Widening Availability Through Engineered Resiliency (WATER): Increasing Drought Resiliency Through New Well Construction in East Valley Water District (EVWD)

East Valley Water District

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Executive Summary

East Valley Water District (EVWD or the District) is a special district that provides water and wastewater services within the City of Highland, the City of San Bernardino and portions of San Bernardino County in the state of California. EVWD is applying for the WaterSMART Drought Resiliency Projects funding opportunity as a Category A applicant with Funding Group II. The proposed project scope, construction of a new well, falls under Task B: Increasing Reliability of Water Supplies Through Groundwater. The proposed project, titled Widening Availability Through Engineered Resiliency (WATER): Increasing Drought Resiliency Through New Well Construction in East Valley Water District , is intended to construct a well with the capacity to deliver an estimated minimum of 2.88 million gallons per day (MGD) to assist with potential supply shortages caused by prolonged drought conditions. The proposed well construction is expected to take 23 months to construct, with a set completion date of April 30, 2028. Currently, the proposed well has a tentative location within EVWD's service area and not on Federally owned land.

The District's 2020 Hazard Mitigation Plan (HMP) identifies drought as one of the primary natural hazards that threatens the service area, and notes that an extended drought can cause stress to its operations and potentially prevent the District from meeting mission criteria. Prolonged drought, a predicted consequence of climate change, threatens overall water supply in this region. Per EVWD's system-wide analysis in the Water System Master Plan (WSMP), wells were identified as a near-term water system improvement needed to ensure consistent water supply during periods of drought. By constructing a new well this project aims to increase system-wide resilience to drought conditions and will ensure that the EVWD will be able to continue to provide potable water to communities and the service area, whose majority population is designated as disadvantaged by the Climate and Economic Justice Screening Tool (CEJST).

EVWD utilizes both surface water (derived from both local surface water and purchased through the California Department of Water Resources State Water Project) and ground water for potable water supply. Table 1 below outlines the breakdown of water supply and average annual water supply:

Table 1. Average Annual Water Supply for EVWD

Year	Surface Water Total (acre feet)*	Agency Groundwater (acre feet)	Recycled M&I Water (acre feet)	Other (acre feet)	Total (acre feet)
2014	17,77.49	18,142.70	0.00	0.00	19,920.19
2015	3,664.31	13,501.17	0.00	0.00	17,165.48
2016	4,372.23	12,791.65	0.00	0.00	17,163.88
2017	3,439.16	15,215.29	0.00	0.00	18,654.45
2018	4,149.12	14,546.01	0.00	0.00	18,695.13
2019	4,035.48	12,941.15	0.00	0.00	16,976.63
2020	3,203.45	15,169.46	0.00	0.00	18,372.91
2021	4,310.38	14,168.46	0.00	0.00	18,478.84

2022	3,426.00	15,148.40	0.00	0.00	18,574.40
2023	3,290.01	12,532.07	0.00	0.00	15,822.08
Total Average Annual Water Supply for 2014-2023 in AFY =					17,982.40
Average Annual Water Supply = 1798.24 acre-feet					

With the construction of a new well capable of delivering an estimated 2.88 million gallons per day, EVWD aims to bolster its capacity to navigate potential water supply shortages exacerbated by drought—which continues to increase in duration and severity due to climate change. This strategic move aligns with EVWD's commitment to enhancing system-wide resilience and builds upon previous efforts pursued through the WaterSMART funding program. EVWD is committed to ensuring the continuous provision of potable water to communities within its service area, particularly those identified as disadvantaged by CEJST.

Project Location

The proposed well is in San Bernardino County, California, approximately 5 miles East of Highland, CA. Currently, EVWD has an existing WaterSMART award for the planning and design of this project. The project location is currently tentative, to be determined and finalized as part of the scope of the existing award for design. The location of this well will be determined prior to the anticipated Notice of Award date for the WaterSMART Drought Resiliency Projects funding opportunity. The tentative site, as proposed in the previously awarded planning and project design application, is located at latitude is 34° 6'32.8"N, and the longitude is 117° 8'28.5"W. A map has been provided in Attachment C. Project Location Map as reference for the project's tentative location. The well will be located within the Bunker Hill Basin located at the top of the Santa Ana River watershed, which covers over 90,000 acres.

Project Description

In 2023, the District completed the construction of the Sterling Natural Resources Center (SNRC) a 20-acre state-of-the-art facility in Highland, which provides a new water supply to boost the region's water independence and resiliency. The recycled water supply from this facility can recharge the Bunker Hill Basin, from which EVWD extracts its groundwater. However, the completion of the SNRC came at the price of four wells — EVWD had to cease operations of these wells to abide by California State groundwater laws due to their proximity to the SNRC's groundwater recharge. To restore its access to groundwater supply, EVWD has identified the need to construct three wells in the near future to ensure resilience to drought, especially amidst a changing climate where such events may become more frequent and severe. In April 2024, EVWD received WaterSMART Planning and Project Design award to carry out the project design for the proposed well at the center of this application. Now, EVWD seeks to pursue the Drought Resiliency Projects program to fund the construction of this well. The scope of this project

includes initial well drilling and testing, reporting, final well construction and testing, and grant closeout.

Applicant Category and Eligibility of Applicant

As a California Special District, EVWD falls under applicant Category A. Category A applicants are defined as States, Tribes, irrigation districts, and water districts; state, regional, or local authorities whose members include one or more organizations with water or power delivery authority; and other organizations with water or power delivery authority. As a Special District, EVWD provides water to roughly 108,000 residents across the District. Additionally, EVWD is located in California, which is listed as one of the eligible states/territories in the FY25 announcement for this funding program. Therefore, EVWD fully meets the eligibility requirements as defined by Category A.

Evaluation Criteria

A. Severity of Drought or Water Scarcity and Impacts

Describe recent, existing, or potential drought or water scarcity conditions in the project area.
EVWD operates within a region characterized by significant vulnerability to drought, a condition that has historically impacted its water supply operations. Overall, California has experienced a significant trajectory of drought and water scarcity over the years, characterized by progressive drying conditions since 1895. The state has faced several severe droughts in the 21st century, notably from 2007 to 2009, 2012 to 2016, and most recently from 2021 to January 2023. These drought periods were met with statewide proclamations of emergency due to their severe implications on water resources, public health, and agricultural practices. The conditions were exacerbated by record warmth, contributing to unprecedented hydrologic and societal impacts. Due to its climate and geographic location, the District primarily relies upon its groundwater supply to provide potable water for its roughly 108,000 customers within its service area. During drought and extreme heat, surface waters are particularly vulnerable due to evaporation and environmental exposure. This vulnerability is significant, especially in regions like the EVWD service area, where historical patterns of drought have been observed alongside projections of increasing frequency and severity driven by climate change. Less than a third of EVWD's water supply is derived from surface water—namely the nearby Santa Ana River. Surface water bodies, including reservoirs, lakes, and rivers, experience heightened evaporation rates as temperatures rise. The intense heat causes significant loss of water volume, which diminishes the available supply for municipal, agricultural, and environmental needs. When surface water supplies diminish, the reliance on groundwater typically increases. Enhancing water supply systems and implementing

proactive measures, such as building new well, are essential steps to mitigate the adverse effects of climate change and diversify water resources amidst increasing challenges.

Looking to the future, the National Climate Assessment warns of persistent drought patterns in the Southwestern United States, including California, suggesting that water scarcity may continue to be a critical issue. This projection consequently raises concerns over groundwater sustainability, emphasizing the need for strategic management and conservation efforts to mitigate the impacts of ongoing and future drought conditions in the project area. As reservoirs fluctuate and groundwater recovery lags, a cautious approach is essential to ensure water availability for California's ecosystems, agriculture, and communities.

Is the project in an area that is currently suffering from drought or water scarcity, or which has recently suffered from drought or water scarcity? Please describe existing conditions, including when and the period of time that the area has experienced drought or water scarcity conditions. Include information to describe the frequency, duration, and severity of current or recent conditions. You may also provide information relating to historical conditions. Please provide supporting documentation (e.g., Drought Monitor, droughtmonitor.unl.edu).

The EVWD service area includes the City of Highland, portions of the City of San Bernardino, and unincorporated areas of San Bernardino County. The US Drought Monitor website provides 24 years of drought data for San Bernadino County and highlights a history of persistent drought. The data reports that exceptional drought was observed sections of in San Bernadino County in 2014, 2015, 2016, 2021, and 2022. Furthermore, Extreme drought was observed in 2002, 2003, 2007, 2008, 2013 through 2016, 2018, and 2020 through 2022 (source: Data Tables | U.S. Drought Monitor (unl.edu).

When the District experiences drought, it has historically faced considerable water supply challenges. The District's 2020 HMP identifies drought as one of the major natural hazards threatening the service area, noting that extended drought conditions culminate in water shortages that can impact human life, wildlife, ecosystems, and food production.

