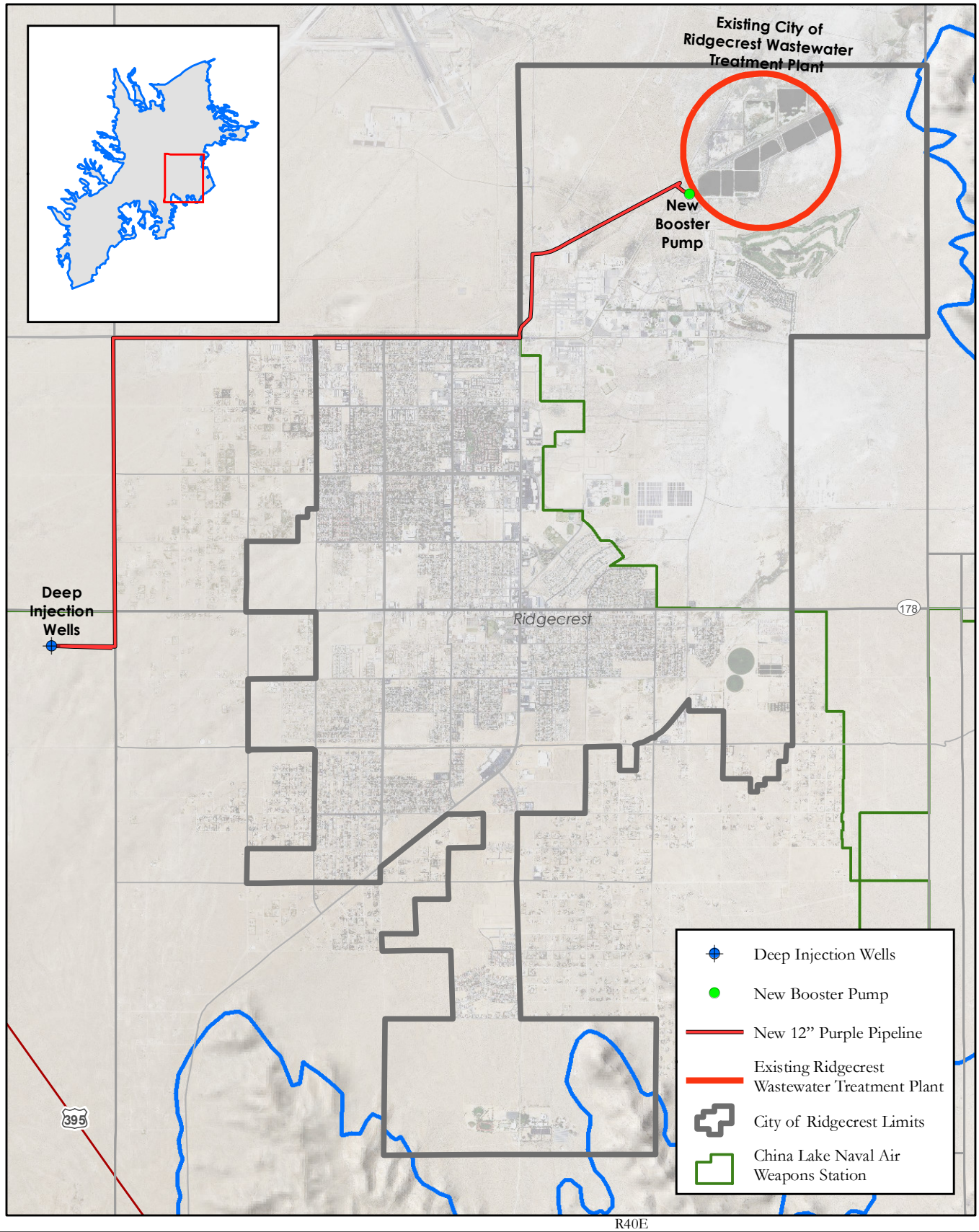


Document Path: J:\jn2652\IWV_Sec5_RecycledWaterProject2.mxd

STETSON ENGINEERS INC.

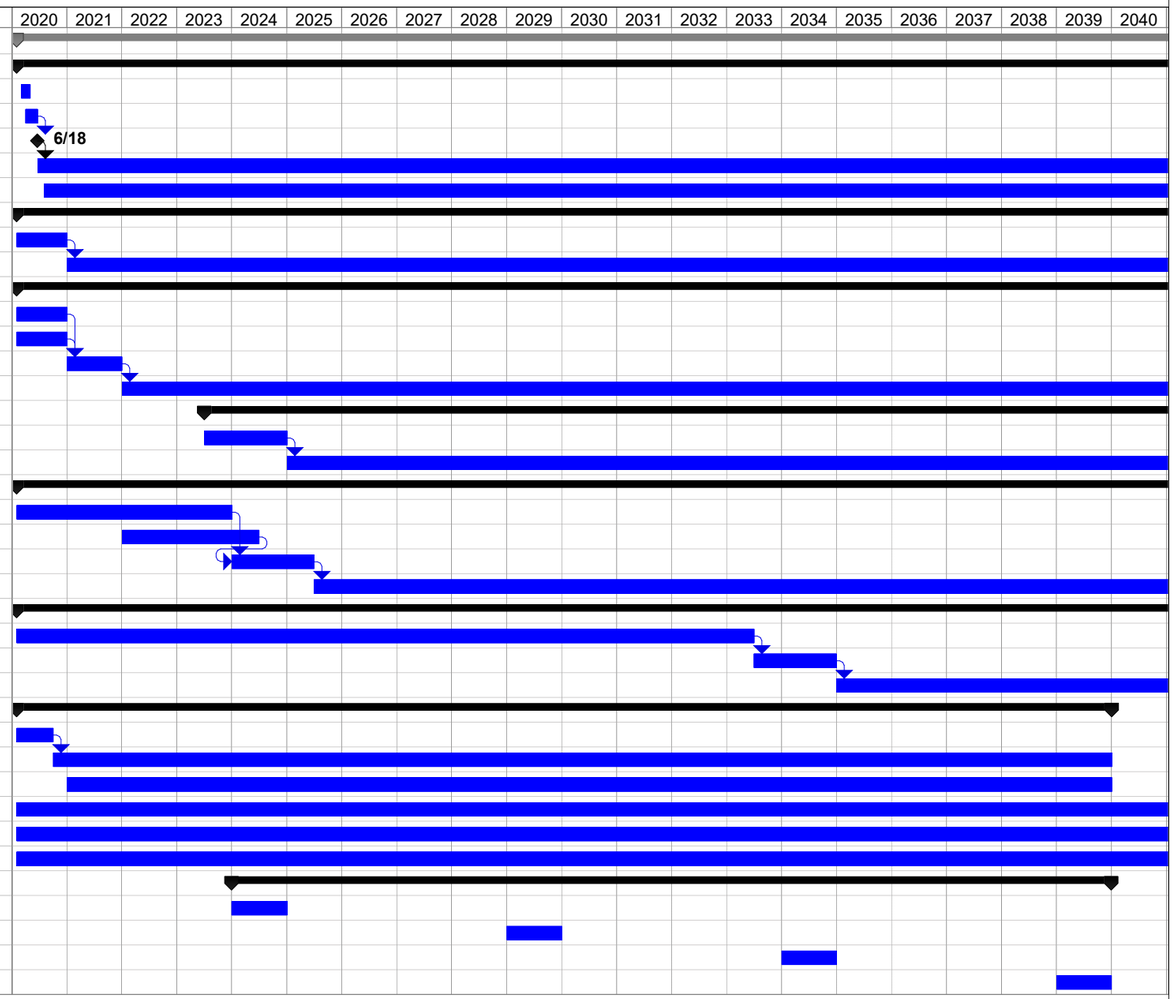
RECYCLED WATER PROJECT 2 CONCEPTUAL MAP
GROUNDWATER RECHARGE WITH RECYCLED WATER