Over the years, the vulnerability of EVWD to drought has been exacerbated by decreasing groundwater levels, resulting from a combination of high demand and the inability of aquifers to recharge effectively during dry years. This trend has highlighted the importance of promoting groundwater recharge and responsible groundwater monitoring and use.

In recent years, drought conditions have been especially severe, prompting the declaration of a Drought State of Emergency by Governor Newsom in October 2021, which extended into 2023. The continued dryness has intensified the District's reliance on groundwater, leading to increased pressure on its aquifers. Climate change further

complicates this scenario, as models predict rising temperatures and diminishing snowpack, which could considerably reduce surface water supplies in the future.

Describe any projected increases to the severity or duration of drought or water scarcity in the project area resulting from changes to water supply availability and climate change. Provide support for your response (e.g., reference a recent climate informed analysis, if available).

The Fifth National Climate Assessment, published in 2023, is the US Government's preeminent report on climate change impacts, risks, and responses. The Assessment warns of a future with persistent drought patterns in the Southwestern United States, including California, and suggesting that water scarcity will continue to be a critical issue. The assessment explains that, for the Southwest specifically, there is a heightened probability and risk that climate change threatens water resources, drought, heatwaves, and wildfires, among other hazards. The Assessment Reports with very high confidence that climate change has reduced surface water and groundwater availability for people and nature in the Southwest. This assessment predicts an increase in drought occurrences in the region, leading to a decline in surface water supply and posing significant risks to urban public health due to heightened heatwaves.

EVWD's 2020 HMP also reports that the region faces projected increases in drought severity and duration, and that this trend is exacerbated by both climate change and changes to water supply availability. The HMP highlights that drought in California is recurring and impacting EVWD's entire service area by decreasing available local and imported surface water. An extended drought can stress operations, impact economic development, and potentially prevent EVWD from meeting mission criteria. The longer a drought continues, the more EVWD will depend on groundwater.

What are the ongoing or potential drought or water scarcity impacts to specific sectors in the project area if no action is taken (e.g., impacts to agriculture, environment, hydropower, recreation, tourism, forestry), and how severe are those impacts? Impacts should be quantified and documented to the extent possible.

EVWD is currently drafting the latest iteration of its Drought Contingency Plan (DCP) with the Bureau of Reclamation, which is now in its final review stage. In this planning document, EVWD lists the construction of three new wells as its highest priority. Without the proactive establishment of a new well and enhancement of water supply systems, the EVWD service area will face impacts across vital sectors, including public health, agriculture, economic stability, environmental sustainability, and effective water management. The intertwining challenges posed by a growing population and escalating climate threats necessitate immediate action to mitigate the detrimental effects of future drought conditions.

The proposed well, located in Bunker Hill Basin, will be utilized, primarily, to supply potable water to the population of the EVWD, including the city of Highland, portions of San Bernadino City, and unincorporated areas of San Bernadino Country. The population of this service area is approximately 108,000. Based on a review of growth forecasts developed by the Southern California Association of Governments, the population within EVWD's service area is expected to be approximately 141,900 by year 2040.

This project is intended to compliment other recent efforts the District has taken to enhance its water supply system. Notably, the completion and opening of the SNRC. Capable of treating 8 MGD of wastewater to produce high-quality recycled water, the SNRC helps to recharge the local Bunker Hill Groundwater Basin. However, as a result of the new facility, the District has been forced to take four wells offline once the SNRC is put into operation due to their proximity to the recycled water recharge. Construction of a new well proposed will therefore contribute to restoring capacity from the loss of four decommissioned wells.

While the District will continue to use surface water sources when available, it is essential that even in low allocation periods, the District maintains the ability to adequately serve the community. With concerns that prolonged drought conditions will increase reliance on groundwater supply, especially with new wells coming online – the groundwater replenishment from the newly constructed SNRC will help ensure the desired three proposed wells, including the proposed well at the center of this application, are offset to maintain healthy levels of groundwater resources in the Basin.

If no action, EVWD will be unable to access its groundwater supply to meet the production level carried out before the opening SNRC, leaving the District especially vulnerable to lack of water supply during times of drought. The ongoing and potential impacts on specific sectors may include:

- **Threats to Public Health**: Without proactive measures to ensure water availability, residents may face reduced access to clean drinking water, leading to potential health crises characterized by sanitation issues and increased risks of heat stress during hotter conditions.
- **Impact on Small and Local Businesses**: Reliable access to water is essential for economic continuity. Small businesses, particularly in the Accommodation and Food Services sector, which constitutes nearly 8% of the local economy and provides 59,420 jobs in San Bernadino County (OnTheMap (census.gov)), cannot function without adequate potable water. Insufficient water supply could force these businesses—including essential services like hospitals and food vendors—to close during peak shortages.
- **Healthcare and Social Assistance**: This sector is the largest in San Bernardino County, comprising 16% of the local economy and providing 128,035 social

assistance jobs according to the US Census Bureau Work Area Profile Analysis (OnTheMap (census.gov)). Access to potable water is critical for healthcare services, as proper sanitation standards reliant on clean water are indispensable.

B. Project Benefits

What is the estimated quantity of additional supply the project will provide and how was this estimate calculated? Clearly state this quantity in AFY as the average annual benefit over ten years (e.g., if the project captures flood flows in wet years, state this and provide the average benefit over ten years or longer including dry years).

The project will result in a completed, operational well with the capacity to deliver a minimum of 2.88 MGD, or 3,874 acre-feet per year, to assist with potential supply shortages caused by prolonged drought conditions. A common practice for estimating the production potential of a new well is to review the transmissivity of the aquifers from which the well will produce groundwater. Transmissivity can be calculated from data collected during a pump test of a well.

The production potential of a new well is assumed to be comparable to the historical pumping capacity of nearby wells: Plant No. 142 and Plant No. 125. Review of available historical data indicated the pumping capacity of wells No. 142 and No. 125 ranges from approximately 500 to 2,000 gallons per minute (gpm). The production potential for a well located at this proposed project location should be at a minimum, equal to the maximum rate for wells No. 142 and No. 125. It should be noted that modern methods for well design and construction, combined with a good understanding of water level conditions in this study area, may result in a more consistent and reliable yield for a new production well.

What percentage of the total water supply does the project's water yield represent? How was this estimate calculated?

The total average water supply for EVWD is 17,982.40 AFY. The well constructed by this project will have the capacity to deliver 1,180.08 AFY, representing 15% of EVWD's total water supply.

How will the project build long-term resilience to drought or other water reliability issues? Include factors such as the predictability of supply, variability in availability, and the likelihood of interruptions or failures.

A new well can enhance system-wide resilience and water reliability by providing a more consistent and diversified supply, buffering against variability, and mitigating the impact of supply interruptions. Groundwater wells help diversify the water supply portfolio, reducing

reliance on a single source. This is crucial in a state like California, where the variability in precipitation can be extreme.

The District's largest supply source and only source of treated imported water, Plant 134, has limited production capacity of 5.2 MGD over an extended period instead of its rated capacity of 8.0 MGD. Plant 134 treats water from the Santa Ana River and supplements this surface water supply with imported water from the State Water Project (SWP) purchased from San Bernardino Valley Municipal Water District when it is available. Limitation of surface water depending on river flow and SWP allocation has been seen historically between 0-30% in dry years. The water supply analysis performed as part of the WSMP was used to determine whether available water sources are sufficient to meet near-term Maximum Day Demand (MDD) under normal and emergency operating conditions. This analysis revealed substantial supply deficits throughout the District's supply zones in meeting MDD under even normal conditions. The WSMP revealed deficits significantly worsened in a scenario where Plant 134 was taken out of service.

Drought years cause significant disruptions to surface water supplies. While the District will continue to use surface water sources when available, it is essential that even in low allocation periods, the District maintains the ability to adequately serve the community. The identified project will enhance the District's ability to increase groundwater production in times of drought when surface water sources are not available, increasing the overall resilience to drought and climate change. This increased reliability of drinking water, paired with the call for conservation by community members, will allow for the District to remain resilient throughout a prolonged drought emergency. Furthermore, by increasing the number of wells in operation, the District will be able to avoid maintenance deferrals during high demand periods allowing for maximized operational efficiency and cost avoidance and follow the developed production schedule to minimize electricity costs.

How many years will the project continue to provide benefits?

This well has the potential to provide significant benefits for up to 100 years by ensuring a stable and reliable water supply that can adapt to the challenges of climate change, population growth, and evolving water needs.

Provide a qualitative description of the degree/significance of the benefits associated with the additional water supplies.

The new well serves as a crucial asset to combat the impact of water deficits, particularly during periods of drought. By diversifying the water supply portfolio, the reliance on a single source, such as the limited production capacity of Plant 134, is decreased. This reduction in dependency contributes to a more robust system that can adapt to varying conditions, especially in regions like California with extreme precipitation fluctuations. It

offers a supplementary source of water when surface water runs low, acting as a vital buffer against shortages. This capability significantly strengthens the system's ability to withstand variability in precipitation, ensuring a more consistent and diversified water supply that is less vulnerable to disruptions.

The expansion of operational wells allows for optimized production schedules, minimizing electricity costs and avoiding maintenance deferrals during peak demand periods. This not only improves operational efficiency but also results in substantial cost savings for the District.

Moreover, it serves as a strategic asset in emergency situations, offering a localized solution that minimizes the need for costly and disruptive measures like water rationing or external water imports. Emphasizing sustainability and long-term reliability, the new well fosters system robustness by diversifying water supply portfolios and fortifying the resilience of water infrastructure against potential disruptions, ultimately enhancing the community's water security and well-being.

How will the project supply help buffer against water shortages, reduce the need for emergency responses, and enhance the resilience of water systems?

The proposed project will bolster the District's capacity to boost groundwater production during drought periods when surface water sources are limited, thus enhancing overall resilience to drought and climate variability. This improved reliability in drinking water, combined with community-led conservation efforts, will fortify the District's endurance in prolonged drought scenarios. By expanding the operational well count, the District can circumvent maintenance deferrals during peak demand times, ensuring optimized operational efficiency, cost savings, and adherence to a structured production schedule to minimize electricity expenses.

Introducing a new well can act as a buffer against water deficits by offering an auxiliary water source when surface reservoirs are depleted, ensuring a steadier water supply during droughts. This mitigates the necessity for emergency measures like water restrictions or costly water imports by providing an immediate, localized solution. Furthermore, it strengthens water systems' resilience by diversifying the water supply sources, making the entire system less susceptible to disruptions in other supply sources, such as reservoirs or water transfers. Sustainable well management practices also guarantee long-term water reliability.

In addition, for Task B projects only:

In acre-feet per year (AFY), what is the estimated capacity of the new well(s)? How was the estimate calculated?

The project aims to establish a functional well that can provide at least 2.88 MGD or 3,874 acre-feet per year, to help mitigate potential water supply shortages during extended drought periods. Typically, when assessing the potential output of a new well, one would examine the transmissivity of the aquifers that supply groundwater to the well. This transmissivity data is often obtained from a pump test conducted on the well.

The anticipated production capacity of the new well is assumed to be similar to the historical pumping capabilities of nearby wells, specifically Plant No. 142 and Plant No. 125. Analysis of past records revealed that the pumping rates of Wells No. 142 and No. 125 ranged from around 500 to 2,000 gallons per minute (GPM). Consequently, the expected output of a well at the proposed project site should meet or exceed the maximum pumping rate of Wells No. 142 and No. 125. It is important to highlight that contemporary well design and construction techniques, along with a comprehensive grasp of the water level dynamics in the study area, could lead to a more consistent and dependable yield from a new production well. The current, tentative well location is roughly 1.3 miles from the Santa Ana River, as demonstrated in Attachment C. Project Location Map.

How much water do you plan to extract through the well(s), and how does this fit within and comply state or local laws, ordinances, or other groundwater governance structures applicable to the area?

San Bernardino County's groundwater governance is primarily covered under Article 3: Water Wells, which outlines regulations for the construction, reconstruction, abandonment, and destruction of wells. The aim is to protect underground water resources and provide safe water to residents. Permits for wells may include requirements for groundwater management, mitigation, and monitoring to ensure sustainable use.

EVWD operates within the well construction standards set forth by California’s Department of Water Resources (DWR) Bulletin 74. This set guidelines for the proper construction, modification, and abandonment of wells. These standards are designed to prevent contamination of groundwater resources and ensure safe extraction practices.

In an effort to encourage regional groundwater coordination, EVWD is a proud member of the San Bernardino Basin Groundwater Basin Council. This Council, spearheaded by the San Bernardino Valley Water Conservation District, represents a groundbreaking collaboration among various cities, water districts, and agencies. This voluntary group is working together on an innovative approach to water management. Members contribute water resources or financial support to help secure imported water, aimed at replenishing and maintaining the groundwater basin at sustainable levels. Council members offer funding, water supplies, and operational support to ensure the long-term sustainability of

this crucial water source. Currently, the council includes the San Bernardino Valley Water Conservation District, San Bernardino Valley Municipal Water District, San Bernardino Municipal Water Department, East Valley Water District, Bear Valley Mutual Water Company, Yucaipa Valley Water District, Loma Linda University, and the cities of Loma Linda, Rialto, Colton, along with West Valley Water District and Redlands. Despite a century of disputes over water rights, these entities share a legacy of cooperation, particularly during severe droughts, to ensure mutual support and resource sharing.

Due to the newly constructed SNRC, the District has been forced to take four wells offline due to their proximity to the recycled water recharge. The construction of a new well will therefore contribute to restoring capacity from the loss of four decommissioned wells. The closure of these wells means that the District is currently under its standard extraction rate. Therefore, the construction of this new well, and the subsequent anticipated 2.88 MGD output, would be within the District's legal allowance for extraction. Furthermore, as a non-plaintiff party to the 1969 Western Judgment (Western Municipal Water District of Riverside County et al. v. East San Bernardino County Water District, et al. Case No. 78426), EVWD can pump groundwater to meet the needs of their customers, even in excess of their production rights (14,217 AFY, 12.69 MG).

Will the well be used as a primary supply or supplemental supply when there is a lack of surface supplies?

Currently, the District produces 75% of its water supply from local groundwater wells within the Bunker Hill Groundwater Basin. Approximately 20% of the water supplied to district customers originates from the Santa Ana River via the North Fork Water Company, with the remaining 10-15% of the water supply sourced from the imported State Water Project. Therefore, the majority of the District's supply comes from the Bunker Hill Groundwater Basin—which becomes an especially vital source of water during times of drought and diminished surface water supply. The proposed well will serve as a primary source of water, but also plays a crucial role in ensuring sustainable water supply in the event of unreliable or unpredictable surface water supply during drought.

Does the applicant participate in an active recharge program contributing to contributing to groundwater sustainability?

Yes. The District's SNRC is an advanced water recycling facility designed to enhance water sustainability in the Inland Empire region. This facility can treat up to 8 million gallons of wastewater per day, converting it into high-quality recycled water. This recycled water is then used to replenish the aquifer, creating a sustainable water supply for over 600,000 residents in the region. The facility's efforts allow the storage of hundreds of millions of gallons for dry years, enhancing local water independence and supporting environmental

commitments

Provide information documenting that proposed well(s) will not adversely impact the aquifer it/they are pumping from (overdraft or land subsidence). This should include aquifer description, information on existing or planned aquifer recharge facilities, a map of the well location and other nearby surface water supplies, and physical descriptions of the proposed well(s) (depth, diameter, casing description, etc.). If available, information should be provided on nearby wells (sizes, capacities, yields, etc.), aquifer test results, and if the area is currently experiencing aquifer overdraft or land subsidence.

The proposed project will not adversely impact Bunker Hill Basin. Bunker Hill Basin is the largest basin in the Upper Santa Ana River watershed. It has three water-bearing zones and consists of alluvial materials that underlie the entire valley. Recharge to the Bunker Hill Basin is from run-off infiltration from the San Gabriel and San Bernardino Mountains into the Santa Ana River, Mill Creek, and Lytle Creek. These systems contribute about 50 percent of the total recharge to the basin. Average annual precipitation in the Bunker Hill Basin ranges from 13 inches to 31 inches. Additionally, the Basin is recharged by imported water—primarily from northern California—as well as the EVWD operated SNRC, which processes 8 million gallons of recycled water per day. The estimated storage capacity of this basin area is about 5,000,000 acre-feet.

There are two wells nearby the current tentative location of the proposed project: wells at Plant 125 and Plant 142. The well at Plant 125 was drilled in 1980. The casing for well 125 is steel, at 400 feet deep and with a 20-inch diameter. The well at Plant 142 is roughly 410 feet deep, with a bore-hole diameter of 20 inches as well. A map of existing water system facilities, including Plants 125 and 142, can be found in Attachment F. EVWD Existing Water System Facilities. The depth, diameter, and casing material of the proposed well at the center of this application is anticipated to be similar to the wells at Plant 125 and 142. These specifications will be determined during the design phase, as carried out as a part of the awarded WaterSMART Planning and Project Design well design project.

Describe the groundwater monitoring plan that will be undertaken and the associated monitoring triggers for mitigation actions. Describe how the mitigation actions will respond to or help avoid any significant adverse impacts to third parties that occur due to groundwater pumping.