N

0 0.45 0.9 Miles

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY
Preliminary GSP Implementation Schedule
December 10, 2019

ID	Task Name	Start	Finish
0	**Preliminary GSP Program Development and Implementation Schedule**	**Mon 2/3/20**	**Wed 1/1/70**
1	**Management Action No. 1: Pumping Allocation Plan, Transient Pool, and Fallowing Program**	**Mon 2/3/20**	**Wed 1/1/70**
2	Pumping Verification Process	Wed 3/4/20	Thu 4/30/20
3	Pumping Allocations and Transient Pool Plan Development	Wed 4/1/20	Thu 6/18/20
4	Board Adoption of Pumping Allocations and Transient Pool Plan	Thu 6/18/20	Thu 6/18/20
5	Pumping Allocations and Transient Pool Plan Implementation	Fri 6/19/20	Wed 1/1/70
6	Fallowing Program Implementation	Mon 8/3/20	Wed 1/1/70
7	**Project No. 5: Dust Control Mitigation Plan**	**Mon 2/3/20**	**Wed 1/1/70**
8	Dust Control Feasibility/Planning/Permitting	Mon 2/3/20	Thu 12/31/20
9	Dust Control Mitigation Plan Implementation	Fri 1/1/21	Wed 1/1/70
10	**Project No. 3: Conservation Efforts**	**Mon 2/3/20**	**Wed 1/1/70**
11	SDAC Pilot Project: Water Audit, Leak Detection, and Leak Repair Program	Mon 2/3/20	Thu 12/31/20
12	SDAC Pilot Project: Rebate Program	Mon 2/3/20	Thu 12/31/20
13	Conservation Program Development	Fri 1/1/21	Fri 12/31/21
14	Conservation Program Implementation	Mon 1/3/22	Wed 1/1/70
15	**Project No. 6: Pumping Optimization**	**Mon 7/3/23**	**Wed 1/1/70**
16	Pumping Optimization Plan Development	Mon 7/3/23	Tue 12/31/24
17	Pumping Optimization Implementation	Wed 1/1/25	Wed 1/1/70
18	**Project No. 3: Recycled Water Project**	**Mon 2/3/20**	**Wed 1/1/70**
19	Ridgecrest WWTP Upgrades (Non-IWVGA) *	Mon 2/3/20	Mon 1/1/24
20	Recycled Water Project Feasibility/Planning/Design	Mon 1/3/22	Fri 6/28/24
21	Recycled Water Project Construction	Tue 1/2/24	Mon 6/30/25
22	Recycled Water Project Implementation	Tue 7/1/25	Wed 1/1/70
23	**Project No. 1: Imported Water Project**	**Mon 2/3/20**	**Wed 1/1/70**
24	Imported Water Supply Feasibility/Planning/Design	Mon 2/3/20	Thu 6/30/33
25	Imported Water Supply Project Construction	Fri 7/1/33	Fri 12/29/34
26	Imported Water Supply Project Implementation	Mon 1/1/35	Wed 1/1/70
27	**Project No. 4: Shallow Well Mitigation Program**	**Mon 2/3/20**	**Mon 1/2/40**
28	Shallow Well Evaluation Criteria Development	Mon 2/3/20	Wed 9/30/20
29	Impacted Shallow Well Identification and Characteriztaion	Thu 10/1/20	Mon 1/2/40
30	Shallow Well Mitigation Program Implementation	Fri 1/1/21	Mon 1/2/40
31	**GSP Monitoring Program**	Mon 2/3/20	Wed 1/1/70
32	**Data Gap Analysis and Project Implementation**	Mon 2/3/20	Wed 1/1/70
33	**GSP Annual Reports**	Mon 2/3/20	Wed 1/1/70
34	**GSP DWR Updates**	**Mon 1/1/24**	**Fri 12/30/39**
35	2025 Update	Mon 1/1/24	Tue 12/31/24
36	2030 Update	Mon 1/1/29	Mon 12/31/29
37	2035 Update	Mon 1/2/34	Fri 12/29/34
38	2040 Update	Mon 1/3/39	Fri 12/30/39



Notes:
* Schedule subject to Navy and Ridgecrest negotiations.

Task	Rolled Up Milestone	Inactive Milestone	Start-only	Baseline
Critical Task	Rolled Up Progress	Inactive Summary	Finish-only	Baseline Milestone
Milestone	Split	Manual Task	External Tasks	Baseline Summary
Summary	External Tasks	Duration-only	External Milestone	Progress
Rolled Up Task	Project Summary	Manual Summary Rollup	Critical	Deadline
Rolled Up Critical Task	Group By Summary	Manual Summary	Critical Split	

APPENDICES

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APPENDIX 1-A

JOINT EXERCISE OF POWERS AGREEMENT

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Kern County
Agt. # 852-2016

JOINT EXERCISE OF

POWERS AGREEMENT

creating the

INDIAN WELLS VALLEY

GROUNDWATER AUTHORITY

TABLE OF CONTENTS

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

JOINT EXERCISE OF POWERS AGREEMENT

THIS JOINT EXERCISE OF POWERS AGREEMENT ("**Agreement**") forming the Indian Wells Valley Groundwater Authority ("**Authority**") is made and entered into as of July 15, 2016 ("**Effective Date**"), by and among the public agencies listed on the attached Exhibit "A" (collectively "**General Members**" and individually "**General Member**") for the purpose of forming a Groundwater Sustainable Agency ("**GSA**") and achieving groundwater sustainability in the Indian Wells Valley Groundwater Basin.

RECITALS

WHEREAS, the comprehensive groundwater legislation collectively enacted and referred to as the "Sustainable Groundwater Management Act" ("**SGMA**") initially became effective on January 1, 2015.

WHEREAS, the stated purpose of SGMA, as set forth in California Water Code section 10720.1, is to provide for the sustainable management of groundwater basins at a local level by providing local groundwater agencies with the authority and technical and financial assistance necessary to sustainably manage groundwater.

WHEREAS, SGMA further provides for and anticipates that the local groundwater agencies and federal governmental entities overlying a basin will form Groundwater Sustainable Agencies ("**GSAs**") for the purpose of achieving groundwater sustainability through the adoption and implementation of Groundwater Sustainability Plans ("**GSPs**") for the basin.

WHEREAS, each of the General and Associate Members overlie a portion of the Indian Wells Valley Groundwater Basin ("**Basin**") which is designated basin number 6-54 in Department of Water Resources Bulletin No. 118 and which is included on the list of critically overdrafted basins.

WHEREAS, SGMA requires that the Basin have a designated GSA by no later than June 30, 2017 and an adopted GSP by no later than January 31, 2020.

WHEREAS, the General Members are authorized by the Joint Exercise of Powers Act (Chapter 5 of Division 7 of Title 1 of the California Government Code) ("**Act**") to create the Authority for the purpose of jointly exercising those powers granted by the Act and any additional powers which are common among them.

WHEREAS, the General and Associate Members, individually and collectively, have the goal of cost effective sustainable groundwater management that considers the interests and concerns of all of the communities and parties that rely upon the Basin for their water supply.

WHEREAS, the General Members hereby enter into this Agreement to establish this Joint Powers Authority to undertake the management of groundwater resources pursuant to SMGA.

AGREEMENT TERMS

NOW THEREFORE, in consideration of the matters recited and the mutual promises, covenants, and conditions set forth in this Agreement, the Associate Members having expressed their intent to enter into a memorandum of understanding with the Joint Powers Authority delineating their participation in the Authority, the General Members hereby agree as follows:

Article I: Definitions

Section 1.01 – Definitions.

As used in this Agreement, unless the context requires otherwise, the meaning of the terms hereinafter set forth shall be as follows:

(a) "Act" shall mean the Joint Exercise of Powers Act, set forth in Chapter 5 of Division 7 of Title 1 of the California Government Code, sections 6500, *et seq.*, including all laws supplemental thereto.

(b) "Agreement" means this Indian Wells Valley Ground Water Authority Joint Exercise of Powers Agreement.

(c) "Associate Member" or "Associate Members" shall refer to those federal governmental entities listed in the attached Exhibit "B". Associate Members shall only consist of those federal governmental entities overlying the Basin who are authorized to participate in a GSA and whose willful participation is necessary because of, and limited by, legal principles such as sovereign immunity and/or the preemption doctrine. To the extent permitted by law and/or federal rules and regulations as they may be amended, "Associate Members" shall be afforded a representative non-Director's seat on the Authority's Board of Directors which will entitle them to full participation in the meetings and discussions of the Board. However, Associate Members shall not appoint Directors and they shall not have the power to vote on any action to be taken by the Authority or to become an officer of the Authority.

(d) "Authority" shall mean the Indian Wells Valley Groundwater Authority, which is a separate entity created by this Agreement pursuant to the provisions of California Government Code sections 6500 *et seq.*

(e) "Basin" shall mean the Indian Wells Valley Groundwater Basin which is designated basin number 6-54 in Department of Water Resources' Bulletin No. 118 and as its boundaries may be modified from time to time through the procedures described in California Water Code section 10722.2.

(f) "Board of Directors" or "Board" shall mean the governing body of the Authority as established by Section 6.01 of this Agreement.

(g) "Bylaws" shall mean the bylaws adopted by the Board of Directors pursuant to Section 8.5 of this Agreement to govern the day-to-day operations of the Authority.

(h) "Fiscal Year" shall mean that period of 12 months established as the Fiscal Year of the Authority pursuant to Section 9.03 of this Agreement.

(i) "General Member" or "General Members" shall mean the eligible agencies listed in the attached Exhibit "A" that have executed this Agreement, including any new General Members that may subsequently join this Authority with the authorization of the Board, pursuant to Section 5.02 of this Agreement.

(j) "Groundwater Sustainability Agency" or "GSA" shall have the meaning set forth in California Water Code section 10721(j).

(k) "Groundwater Sustainability Plan" or "GSP" shall have the meaning set forth in California Water Code section 10721(k).

(l) "Primary Director" and "Alternate Director" shall mean a Primary Director or Alternate Director appointed by a General Member pursuant to Section 6.02 of this Agreement.

(m) "Regular Monthly Receivables" shall mean those costs and bills of the Authority, which are routine in nature and which have not been objected to by any Director either at the meeting or in writing prior to the meeting.

(n) "Special Activities" shall mean activities that are consistent with the purpose of this Agreement and which are done in the name of the Authority pursuant to Section 10.01 of this Agreement, but which are undertaken by fewer than all the General Members.

(o) "Sustainable Groundwater Management Act" or "SGMA" shall mean the comprehensive groundwater legislation collectively enacted and referred to as the "Sustainable Groundwater Management Act" ("SGMA") as codified in California Water Code sections 10720 *et seq.* and as may be amended in the future.

Article II: Authority Creation

Section 2.01 – Creation of the Authority.

There is hereby created a joint powers agency known as the Indian Wells Valley Groundwater Authority ("Authority"). The Authority shall be, to the extent provided by law, a public entity separate from the General Members of this Agreement.

Section 2.02 – Purpose of the Authority.

The purpose of this Agreement, and the creation of the Authority, is to provide for the joint exercise of powers common to the General Members, and those additional powers granted by SGMA, for the purpose of cooperatively carrying out the requirements of SGMA, including, but not limited to, serving as the GSA for the Basin and developing, adopting and implementing a GSP that achieves groundwater sustainability in the Basin.