Groundwater monitoring in the Bunker Hill Basin is overseen by the basin WaterMasters. Over pumping can cause land subsidence and aquifer compaction which contribute to permanent aquifer-system loss. To avoid this, the District partakes in basin depth monitoring and recharge efforts. The depth to groundwater level for wells within the EVWD service area have been monitored since 1985. Thresholds were determined using this hydrograph data to determine what levels correspond with recharge needs. Depths in the

upper 30% require no recharge, depths in the middle 30% are in the target zone, and depths in the lower 30% are in the recharge zone. To help meet recharge needs, the SNRC treats 8 MGD per day.

Sub-Criterion B.3.a Climate Change

In addition to drought resiliency measures, does the proposed project include other natural hazard risk reductions for hazards such as wildfires or floods?

Along with persistent drought, wildfires occur annually in Southern California, typically after long, dry summers in the autumn months. These events can be triggered by manmade causes or the Santa Ana Winds – which are most common from October through March. These fast moving, warm to hot, dry winds are highly capable of sparking and spreading wildfires. Increasing wildfire risk frequency is inextricably linked with projected increases in average temperatures for the region. The probability of wildfire occurrence is highly likely as several wildfires occurred within or close to the service areas in recent years, and there is data to suggest that this risk in growing with climate change and urban development. According to a 2018 climate change report released by the California Environmental Protection Agency, the five largest fire years (at the time of the report) since 1950 occurred in 2006, 2007, 2008, 2012, and 2015. The trend of devasting fire years have continued since the report with 2017 being one of the largest fire years in history in terms of acreage, and with 2020 as the worst fire season on historical record for the state. Currently, as of October 2024, the region is still battling the Line Fire, which has burned almost 45,000 acres since September and damaged EVWD water mains in the process.

Along with wildfire, a flood event is likely to affect the service area, with a notable severe event likely occurring every few years. However, climate change is increasing such extreme weather events, and causing the cycles of precipitation and drought to be more unpredictable. This climate change-linked severity and unpredictability was on full display in early 2023 as a series of atmospheric rivers (narrow bands of enhanced water vapor transport, typically along boundaries between large areas of divergent surface air flow) resulted in historic and catastrophic flooding throughout the state. Lasting approximately three weeks, the flood events occurred following the driest three years in the state's recorded history.

As mentioned, climate change is also linked to increased frequency and/or severity of drought and wildfires which can further exacerbate flash flooding conditions by reducing soil infiltration, reduction of native plant material, and increase chances of flash floods. Generally, flash floods are more likely than floods in this region, with either event more likely to occur in the fall or winter months. Flash floods can cause mud and landslides due

to EVWD's proximity to the foothills and elevation variation from its northern to southern boundaries. Both wildfires and flooding are natural hazards that pose notable risk to the District's only surface water treatment plant, Plant 134. This further emphasizes the need for greater access to groundwater, especially in an event where surface water treatment is halted due to impacts from natural disasters. An additional well would increase access to groundwater supply, enhancing the District's resilience to climate change to ensure continuous water supply to communities within the service area. Potable water access is also a key resource during heat waves, which, according to the National Climate Assessment, are projected to increase in this region of the country as climate change advances. Access to drinking water during heat waves is especially critical for disadvantaged communities and vulnerable populations, who historically may not have access to emergency water supplies or air conditioning.
Will the proposed project establish and use a renewable energy source?
No.
Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation?
No.
Does the proposed project include green or sustainable infrastructure to improve community climate resilience?
No.
Does the proposed project seek to reduce or mitigate climate pollutions such as air or water pollution?
No.
Does the proposed project have a conservation or management component that will promote healthy lands and soils or serve to protect water supplies and its associated uses?
No.
Does the proposed project contribute to climate change resiliency in other ways not described above?
The proposed well's primary contributions to climate change resilience involve securing additional groundwater that can be used during prolonged droughts. During such times, surface water sources may diminish, necessitating conservation efforts to protect natural

ecosystems and to support firefighting activities.

Sub-Criterion B.3.b Ecological Benefits

Does the project seek to improve the ecological resiliency of a wetland, river, or stream in the face of climate change? Provide a narrative discussion, quantification, and metrics to support the anticipated improvements in ecological resilience.
Not applicable.
Identify ecological benefits expected to result from project implementation. Provide a narrative discussion, quantification, and metrics addressing, as applicable, the types and status of species benefited, acreage of habitat improved, restored, or protected, the amount of additional stream flow added, and the improvements in relevant water quality metrics? Support all metrics and quantifications with appropriate calculations.
Not applicable.
Will the proposed project reduce the likelihood of a species listing or otherwise improve the species status? Identify the species of interest, explain how the project will positively impact the species and potential contribute to delisting
Not applicable.

Sub-Criterion B.3.c Other Benefits

Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)? Describe the associated sector benefits.
The proposed project will significantly enhance water resilience, thereby promoting business continuity across various sectors. EVWD categorizes its water customers into six categories for the purposes of recording water use and billing: Residential, Multi-Family, Commercial, Irrigation Commercial, Fire Service, and Bulk Water. According to the 2020 HMP, approximately 60% of EVWD's total deliveries were to single family residential connections, followed by 19% to multi-family connections, 11% to commercial connections, 10% to commercial irrigation connections, and the remainder to fire service and bulk water sales. Some of the largest industries within EVWD's service area include sectors such as education, health care, retail trade, construction, and manufacturing. A stable water supply will be particularly beneficial for the healthcare and social assistance sector, which accounts for 16% of the local economy, and relies on adequate water for sanitation and operations. Additionally, consistent access to water is also crucial for the sustainability of small businesses, especially in the hospitality and food service industries, which are vital

contributors to the local economy. By ensuring the availability of water, this project will support economic continuity and help prevent closures due to insufficient supply.

Will the project benefit a larger initiative to address sustainability?

To understand why a new well is important for building water resilience in the EVWD service area, one must understand how this proposed well fits into a larger resilience and sustainability effort. First, it is essential to understand recent developments, particularly the construction of the Sterling Natural Resource Center. This facility, which commenced construction in 2018, was successfully completed and began operations as a water recycling treatment and groundwater recharge center in early 2024.

The SNRC serves as a wastewater recycling facility, treating wastewater from the nearby urban area. Once treated, this water is used to recharge the local groundwater basin, and spends a minimum of 12 months underground before returning to municipal circulation. The plant further contributes to sustainability by capturing biowaste from the recycled water and converts it into energy. Additionally, some of the 20 acres on which SNRC was developed is available as public green space. The construction of the SNRC has increased the EVWD's sustainability through water recycling and groundwater recharge.

Although the SNRC marks a significant advancement in sustainability for the East Valley Water District, the facility's construction necessitated the retirement of four wells. Wells are important for water resiliency, especially during drought conditions when surface water resources diminish. To address this loss, building a new well on the proposed site is important for restoring groundwater resources.

Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

In the Western United States, including California, there is a long-standing history of tension and litigation over water rights, especially in areas like San Bernardino County where water resources are limited. The allocation of water has frequently led to disputes between various stakeholders, including agricultural users, urban centers, and environmental interests. Factors such as increasing population pressures, climate change, and prolonged drought conditions exacerbate these tensions by straining existing water supplies.

As a member of the San Bernardino Basin Groundwater Council, EVWD is dedicated to addressing complex environmental challenges. The San Bernardino Basin Groundwater Council stands as a powerful example of regional cooperation, uniting cities, water districts, and agencies in a collective effort to safeguard a critical shared resource. This voluntary council embodies a regional approach to groundwater management, with each participating entity contributing water, funding, or operational support to restore and

maintain sustainable levels in the groundwater basin. By joining forces, these historically competitive stakeholders have set aside past disputes over water rights to prioritize the greater good. Their collaboration ensures a reliable water supply for the entire region, demonstrating that cooperative efforts are essential for tackling the challenges of water management, especially in times of drought and increasing demand.

The proposed project will contribute to preventing water-related conflict by enhancing the reliability and resilience of the water supply in the EVWD service area. The District has notified the WaterMasters, who ensure proper water allocation on behalf of the State of California, of the project application. Fostering regional collaboration on projects impacting a groundwater basin are essential to water sustainability and promote the District's partnership and stewardship core values. The District has agreed to consult the San Bernardino Valley Municipal District and the Western Municipal Water District throughout design to ensure the proposed locations of the wells are in good faith with other regional groundwater planning efforts.

C. Planning and Preparedness

Plan Description and Objective: Is your proposed project supported by a specific planning document?