Article III: Term

Section 3.01 – Term.

This Agreement shall become operative on the Effective Date provided that at least two of the General Members listed in Exhibit A have executed this Agreement by said date. If an eligible agency listed in Exhibit A has not executed this Agreement and paid their initial funding contribution called for in Section 9.02 by August 15, 2016, they will lose their right to join through execution of this Agreement and their membership will be subject to the process for inclusion of new General Members set forth in Section 5.02.

This Agreement shall remain in effect until terminated by the unanimous written consent of all then active General Members or there are less than two General Members remaining in the Authority; provided, however, that this Agreement shall remain in effect during the term of any contractual obligation or indebtedness of the Authority that was previously approved by the Board.

Article IV: Powers

Section 4.01 – Powers.

The Authority shall possess the ability to exercise those powers specifically granted by the Act. Additionally, the Authority shall possess the ability to exercise the common powers of its Members related to the purposes of the Authority, including and limited to the following:

4.01.1 To designate itself the GSA for the Basin pursuant to SGMA.

4.01.2 To develop, adopt and implement a GSP for the Basin pursuant to SGMA.

4.01.3 To adopt rules, regulations, policies, bylaws and procedures governing the operation of the Authority and the adoption and implementation of the GSP.

4.01.4 To contract for the services of engineers, attorneys, planners, financial consultants, and separate and apart therefrom to appoint agents and representatives to employ such other staff persons as necessary.

4.01.5 To collect and monitor all data related and beneficial to the development, adoption and implementation of the GSP for the Basin

4.01.6 To issue revenue bonds or other appropriate public or private debt and incur debts, liabilities or obligations in connection with the operation, maintenance, administration and management of any facilities required to carry out these purposes.

4.01.7 To levy assessments, charges and fees as provided in SGMA.

4.01.8 To regulate and monitor groundwater extractions as permitted by SGMA, provided that this provision does not extend to a General or Associate Member's operation of its system to distribute water once extracted or otherwise obtained, unless and to the extent required by other laws.

4.01.9 To establish and administer water banking programs for the benefit of the Basin.

4.01.10 To establish and administer water recycling, recapturing or purifying programs for the benefit of the Basin.

4.01.11 To cooperate, act in conjunction and contract with the United States, the State of California, or any agency thereof, counties, municipalities, public and private corporations of any kind (including without limitation, investor-owned utilities), and individuals, or any of them, for any and all purposes necessary or convenient for the full exercise of the powers of the Authority.

4.01.12 To accumulate operating and reserve funds and invest the same as allowed by law for the purposes of the Authority.

4.01.13 To apply for and accept grants, contributions, donations and loans under any federal, state or local programs for assistance in developing or implementing any of its projects or programs in connection with any project untaken in the Authority's name for the purposes of the Authority.

4.01.14 To acquire by negotiation or condemnation, lease, purchase, construct, hold, manage, maintain, operate and dispose of any buildings, property, water rights, works or improvements within and without the respective boundaries of the General Members necessary to accomplish the purposes described herein.

4.01.15 To sue or be sued in its own name.

4.01.16 To invest funds pursuant to California Government Code section 6509.5 or other applicable State Law.

4.01.17 Any power necessary or incidental to the foregoing powers in the manner and according to the procedures provided for under the law applicable to the General Members to this Agreement.

4.01.18 Any additional powers conferred under SGMA or the Act or under applicable law, insofar as such powers are needed to accomplish the purposes of SGMA, including all powers granted to the Authority under Article 4 of the Act which are in addition to the common powers of the General Members, including the power to issue bonds or otherwise

incur debts, liabilities or obligations to the extent authorized by the Act or any other applicable provision of law and to pledge any property or revenues of the rights thereto as security for such bonds and other indebtedness.

Section 4.02 – Exercise of Powers.

In accordance with California Government Code section 6509, the foregoing powers shall be subject to the restrictions upon the manner of exercising such powers pertaining to the County of Kern.

Section 4.03 – Water Rights and Consideration of all Beneficial Uses and Users of Groundwater in the Basin.

As set forth in California Water Code section 10723.2, and any future amendments to SGMA, the GSA shall consider the interests of all beneficial uses and users of groundwater in the Basin, as well as those responsible for implementing the GSP. Additionally, as set forth in California Water Code section 10720.5(a), and any future amendments to SGMA, any GSP adopted pursuant to this Agreement shall be consistent with Section 2 of Article X of the California Constitution and nothing in this Agreement modifies the rights or priorities to use or store groundwater consistent with Section 2 of Article X of the California Constitution, with the exception that no extraction of groundwater between January 1, 2015 and the date the GSP is adopted may be used as evidence of, or to establish or defend against, any claim of prescription. Likewise, as set forth in California Water Code section 10720.5(b), and any future amendments to SGMA, nothing in this Agreement or any GSP adopted pursuant to this Agreement determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.

Section 4.04 – Preservation of Police Powers.

Nothing set forth in this Agreement shall be deemed to modify or otherwise limit a county's or city's police powers in any way or its authority to regulate groundwater under existing law or any amendment thereto. The adopted GSP shall not authorize any water supply augmentation to the Basin with groundwater extracted from another groundwater basin within the jurisdiction of a General Member without the express approval of the Primary Director representing that General Member.

Article V: Membership

Section 5.01 – General Members.

The General Members of the Authority shall be the public agencies listed on the attached Exhibit "A", so long as their Membership has not been withdrawn or terminated pursuant to the provisions Article XI of this Agreement.

Section 5.02 – New General Members.

The Board may approve an application for a new General Member to the Authority through a vote of the Board so long as: 1) the new General Member is a public agency that is qualified to join the Authority under the provisions of SGMA and the Act; and, 2) the new General Member agrees to or has met any other conditions that the Board may establish from time to time.

Once an application is approved by the Board of Directors, the governing bodies for each of the General Members shall be sent the application for consideration and possible approval. For a new General Member to be admitted, the application must be approved by each of the governing bodies for the General Members. Upon final approval, the attached Exhibit "A" shall be amended to reflect the new General Member.

Section 5.03 – Associate Members.

The Associate Members of the Authority shall be those Federal Governmental Entities listed on the attached Exhibit "B" so long as their Membership has not been withdrawn or terminated pursuant to the provisions Article XI of this Agreement. Associate Members shall be afforded a representative non-voting seat on the Authority's Board of Directors which will entitle the representative to full participation in the meetings and discussions of the Board. However, representatives of Associate Members shall not be Directors, nor shall they become officers of the Authority and they shall not have the power to vote on any action and or proposal before the Board of Directors.

Article VI: Directors and Officers

Section 6.01 – Board of Directors.

The Authority shall be governed and administered by a Board of Directors ("Board") which is hereby established and which shall be composed of one voting seat per General Member. To the extent permitted by law and/or federal rules and regulations as they may be amended, Associate Members shall not be allowed to vote on any matter before the Board but they shall be afforded a representative non-voting seat on the Board, which will entitle them to full participation in the meetings and discussions of the Board and any Committees established by the Board.

Section 6.02 – Directors and Alternates.

Each General Member's governing body shall appoint one Primary Director and one Alternate Director. The Alternate Director shall serve and assume the rights and duties of the Primary Director when the Primary Director is unable to attend a Board meeting. The Primary and Alternate Directors for the County of Kern, Indian Wells Valley Water District and the City of Ridgecrest shall be elected members of their governing bodies. Primary Directors and Alternate Directors shall serve at the pleasure of the governing body appointing them and they may be removed at any time, with or without cause, in the sole discretion of their governing body. Each Primary Director and Alternate Director shall hold office until their successor is selected by their governing body and the Authority has been notified of the succession.

Section 6.03 – Officers of the Board.

Officers of the Authority's Board shall consist of a Chairperson and Vice-Chairperson. The Chairperson shall preside at all meetings of the Board, while the Vice-Chairperson shall perform the duties of the Chairperson in the absence or disability of the Chairperson. The Chairperson and Vice-Chairperson shall exercise and perform such other powers and duties as may be assigned by the Board.

Section 6.04 – Appointment of Officers of the Board.

The Board shall annually elect the Officers of the Board from the Primary Directors. Officers of the Board shall hold office for a term of one year commencing on January 1 of each and every calendar year and they may serve for multiple consecutive terms. Officers of the Board may be removed and replaced at any time, with or without cause by a Board vote. In the event that an Officer of the Board loses their position as a Primary Director, that Officer of the Board position shall become vacant and Board shall elect a new individual to serve the remaining term.

Article VII: Board Meetings and Actions

Section 7.01 – Initial Meeting.

The initial meeting of the Board shall be held at a location overlying the Basin within forty five days (45) days of the Effective Date of this Agreement.

Section 7.02 – Regular Meeting Schedule.

The Board shall establish a regular meeting time and place at the initial meeting of the Board. The Board may vote to change the regular meeting time and place provided that the new location remains at a place overlying the Basin.

Section 7.03 – Special Meetings.

Special meetings of the Board shall be conducted pursuant to California Government Code section 54956 and they may be called by the Chairperson, or by the concurrence of any two Primary Directors.

Section 7.04 – Committees of the Board.

The Board may from time to time establish advisory committees for the purpose of making recommendations to the Board on the various activities of the Authority. The establishment of any committee and its duties shall require the vote of the Board of Directors and the activities of the committee shall be subject to the provisions of the Ralph M. Brown Act (California Government Code sections 54950, *et seq.*). Committees shall exist for the term specified in the action creating the committee and the Board may dissolve a committee at any time through a vote of the Board of Directors.

The Board shall ensure that the development of the GSP includes the meaningful participation of all water users in the Basin including but not limited to the General Members, Associate Members, regulated public water utilities, mutual water companies and other private well pumpers. The Board shall ensure this meaningful participation through the establishment of one or more committees which will contain members from the above groups so long as their participation does not violate the State ethics and conflict of interest laws, including California Government Code sections 1090 *et seq.*, or any other law.

Section 7.05 – Conduct of Board and Committees of the Board Meetings.

All meetings of the Board of Directors, including special meetings and Board committee meetings, shall be noticed, held, and conducted in accordance with the provisions of the Ralph M. Brown Act (California Government Code sections 54950, *et seq.*). The Board may use teleconferencing in connection with any meeting in conformance with, and to the extent authorized by, applicable law. The Board may further establish rules of conduct for its meetings provided that said rules do not conflict with the Ralph M. Brown Act or other applicable law.

All meetings of Committees of the Board that are formed in accordance with Section 7.04 shall be noticed, held, and conducted in accordance with the provisions of the Ralph M. Brown Act (California Government Code sections 54950, *et seq.*). A Committee may use teleconferencing in connection with any meeting in conformance with, and to the extent authorized by, applicable law. The Board may further establish rules of conduct for Committees of the Board meetings provided that said rules do not conflict with the Ralph M. Brown Act or other applicable law.

Section 7.06 – Quorum.

A quorum of the Board shall consist of majority of the Directors representing the then active General Members. In the absence of a quorum, no business may be transacted beyond the adjournment of a meeting by the remaining Directors. A Director shall be deemed present for the determination of a quorum if the Director is present at the meeting in person or if they participate in the meeting telephonically as provided for by Ralph M. Brown Act.

Section 7.07 – Voting.

The affirmative vote of a majority of the Board shall be required for the approval of any Board action. In addition, no action may be approved by the Board unless it receives the affirmative vote from no less than two of the then voting Directors representing the County of Kern, the City of Ridgecrest and/or the Indian Wells Valley Water District.

Notwithstanding the foregoing, the Board may approve the Regular Monthly Receivables by a simple majority vote so long as the routine costs and bills making up the Regular Monthly Receivables have not been objected to by any Director. While a Director may voice an oral objection at the meeting, a Director's presence is not required and they may also file an objection in writing prior to the meeting. Likewise, any meeting of the Board may be adjourned by a simple majority vote of the then present Directors.

Section 7.08 – GSP Adoption, Modification, or Alteration.

The final adoption of a GSP and the modification and/or alteration of any adopted GSP shall require the affirmative vote of at least 4/5ths of the General Members on the Board, unless a General Member's Director abstains or recuses himself or herself from the matter. In the event a General Member's Director abstains or recuses himself or herself, the voting requirement shall become 3/4ths. In the event that two General Member Directors abstain and/or recuse themselves, the voting requirement shall become 2/3rds.

Section 7.09 – Minutes.

The Board shall cause minutes to be kept of all public meetings of the Board and any Board appointed Committees. The Board shall further cause a copy of draft minutes to be forwarded to each Director and to each General Member Agency.

Article VIII: Operations and Management

Section 8.01 – Administrator.