The concept of a new well was a direct result of the analysis that was conducted as part of the 2019 WSMP. Every five years, the District updates the WSMP with the goal to develop recommendations and projects that help achieve and maintain EVWD's distribution system criteria and service level to provide cost-effective and fiscally responsible water services that meet the water quantity, water quality, system pressure, and reliability requirements of its customers. This 2019 WSMP looked at existing, near-term, and build-out conditions for the EVWD service area. Additionally, the plan addressed existing system deficiencies and facility requirements to meet increasing demands over the next 20 years, analyzing both near-team and build-out planning scenarios to assess need. The report also provides details of a proposed Capital Improvement Program (CIP) for the water system, including phasing of projects and capital requirements.

In preparing this update, EVWD and consultants utilized many reports, maps, and other available data to determine goals for the service area, operational issues, condition of current infrastructure, and general information on the distribution system. Pertinent materials included water system atlas maps, historical production and billing data, planning and development information, land use information, aerial photography, and Geographic Information System (GIS) information.

Furthermore, the District has relied upon its 2020 HMP, which includes hazard identification, risk assessment, and mitigation strategies to guide priorities for its CIP. The hazard mitigation section provides hazard profiles, covering the type, location, extent, previous occurrences, and probability of future occurrences. Vulnerability is described in terms of impacts to the service population, the number of existing and future buildings, infrastructure, critical facilities, potential dollar losses, and a general description of land uses and development trends. Mitigation strategies utilize the hazard profiles and risk assessments to determine a detailed implementation strategy for the appropriate mitigation action, defining the responsible parties, identifying funding sources, estimating timeframes for completion, and tracking the status of projects. The 2020 HMP highlights the impact, extent, of severity of drought within its region, as well as the importance of acceptable groundwater withdraw standards and practices to ensure sustainable supply.

Plan Development Process: Was the plan(s) developed through a collaborative process?

The development of both the WSMP and the HMP involved a collaborative process with stakeholders and public participation to capture and reflect the community's input in the final reports. The District presented the WSMP at two public meetings for Board and public comment. Holding multiple meetings available for public comment suggests that there was a deliberate attempt to engage with the public and receive feedback. Any comments and public feedback received was incorporated into the final WSMP and its recommendations.

The City of Redlands, Riverside Public Utility, Patton State Hospital, and San Bernardino County Office of Emergency Services joined the Community Advisory Commission, a collection of multijurisdictional public agencies and districts contacted for feedback during the stakeholder engagement process, to review the preliminary findings of the Hazard Mitigation Plan, including a review of hazard profiles, a high-level summary of the risk assessment, and the goals and objectives of the mitigation strategy. Stakeholders unable to attend were invited to share their concerns directly with the HMP Planning Chair and/or comment on the draft plan via online survey. The online survey was posted in English and Spanish on the EVWD website. The District leveraged social media channels including Facebook, Instagram, and Nextdoor, and public notices including bill inserts to advertise for attendance to public meetings to discuss the HMP and collect public input. The online survey was publicly available for 30 days. The HMP integrated feedback from the survey as well as discussions with stakeholders during open public events throughout the plan.

Plan Support for Project: Describe to what extent the proposed project is supported by the identified plan.
Both the 2019 WSMP and the 2020 HMP concluded that the District must prioritize the enhancement of water supply resiliency. The WSMP referred to the construction of new wells as a "critical recommendation" and categorized the construction of new wells as a recommended near-term water system improvement (as demonstrated in Attachment G. WSMP Near-Term Water System Improvements). The WSMP has indicated that Intermediate, Upper, and Foothill pressure zones would benefit from a new well to improve water supply. In the 2020 HMP, the construction of wells was identified as "high priority," with EVWD ranking this third on its priority actions list.

D. Readiness to Proceed and Project Implementation

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates for completing the project within the applicable timeframe. Milestones may include but are not limited to preliminary and/or final design, environmental and cultural resources compliance, permitting, and construction/installation.
Prior to beginning this construction project scope, EVWD will begin carrying out its awarded FY23 WaterSMART Planning & Project Design project, titled WATER: Increasing Drought Resiliency Through New Well Design in EVWD. Complete well design requires well drilling, which informs the well equipping design portion of the project. The well drilling is included as a part of this application's scope, with the intention of utilizing Drought Resiliency Projects funding if awarded. Once well drilling is completed, the remainder of the design (i.e. well equipping) will be finalized, allowing the remainder of this proposed construction scope to begin. Environmental regulatory compliance will be completed before any groundbreaking would begin. A comprehensive schedule is provided in Attachment B. Project Schedule. The implementation plan of the construction portion of this project, as part of the Drought Resiliency Projects application, is highlighted in the sequence below: **Milestone 1. Well Drilling** (8 months) The contracted engineering firm will lead Milestone 1, overseeing the initial drilling and testing of the new well. Scheduled over 8 months with a completion date of August 31, 2026, this milestone includes preliminary site drilling and testing procedures are conducted to assess the water quality, flow rate, and overall viability of the well for sustainable water extraction. This phase is crucial in ensuring the functionality and reliability of the well for its intended purpose. **Milestone 2. Reporting** (3 months)

During milestone 2, the contracted engineering firm will compile and analyze data gathered from milestone 1. The reporting milestone will encompass the preparation of comprehensive documentation detailing the well construction process, testing results, and any necessary adjustments or recommendations for the successful progression of the project. Ultimately, this milestone serves as a key bridge between fieldwork activities and future decision-making processes within the project timeline. Milestone 2 is expected to take 3 months with an anticipated completion date of November 30, 2026.

Milestone 3. Well Equipping (8 months)
The contracted Architectural & Engineering (A&E) firm will carry out Milestone 3 by managing the procurement, installation, and testing of essential well equipment necessary for operational readiness. Tasks will include the installation of pumping equipment, electrical components, and monitoring devices, followed by meticulous testing to ensure efficiency and safety. This construction milestone will build on previous data and construction from milestones 1 and 2 and result in a completed, functional groundwater well. Milestone 3 is expected to take 8 months to complete, culminating on December 31, 2027.

Milestone 4. Grant Closeout (4 months)
Milestone 4 accounts for the submission of all required deliverables resulting from this project to the Bureau of Reclamation. Grant closeout may also include submitting final requests for reimbursement (RFRs) and compiling auditing documentation. Grant close out is anticipated to take 4 months with completion in April 30, 2028.

Describe any permits or approvals that will be required (e.g., water rights, water quality, stormwater, other regulatory clearances). Include information on permits or approvals already obtained. For those permits and approvals that need to be obtained, describe the process, including estimated timelines for obtaining such permits and approvals.

EVWD holds water rights to Santa Ana River water through its stock ownership in the North Fork Mutual Water Company, which entitles EVWD to 4 MGD on average. As a part of the scope of the awarded WaterSMART Planning & Project Design well design project, the contracted engineering firm is expected to initiate environmental consultation with regulatory agencies, obtain required permitting such as National Pollutant Discharge Elimination System (NPDES) Permit, Drinking Water Source Assessment and Protection (DWSAP) Permit, and conduct due diligence required to comply with Environmental and Cultural Resource Compliance parameters and CEQA. The firm will be expected to present the relevant information required to meet all environmental and regulatory compliance at a State, Federal, and local level.

Identify and describe any engineering or design work performed specifically in support of the proposed project. If design work has commenced, what phase of design is the project current in (e.g., preliminarily or final and percentage-30%, 60%, 90%, or

complete). If additional design is required, describe the planned process and timeline for completing the design. Projects that are further in design will receive more points.

EVWD has access to and has referenced pump test reports and production reports available from nearby wells, as well as data analyzed through GIS. Additionally, data from both the WSMP and HMP have been utilized to justify the design and construction of a new well, as well as project location selection. On September 18, 2023, a site feasibility study, titled “A Site Feasibility for New Groundwater Production Well Technical Memorandum” was produced to determine the proposed project location. The proposed project is a result of the assessed Alternative Site B. This site feasibility study is provided in Attachment E. EVWD Well Site Feasibility Study.

In April 2024, EVWD was awarded a WaterSMART Planning and Project Design grant to carry out design for the well at the center of this Drought and Resiliency Projects application. The scope of work is comprised of five major milestones: preliminary design, design package for well drilling, design package for well equipping, cost estimates, and permitting items to meet CEQA requirements. The preliminary design phase of the project will address the development of project requirements, evaluation of design alternatives, evaluation of site alternatives, and confirmation of project site. Once finalized, the preliminary design will provide the foundation for the preparation of the final design drawings and specifications for the construction of the project, which will take place during the completion of the design packages for both well drilling and well equipping. A complete design package would allow for an accurate cost estimate for the construction of this project. Finally, the scope would include securing all relevant permitting items to meet the requirements of the Environmental and Cultural Resource Compliance. The first milestone for this project—Procurement—began in October 2024. The preliminary design, the 60% design package which includes well drilling, and the environmental regulatory compliance milestone will be completed by December 2025.

To carry-out the next phase of design—well equipping— EVWD will then begin the well drilling phase of this project. This is considered a construction cost, and therefore will not be funded by the Planning & Project Design grant. Instead, EVWD has included well drilling as a part of this Drought Resiliency Projects proposal’s scope (see Milestone 1 above), with the desire to utilize any potential award to fund the construction milestones that work toward establishing this well. Once well drilling is completed, by November 2026, the design work will resume in December 2026. By February 2027, the 90% design will be completed—included the well equipping design portion of this project. Final Design is intended to be completed by April 2027, with well equipping set to begin May 2027.

Describe any land purchases that must occur before the project can be implemented, and the status of the purchase. (While land purchases are not allowable costs under this NOFO, this information is still important to assess the readiness to proceed.)
Currently, there is no intention of land acquisition as a part of this project scope. However, the proposed project location is currently tentative, and will be determined during design.
If the project is completely or partially located on Federal land or at a Federal facility, explain whether the agency supports the project and has granted access to the Federal land or facility, whether the agency will contribute toward the project, and why the Federal agency is not completing the project?
Not applicable.
Describe any new policies or administrative actions required to implement the project.
There will not be any new policies or administrative actions required to implement the project being designed.

E. Presidential and Department of the Interior Priorities

If applicable, describe how the proposed project will directly serve and/or benefit a disadvantaged community. For example, will the project improve public health and safety by addressing water quality, add new water supplies, provide economic growth opportunities, or provide other benefits in a disadvantaged community?
The District provides potable water services for roughly 108,000 residents in both the City of Highland, City of San Bernardino, and San Bernardino County, California. This area is classified as significantly disadvantaged, with most of the population residing in designated disadvantaged communities. According to the Climate and Economic Justice Screening Tool (CEJST), 17 out of the 24 census tracts with EVWD's service area boundary are designated as disadvantaged (please see Attachment D. CEJST Disadvantaged Tracts Map). According to CEJST, 69% of residents within the District's service area live in a disadvantaged community. The 2020 U.S. Census found that the City of Highland's median household income of $72,222, which is below the state median, with 15.9% of residents living below the poverty line. Compared to the State of California, the service area has a higher person per household but lower per capita and median household income. Highland also faces environmental risks, particularly from air pollution and extreme heat, which disproportionately affect low-income residents and those with preexisting health conditions.

Wider San Bernardino County faces similar issues. According to the 2020 U.S. Census, the county faces economic challenges, as the median household income is around $65,000, lower than the state median, and about 14% of residents live below the poverty line. While educational attainment has been steadily improving, the county still lags state averages, with about 23% of residents holding a bachelor's degree or higher. The county's demographic makeup is ethnically diverse, with about 54% of the population identifying as Hispanic or Latino, making it the largest ethnic group. The non-Hispanic White population accounts for around 28%, while African American residents make up about 8%, and Asian residents represent around 7% of the population.

The proposed project aims to improve the reliability of water supply during drought conditions, and will increase water resiliency within these disadvantaged communities. The proposed well is intended to secure access to potable water, which is crucial for socially vulnerable populations. Residents of disadvantaged communities often have limited access to resources needed to secure water during scarcity, such as the ability to purchase or transport potable water for drinking, cooking, and bathing. The lack of drinking water can adversely affect various local industries (like restaurants and grocery stores) and essential services (such as hospitals and senior centers) that support vulnerable populations. Without adequate mitigation efforts, the impact of drought is expected to worsen for these disadvantaged communities, which are particularly sensitive and exhibit lower adaptive capacity to emergencies and natural hazards.

Does the proposed project directly serve and/or benefit a Federally Recognized Tribe? Describe the Tribal benefits. Benefits can include, but are not limited to, public health and safety by addressing water quality, new water supplies, economic growth opportunities, or improving water management.

Yes. EVWD provides services to the San Manuel Band of Mission Indians Reservation (Tribe). The Tribe population is approximately 200 people according to the Judicial Council of California. District staff meets regularly with the Tribe to identify water needs, projects, and community outreach efforts. This project will help the District demonstrate a commitment to the long-term sustainability of the Tribe by providing a resilient water supply system.

Access to drinking water is critical infrastructure—critical to both health and economic wellbeing. This project aims to increase the resilience of EVWD's drinking water supply in the event of drought, a natural hazard that is predicted to both increase in severity and frequency due to climate change. Because the Tribe is within EVWD's service area, the Tribe would also experience the benefits of this project, ensuring the access to groundwater supply in instances where surface water becomes scarcer. Clean, potable water is essential for hydration, sanitation, and various commercial and communities'

services such as restaurants and hospitals. The project helps to secure access to water to meet the needs of the community to prevent disruption of any of the services listed.
Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?
No.

F. Nexus to Reclamation

Does the applicant have a water service, repayment, or O&M contract with Reclamation? If so, please provide the contract number(s).
No.
If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means?
EVWD purchases supplemental surface water through the California State Water Project.
Will the proposed work benefit a Reclamation project area or activity?
No.
Is the applicant a Tribe?
No.

G. Stakeholder Support for the Proposed Project

Describe the level of stakeholder support for the proposed project. Are any stakeholders providing support for the project through cost-share contributions or through other types of contributions to the project?
The District has agreed to consult the San Bernardino Valley Municipal District and the Western Municipal Water District throughout design to ensure the proposed locations of the wells are in good faith with other regional groundwater planning efforts.

Widening Availability Through Engineered Resiliency (WATER): Increasing Drought Resiliency Through New Well Construction in East Valley Water District (EVWD)

Budget Narrative

The line-item cost estimate for submitted for the WATER: Increasing Drought Resiliency through New Well Construction in EVWD is based on a combination of in-house labor to be completed by EVWD personnel and contracted estimates derived from other projects with similar scopes of work. The budget narrative is broken down by expected personnel and construction costs and associated to project milestones.

1. Personnel

Milestone 1. Well Drilling (Nathan Carlson, Senior Engineer, $132.21/hr)

EVWD would allocate personnel costs to oversee a subcontractor responsible for well drilling by assigning staff to manage and monitor the subcontractor's work. This would involve Mr. Carlson coordinating with the subcontractor to ensure timelines and specifications are met, as well as engineers or hydrologists reviewing the subcontractor's plans and methods.

Milestone 2. Reporting

Milestone 2 involves overseeing the contracted engineering firm to review and evaluate the comprehensive documentation provided. EVWD personnel would ensure that the reports meet regulatory and contractual requirements and facilitate decision-making for future project phases. Administrative staff would be involved in organizing and distributing the reports internally, ensuring that key stakeholders are informed and prepared for the next steps. Milestone 2 is anticipated to be completed by EVWD personnel, most likely Mr. Carlson.

Milestone 3. Well Equipping

Personnel costs for well equipping would be utilized to oversee the contracted engineering firm’s reporting for Milestone 3 by assigning staff to closely review the documentation on the procurement, installation, and testing of essential well equipment. Additionally, EVWD personnel would verify the installation of well equipping equipment

and ensure efficiency and safety of the equipment. Milestone 3 is anticipated to be completed by EVWD personnel, most likely Mr. Carlson.

Milestone 4. Grant Closeout

Milestone 4 includes the submission of all required deliverables resulting from this project to the Bureau of Reclamation. Grant closeout may also include submitting final requests for reimbursement (RFRs) and compiling auditing documentation. Milestone 4 is anticipated to be completed by EVWD personnel, most likely Mr. Carlson.

Table 1: Total Personnel Cost Breakdown

Milestone	Hours	Hourly Rate	Total
1. Well Drilling	260	$132.21	$34,374.60
2. Reporting	8	$132.21	$1,057.68
3. Well Equipping	300	$132.21	$39,663.00
4. Grant Closeout	80	$132.21	$10,576.80
		Total:	**$85,672.08**
		Federal Cost Share (50%)	**$42,836.04**
		Local Cost Shate (50%)	**$42,836.04**

2. Construction

The hourly rate assigned for each of these items is based on percentages commonly used in the construction industry or on best management practice and knowledge. These costs were confirmed by the District to be in alignment with expectations and based on similar past projects. Procurement of the Architectural & Engineering (A&E) Firm tasked to conduct this project would take place during a previously awarded project—the awarded WATER: Increasing Drought Resiliency Through New Well Design project through the FY23 WaterSMART Planning & Project Design funding opportunity. EVWD will release a Request for Proposals (RFP) for both the design and construction of this well. Once released, EVWD allows a minimum of 30 days for firms to submit their proposals. EVWD will choose the firm best suited to conduct the project from start to finish. Design tasks will be funded through the design award, previously mentioned. If awarded, EVWD intends to fund all construction tasks listed in Table 2 through the FY25 Drought Resiliency Projects funding opportunity.