The Authority may appoint an Administrator, from time-to-time as and when it deems appropriate. If appointed, the Administrator shall serve at the pleasure of the Board of Directors and their duties and responsibilities shall be set forth via a vote of the Board.

Section 8.02 – Legal Counsel and Other Officers.

The Authority may appoint General Legal Counsel who shall serve at the pleasure of the Board via a vote of the Board. Subject to the limits of the Authority's approved budget, the Board shall also have the power to appoint and contract via a vote of the Board for the services of other officers, consultants, advisers and independent contractors as it may deem necessary or convenient for the business of the Authority, all of whom shall serve at the pleasure of the Board.

Section 8.03 – Employees and Management.

In addition to, or in lieu of, hiring employees, the Authority may engage one or more General Members to manage any or all of the business of the Authority on terms and conditions acceptable to the Board of Directors. Any General Member so engaged shall have such responsibilities as are set forth in the contract for such General Member's services, which shall be approved by a majority vote of the Directors representing the non-contracting Members.

Section 8.04 – Principal Office.

At the initial meeting of Board, the Board shall establish a principal office for the Authority, which shall be located at a place overlying the Basin. The Board may change the principal office from time to time as the Board sees fit so long as that principal office remains at a location overlying the Basin.

Section 8.05 – Bylaws.

The Board shall adopt Bylaws governing the conduct of meetings and the day-to-day operations of the Authority on or before the first anniversary of the Effective Date. The Bylaws may be amended from time to time as the Board deems necessary.

Section 8.06 – Official Seal and Letterhead.

The Board may adopt, and/or amend, an official seal and letterhead for the Authority by a vote of the Directors.

Section 8.07 – Conflict of Interest Code.

At the initial meeting of Board, the Board shall begin the process for the adoption and filing of a Conflict of Interest Code pursuant to the provisions of the Political Reform Act of 1974.

Article IX: Financial Provisions

Section 9.01 – Establishment of Funds.

The Board shall establish and maintain such funds and accounts as may be required by generally accepted public agency accounting practices. The Authority shall maintain strict accountability of all funds and report of all receipts and disbursements of the Authority.

Section 9.02 – Initial Funding Payments.

In order to provide the needed capital to initially fund the Authority, the General Members shall each provide an initial contribution of $15,000 due upon their execution of this Agreement. To the extent the Authority is able to secure other funding sources in the future, and to the extent permitted by law, the Authority shall reimburse the initial contributions on a proportionate basis.

Notwithstanding the equal amount of initial funds contributed by each of the General Members, the parties intend for future funding contributions to be allocated on a fair, proportional basis (e.g., irrigated acreage, groundwater pumping, population, and/or number of wells).

Section 9.03 – Fiscal Year.

The Fiscal Year of the Authority shall be from January 1 through December 31 of each year. If the Board so desires, it may change the Fiscal Year.

Section 9.04 – Fiscal Agent and Treasurer.

The County of Kern shall serve as the Fiscal Agent and Treasurer for the Authority unless otherwise directed by a vote of the Board of Directors. The Fiscal Agent shall be responsible for all money of the Authority from whatever source. All funds of the Authority shall be strictly and separately accounted for and regular reports shall be rendered of all receipts

and disbursements during the Fiscal Year as designated by the Board. The books and records of the Authority shall be open to inspection by the General Members.

Section 9.05 – Funds; Property; Bonds.

The Board shall from time to time designate the officers and persons, in addition to those specified in Section 9.04 above, who shall have charge of, handle, or have access to any funds and/or property of the Authority. Each such officer and person shall file a bond in an amount designated by the Board.

Section 9.06 – Audit Duties.

The Board shall contract with a certified public accountant to audit the accounts and records of the Authority as required by applicable accounting practices and the Act.

Section 9.07 – Budget.

By a date no later than January 1, 2017, and sixty (60) days before the end of each Fiscal Year thereafter, the Board shall adopt a budget for the Authority for the ensuing Fiscal Year. The Board may authorize mid-year budget adjustments, as needed.

Notwithstanding Section 11.04, a General Member shall not be fiscally liable for any adopted or modified budget or budget item(s) provided that the General Member's Director provides written notice within fourteen (14) days of the adoption or modification of the budget or a budget item that the Director intends to recommend to their board that the General Member withdraw from this Agreement. The notice provided in this section shall serve to limit the General Member's fiscal liability for the contested budget or budget item(s) so long as the General Member's board formally votes to withdraw from this Agreement within sixty (60) days of the adoption or modification of the budget or budget item(s).

Section 9.08 – Payments To The Authority.

(a) All fees, costs and expenses incurred by the Authority shall be funded from: (i) voluntary contributions from third parties, such as grants; (ii) assessments on the General Members, levied from time to time by the Board to carry out the activities of the Authority generally applicable to all Members; and, (iii) assessments, fees and/or charges levied by the Authority under the provisions of SGMA.

(b) No General Member shall be bound, financially or otherwise, by any obligation, contract or activity undertaken by the Authority unless and except to the extent agreed upon by the General Member, except that each General Member shall be obligated to fund its then current annual share of the general basic budget of the Authority, provided such budgets are otherwise approved as provided herein. Funding of other matters shall be through Special Activity agreements or as otherwise agreed to by the General and Associate Members.

(c) The Associate Members cannot contribute direct funding to the Authority however they will assist in project development technical support, and information sharing including field studies/data, as appropriate.

Article X: Special Activities

Section 10.01 – Special Activities.

With the prior approval of the Board, General Members may undertake Special Activities in the name of the Authority. Prior to undertaking a Special Activity, the General Members electing to participate in the Special Activity shall enter into an activity agreement. Such activity agreement shall provide that: (i) no Special Activity undertaken pursuant to such agreement shall conflict with the terms of this Agreement; and, (ii) the General Members to the activity agreement shall indemnify, defend and hold the other parties to this Agreement and the Authority harmless from and against any liabilities, costs or expenses of any kind arising as a result of the Special Activity described in the activity agreement. All assets, rights, benefits, debts, liabilities and obligations attributable to a Special Activity shall be assets, rights, benefits debts, liabilities and obligations solely of the General Members that have entered into the activity agreement for that Special Activity, in accordance with the terms of the activity agreement, and shall not be the assets, rights, benefits, debts, liabilities and obligations of those General and Associate Members that have not executed the activity agreement. General and Associate Members not electing to participate in the Special Activity shall have no rights, benefits, debts, liabilities or obligations attributable to such Special Activity.