Table 2. Total Construction Cost Breakdown

Milestone	Hours	Hourly Rate	Total
1. Well Drilling	14,400	$125.00	$1,800,000
2. Reporting	200	$125.00	$25,000
3. Well Equipping	32,000	$125.00	$4,000,000
		Total:	**$5,825,000**
		Federal Cost Share (50%):	**$2,912,500**

Local Cost Share (50%):	**$2,912,500**

Milestone 1. Well Drilling

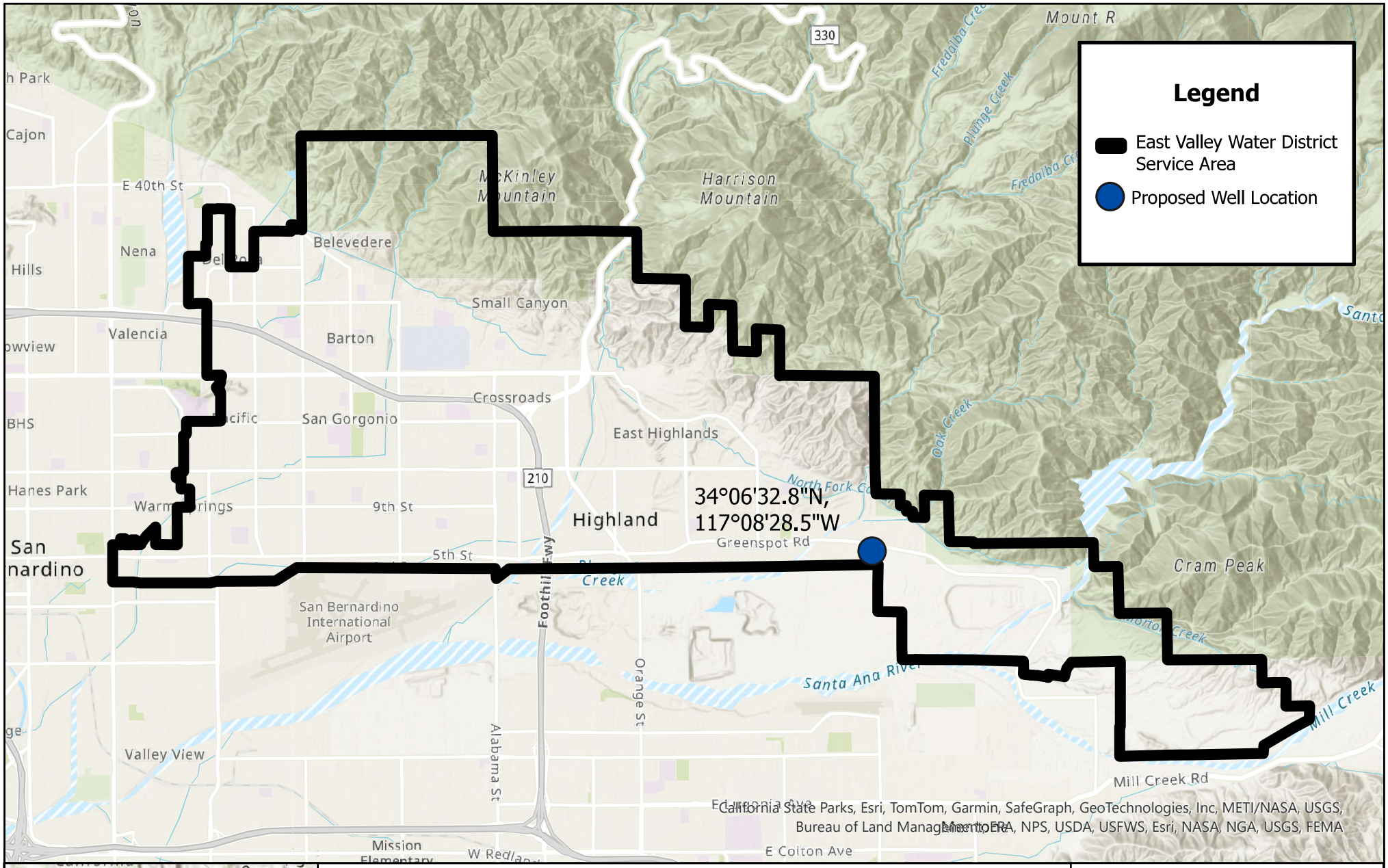
The contracted engineering firm will lead Milestone 1, overseeing the initial drilling and testing of the new well. This milestone includes preliminary site drilling and testing procedures to assess the water quality, flow rate, and overall viability of the well for sustainable water extraction. This phase is crucial in ensuring the functionality and reliability of the well for its intended purpose.

Milestone 2. Reporting

The reporting milestone will encompass the preparation of comprehensive documentation detailing the well construction process, testing results, and any necessary adjustments or recommendations for the successful progression of the project. This milestone serves as a key bridge between fieldwork activities and future decision-making processes within the project timeline.

Milestone 3. Well Equipping

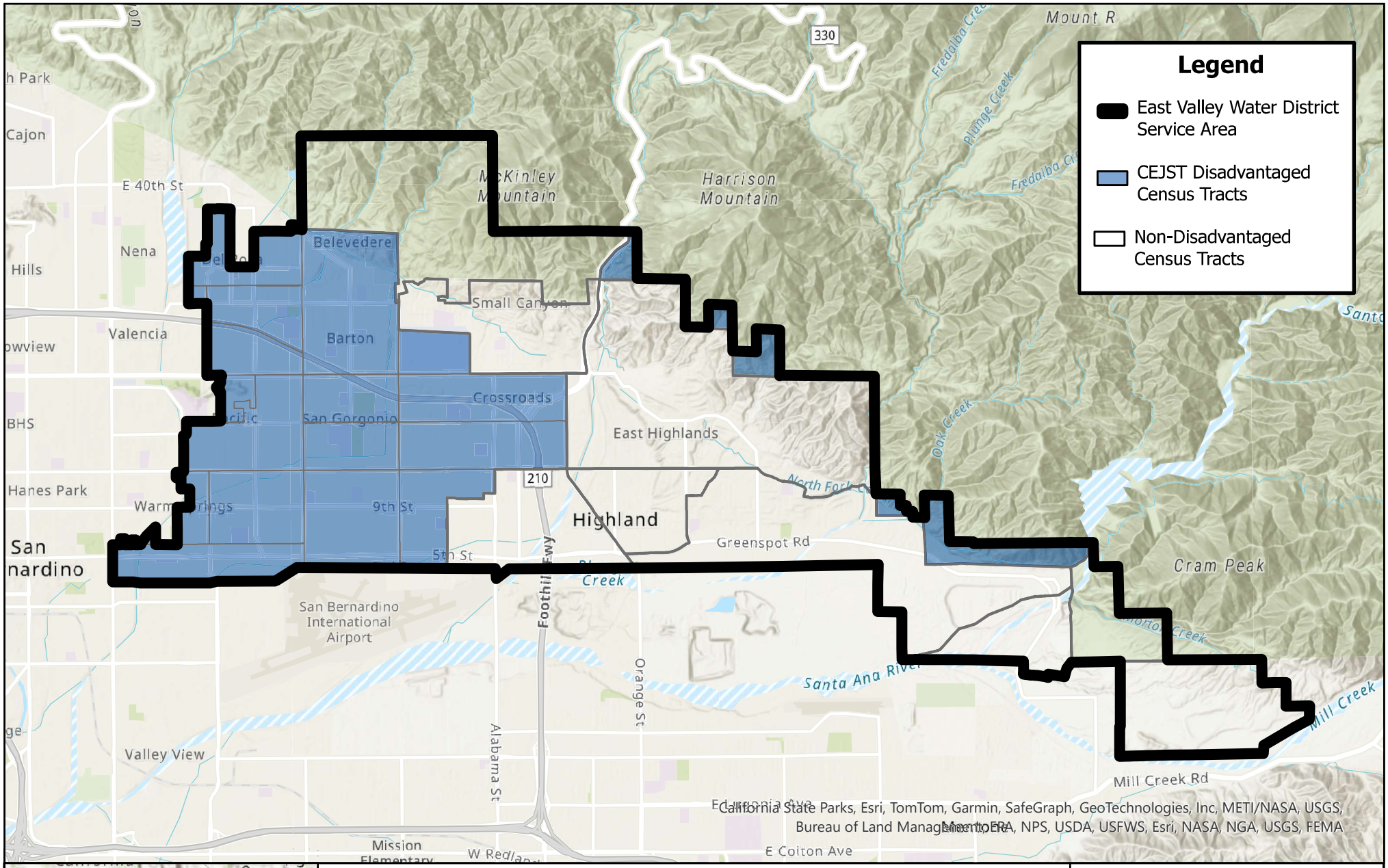
The contracted team will oversee Milestone 3 managing the procurement, installation, and testing of essential well equipment necessary for operational readiness. Tasks will include the installation of pumping equipment, electrical components, and monitoring devices, followed by meticulous testing to ensure efficiency and safety. This construction milestone will build on previous data and construction from Milestones 1 and 2 and result in a completed, functional groundwater well.