Article XI: Relationship of Authority And Its Members

Section 11.01 – Separate Entity.

In accordance with California Government Code Sections 6506 and 6507, the Authority shall be a public entity separate and apart from the parties to this Agreement.

Section 11.02 – Liabilities.

The General Members do not intend hereby to be obligated either jointly or severally for the debts, liabilities or obligations of the Authority, except as may be specifically provided for in California Government Code Section 895.2 as amended or supplemented. Therefore unless, and to the extent otherwise required by law or agreed to herein by the General Members, the debts, liabilities and obligations of the Authority shall not be debts, liabilities or obligations of the General Member entities. The Authority shall own and hold title to all funds, property and works acquired by it during the term of this Agreement.

Section 11.03 – Indemnity.

Funds of the Authority may be used to defend, indemnify, and hold harmless the Authority, each General Member, each Director, and any officers, agents and employees of the Authority for their actions taken within the course and scope of their duties while acting on behalf of the Authority. Other than for gross negligence or intentional acts, to the fullest extent permitted by law, the Authority agrees to save, indemnify, defend and hold harmless each General Member from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, including attorney's fees and costs, court costs, interest, defense costs, and expert witness fees, where the same arise out of, or are attributable in whole or in part, to

negligent acts or omissions of the Authority or its employees, officers or agents or the employees, officers or agents of any General Member, while acting within the course and scope of a General Member relationship with the Authority.

Section 11.04 – Withdrawal of Members.

Any General and/or Associate Member shall the have the ability to withdraw by providing forty-five (45) days written notice of its intention to withdraw. Said notice shall be given to the Board and to each of the other General and Associate Members. In the event of a withdrawal, this Agreement shall continue in full force and effect among the remaining members as set forth in Section 11.06 below.

Section 11.05 – Termination of Members.

The Board may vote to terminate any Member for cause including, but not limited to, the failure to meet its funding obligations set forth in this Agreement or future actions of the Board. In the event of a termination, this Agreement shall continue in full force and effect among the remaining members as set forth in Section 11.06 below.

Section 11.06 – Continuing Obligations upon Withdrawal or Termination.

Except as provided for in Section 9.07, any withdrawal or termination of a General Member, shall not relieve the General Member of its financial obligations (including, but not limited to, indemnity obligations, capital costs, debt obligations, CalPERS unfunded Liability, or any net operations and maintenance costs resulting from such withdrawal) arising under this Agreement prior to the effective date of the withdrawal or termination.

The withdrawal or termination of one or more General Members, shall not terminate this Agreement or result in the dissolution of the Authority. This Agreement shall remain in full force and effect among the remaining members, following the withdrawal or termination of any General Member, and the Authority shall remain in operation provided that there are at least two General Members remaining in this Agreement.

Section 11.07 – Dissolution.

The Authority may be dissolved at any time upon the unanimous vote of the Board and approval of the General Members' governing boards. However, the Authority shall not be dissolved until all debts and liabilities of the Authority have been eliminated. Upon dissolution of the Authority, each General Member shall receive its proportionate share of any remaining assets after all Authority liabilities and obligations have been paid in full. The distribution of remaining assets may be made "in kind" or assets may be sold and the proceeds thereof distributed to the General Members. This distribution shall occur within a reasonable time after dissolution. No former member which previously withdrew or was terminated shall be entitled to a distribution upon dissolution.

Section 11.08 – Disposition of Property Upon Termination of Authority or Board Determination of Surplus.

Upon termination of this Agreement or upon determination by the Board that any surplus money is on hand, such surplus money shall be returned to the then General Members of the Authority that contributed such monies in proportion to their contributions. The Board shall first offer any surplus properties, works, rights and interests of the Authority for sale to the individual General Member and the sale shall be based on highest bid. If no such sale is consummated, the Board shall offer the surplus properties, works, rights and interests of the Authority for sale in accordance with applicable law to any governmental agency, private entity or persons for good and adequate consideration.

Article XII: Miscellaneous Provisions

Section 12.01 – Agreement Complete.

The foregoing constitutes the full and complete Agreement of the General Members. This Agreement supersedes all prior agreements and understandings, whether in writing or oral, related to the subject matter of this Agreement that are not set forth in writing herein.

Section 12.02 – Amendment.

This Agreement may be amended from time to time by the unanimous consent of the General Members, acting through their governing bodies.

Section 12.03 – Assignment.

Except as otherwise provided in this Agreement, the rights and duties of the General Members may not be assigned or delegated without the advance written consent of all the other General Members, and any attempt to assign or delegate such rights or duties in contravention of this section shall be null and void. Any assignment or delegation permitted under the terms of this Agreement shall be consistent with the terms of any contracts, resolutions or indentures of the Authority then in effect. This Agreement shall inure to the benefit of and be binding upon the successors and assigns of the General Members hereto. This section does not prohibit a General Member from entering into an independent agreement with another agency regarding the financing of that General Member's contributions to the Authority or the disposition of proceeds, which that General Member receives under this Agreement so long as such independent agreement does not affect, or purport to affect, the rights and duties of the Authority or the General Members under this Agreement.

Section 12.04 – Dispute Resolution.

In the event there are disputes and/or controversies relating to the interpretation, construction, performance, termination, breach of, or withdrawal from this Agreement, the General Members involved shall in good faith meet and confer amongst themselves in an attempt to informally resolve such matter(s). If the General Members are unsuccessful in resolving such matter(s) through an informal meeting process, they shall attempt to resolve such matter(s) through mediation. If they are unable to resolve such matter(s) through mediation, they may

attempt to settle such issue(s) by arbitration under the rules and regulations of the American Arbitration Association or they may exercise whatever other legal rights and remedies they may have in court. Any party requesting arbitration under this Agreement must make a request on the other General Members by registered or certified mail with a copy to the American Arbitration Association.

Section 12.05 – Execution In Parts Or Counterparts.

This Agreement may be executed in parts or counterparts, each part or counterpart being an exact duplicate of all other parts or counterparts, and all parts or counterparts shall be considered as constituting one complete original and may be attached together when executed by the General Members hereto. Facsimile or electronic signatures shall be binding.

Section 12.06 – Member Authorization.

The governing bodies of the General Members have each authorized execution of this Agreement, as evidenced by their respective signatures below.

Section 12.07 – No Predetermination or Irretrievable Commitment of Resources.

Nothing herein shall constitute a determination by the Authority or any of its General and Associate Members that any action shall be undertaken or that any unconditional or irretrievable commitment of resources shall be made, until such time as the required compliance with all local, state, or federal laws, including without limitation the California Environmental Quality Act, National Environmental Policy Act, or permit requirements, as applicable, have been completed.

Section 12.08 – Notices.

Notices authorized or required to be given pursuant to this Agreement shall be in writing and shall be deemed to have been given when mailed, postage prepaid, or delivered during working hours to the addresses set forth for each of the Members hereto on Exhibit "A" of this Agreement, or to such other changed addresses communicated to the Authority and the General and Associate Members in writing.

Section 12.09 – Severability And Validity Of Agreement.

Should the participation of any General and/or Associate Member to this Agreement, or any part, term or provision of this Agreement be decided by the courts or the legislature to be illegal, in excess of that Member's authority, in conflict with any law of the State of California, or otherwise rendered unenforceable or ineffectual, the validity of the remaining portions, terms or provisions of this Agreement shall not be affected thereby and each Member hereby agrees it would have entered into this Agreement upon the same remaining terms as provided herein.

Section 12.10 – Singular Includes Plural.

Whenever used in this Agreement, the singular form of any term includes the plural form and the plural form includes the singular form.

IN WITNESS WHEREOF, the Members hereto, pursuant to resolutions duly and regularly adopted by their respective Board of Directors or governing board, have caused their names to be affixed by their proper and respective officers as of the day and year first above-written.

CITY OF RIDGECREST

By: _____
Peggy Breeden, Mayor

ATTEST:

By: _____
~~Secretary~~ CITY CLERK

APPROVED AS TO FORM:

By: _____
City Attorney

COUNTY OF INYO

By: _____
Jeff Griffiths, Chairman
County of Inyo Board of Supervisors

APPROVED AS TO FORM:

By: _____
Marshall Rudolph, County Counsel

COUNTY OF KERN

By: _____
Mick Gleason, Chairman
County of Kern Board of Supervisors

APPROVED AND RECOMMENDED:
COUNTY ADMINISTRATIVE OFFICE

By: _____
Alan Christensen, Chief Deputy
CAO for Water Resources

APPROVED AS TO FORM:
OFFICE OF COUNTY COUNSEL

By: _____
Phillip Hall, Deputy County Counsel

IN WITNESS WHEREOF, the Members hereto, pursuant to resolutions duly and regularly adopted by their respective Board of Directors or governing board, have caused their names to be affixed by their proper and respective officers as of the day and year first above-written.

CITY OF RIDGECREST

By: _____
Peggy Breeden, Mayor

ATTEST:

By: _____
Secretary

APPROVED AS TO FORM:

By: _____
City Attorney

COUNTY OF INYO

By: _____
Jeff Griffiths, Chairman
County of Inyo Board of Supervisors

APPROVED AS TO FORM:

By: _____
Marshall Rudolph, County Counsel

COUNTY OF KERN

By: _____
Mick Gleason, Chairman
County of Kern Board of Supervisors

APPROVED AND RECOMMENDED:
COUNTY ADMINISTRATIVE OFFICE

By: _____
Alan Christensen, Chief Deputy
CAO for Water Resources

APPROVED AS TO FORM:
OFFICE OF COUNTY COUNSEL

By: _____
Phillip Hall, Deputy County Counsel

IN WITNESS WHEREOF, the Members hereto, pursuant to resolutions duly and regularly adopted by their respective Board of Directors or governing board, have caused their names to be affixed by their proper and respective officers as of the day and year first above-written.

CITY OF RIDGECREST

By: _____
Peggy Breeden, Mayor

ATTEST:

By: _____
Secretary

APPROVED AS TO FORM:

By: _____
City Attorney

COUNTY OF INYO

By: _____
Jeff Griffiths, Chairman
County of Inyo Board of Supervisors

APPROVED AS TO FORM:

By: _____
Marshall Rudolph, County Counsel

COUNTY OF KERN

By: _____
Mick Gleason, Chairman
County of Kern Board of Supervisors

APPROVED AND RECOMMENDED:
COUNTY ADMINISTRATIVE OFFICE

By: _____
Alan Christensen, Chief Deputy
CAO for Water Resources

APPROVED AS TO FORM:
OFFICE OF COUNTY COUNSEL

By: _____
Phillip Hall, Deputy County Counsel

COUNTY OF SAN BERNARDINO

By: _____
James Ramos, Chairman
County of San Bernardino Board of Supervisors

JUL 12 2016

SIGNED AND CERTIFIED THAT A COPY OF THIS DOCUMENT HAS BEEN DELIVERED TO THE CHAIRMAN OF THE BOARD
LAURA H. WELCH
Clerk of the Board of Supervisors
of the County of San Bernardino

By: _____
Deputy

By Laura Welch, Clerk of the Board

APPROVED AS TO FORM:
OFFICE OF COUNTY COUNSEL

By: _____
FOR Sophie Akins, Deputy County Counsel

INDIAN WELLS VALLEY WATER DISTRICT

By: Don Cortichiato
Don Cortichiato, President of the Board of Directors

APPROVED AS TO FORM:

By: _____
James A. Worth, General Counsel

COUNTY OF SAN BERNARDINO

By: _____
James Ramos, Chairman
County of San Bernardino Board of Supervisors

ATTEST:

By: _____
Laura Welch, Clerk of the Board

APPROVED AS TO FORM:
OFFICE OF COUNTY COUNSEL

By: _____
Sophie Akins, Deputy County Counsel

INDIAN WELLS VALLEY WATER DISTRICT

By: Don Cortichiato
Don Cortichiato, President of the Board
of Directors

APPROVED AS TO FORM:

By: _____
James A. Worth, General Counsel

EXHIBIT A

GENERAL MEMBERS

City of Ridgecrest

City Clerk
100 W. California Avenue
Ridgecrest, CA 93555

County of Inyo

Clerk of the Board of Supervisors
P.O. Drawer N
Independence, CA 93526

County of Kern

Clerk of the Board of Supervisors,
Administrative Center
1115 Truxtun Avenue, 5th Floor
Bakersfield CA 93301

County of San Bernardino

Clerk of the Board of Supervisors
385 N. Arrowhead Ave, 2nd Floor
San Bernardino, CA 92415-0130

Indian Wells Valley Water District

General Manager
500 W. Ridgecrest Boulevard
Ridgecrest, CA 93555