WaterSMART Drought Resiliency Projects Application FY 25

"WATER: Increasing Drought Resiliency Through New Well Construction in EVWD"
Project Location Map

EAST VALLEY WATER DISTRICT



WaterSMART Drought Resiliency Projects Application FY 25

"WATER: Increasing Drought Resiliency Through New Well Construction in EVWD"

CEJST Disadvantaged Communities Map

Source: Climate and Economic Justice Screening Tool (CEJST)

LEADERSHIP · PARTNERSHIP · STEWARDSHIP
EAST VALLEY WATER DISTRICT

Technical Memorandum

Date:	9/18/2023
To:	Jeff Noelte, PhD, PE, BCEE Nate Carlson, PE
CC:	Laine Carlson, PE
Prepared By:	Eric Fregoso, GIT
Reviewed By:	Joe Kingsbury, PG, CHG
Project:	Drought Contingency Plan
Subject:	Site Feasibility for New Groundwater Production Well

1.0 Introduction

East Valley Water District (EVWD) plans to drill and construct a new groundwater production well. The new well would augment potable groundwater supplies and help to reduce well-related vulnerabilities in support of EVWD's Drought Contingency Plan. EVWD has already identified two sites which could be suitable for the proposed new production well.

The objective of this study is to evaluate the conceptual feasibility for the construction of a new well at either of the two sites. This evaluation is an important step as it provides the opportunity to identify any fatal flaws of these sites before expending significant time and resources on a new well project. The purposes of this technical memorandum are to document the method used to evaluate the sites and to provide EVWD staff with the specific information needed to select the site for the new production well.

2.0 Site Evaluations

The sites considered for the proposed new groundwater production well include EVWD's Plant No. 129 (Site A) and an alternative site (Site B) that is approximately 0.25-mile south of Site A. The location of the study area which includes Sites A and B, is shown on Figure 1. Both sites are within EVWD's service area and its Foothill Pressure Zone. Also, these sites overlie the alluvial materials which comprise the Bunker Hill groundwater subbasin of the Upper Santa Ana Valley Basin (Bunker Hill Basin). The hydrogeology of the study area is well-known, and a new production well installed at either site should provide a reliable source of potable water.

EVWD desires a site that provides sufficient space for the installation and operation of the new production well. Based on discussions with EVWD staff, utilizing Site A for the new well is

preferred since it is owned by EVWD, and the well could be plumbed into the existing potable water conveyance system with minimal construction, time, and cost; however, the available space onsite may not be sufficient for the new well, such as during construction activities or for State regulatory horizontal setback and control zone requirements. The preferred location for the production well at Site A is at the west side, in the open space between the booster station building and the north steel reservoir (see Figure 2).

Due to the space constraints at Site A, EVWD identified Site B as a potential alternative location for the new production well (Figure 3). This property is owned by the San Bernardino Valley Municipal Water District (SBVMWD) and will require EVWD to obtain a property easement agreement for the construction and ongoing operation of the production well. The proposed well location for Site B shown on Figure 3 was selected by WSC. Site B is currently vacant open space, and it will need to be determined if SBVMWD's buildout plans for the site will accommodate an easement for a production well.

To determine the level of feasibility for the proposed new production well, Sites A and B were evaluated for the following well siting criteria:

- Site Conditions
    - Ownership
    - Parcel size and configuration
    - Topography, surface drainage, and land use
    - Surroundings
    - Existing structures and utilities
- Regulatory Constraints
    - Horizontal separation from potential sources of pollution
    - Well site control zone
- Construction Constraints
    - Minimum available space
    - Site access
    - Proximity to nearest potable water supply
    - Options for disposal of drill cuttings and effluent water
    - Proximity to underground and overhead obstructions
    - Proximity to nearest residential dwelling
    - Proximity to nearest groundwater well
- Hydrogeologic Conditions
    - Geologic setting
    - Water levels
    - Production potential
    - Interference with vicinity production wells
    - Proximity to areas of poor groundwater quality

The site evaluations were supported by review of available information and data obtained from EVWD, WSC's in-house document library, and online sources. The evaluations also included

GIS-based methods for determining spatial relationships of a potential well site and the siting criteria listed above.

2.1 Site Conditions

The first step of this study was to compile and review general information and current conditions of Sites A and B. Table 1 summarizes the site-specific information, which forms the basis and a point of reference for the other well siting criteria. Aerial plan views and existing conditions for Site A and Site B are provided on Figures 2 and 3, respectively.

Table 1. Summary of Site Conditions

Site Condition	Site A	Site B
Ownership	EVWD	SBVMWD[1]
Parcel Size	3.5 acres; 152,460 sq. ft.	7.35 acres; 320,166 sq. ft.
Parcel Configuration	Irregular, 5-sided	Irregular, 5-sided
Topography	Generally flat; 1-1/2:1 slope and bench in northeast corner; ground surface elevations range from approx. 1,530 to 1,560 feet amsl	Generally flat; ground surface elevations range from approx. 1,520 to 1,530 feet amsl
Surface Type	Paved and landscaped	Grasses and scrub brush
Surface Drainage	Towards drain inlet (see Figure 2)	Sheet, from east to west
Surroundings(see note)	Residential, open space	Open space, residential
Nearest Residential Dwelling	Approximately 150 feet	Approximately 200 feet
Land Use	Plant No. 129 Booster Station	Vacant[2]
Existing Structures	3-million-gallon steel reservoirs (2), pump station building, electrical equipment, block/chain-link fencing, steel security gate	Chain-link fencing with gate
Existing Utilities		
Underground	Drain lines (6", 12", 24" dia.), water mains (6", 12", 20" dia.)	Water main (2), type/size not determined
Overhead	None	Powerlines (along east side of Cone Camp Rd.)

[1] WSC understands that EVWD would coordinate with SBVMWD to obtain a property easement agreement if this site is pursued for the proposed new production well. A conceptual boundary of a 0.9-acre (39,200 sq. ft.) well easement for Site B, as determined by WSC, is shown on Figure 3.

[2] Based on review of historical aerial photos (Google Earth), a single residential dwelling was on the parcel up to at least 2016; however, the proposed location for the new well (Figure 3) has been undeveloped since 1995, if not longer.

Note: The surroundings of Sites A and B include current and planned recharge and conservation projects. Current projects include the Santa Ana River (SAR) Spreading Grounds and the Upper Santa Ana River Habitat Conservation Plan (also known as the Wash Plan). The San Bernardino Valley Water Conservation District (SBVWCD) manages the SAR Spreading Grounds for replenishing the Bunker Hill Basin through percolation of surface water diversions and other water deliveries. Located at the confluence of the SAR and Mill Creek and generally bounded on the north and east by Greenspot Road and on the west by Alabama Street, the Wash Plan is a long term environmental, infrastructure, and management approach by a Task Force[3], to improve habitats for endangered species, and support local water supplies and construction projects. Site B is located approximately 0.5 miles west and slightly to the north of the SAR Spreading Grounds (see Figure 1). Also, Site B is bounded by—but excluded from—the Wash Plan. Planned projects within the study area include the Oak Creek Spreading Grounds and the Plunge Creek Conservation Project. Through efforts initiated by the 2012 Agreement to Develop and Operate Enhanced Recharge Facilities, the proposed site for the Oak Creek Spreading Grounds is approximately ¼-mile west of Site B (see Figure 1). The source water for the Oak Creek Spreading Grounds is currently being evaluated; however, it potentially may include advanced treated wastewater. The Plunge Creek Conservation Project would include new infrastructure and operations to direct and slow stormwater for increased recharge and habitat quality. Details, including the locations of new infrastructure, of this project were not determined for this study.

2.2 Regulatory Constraints

Two sets of regulations apply to a planned municipal water supply well site:

- California Well Standards, and
- Title 22 California Code of Regulations (CCR), specifically
    - New Well Siting, Construction, and Permit Application – Title 22 CCR Division 4, Chapter 16, Article 3, Section 64560

The California Well Standards apply to the construction of all new production wells. Section 8 (Well Location With Respect to Pollutants and Contaminants, and Structures) for Water Wells is most relevant for siting a new well. This regulation requires that a well is horizontally separated from certain structures and features to help ensure public safety and proper functioning of the system. Below is a summary of the minimum horizontal setback requirements:

- 50 feet - Any sewer (sanitary, industrial, or storm; main or lateral)
- 100 feet - Sewer manhole, septic tank, leach line, petroleum storage tank (UST), pond, lake, stream, wetland, and hazardous liquid pipeline
- 150 feet - Sewage treatment plant, seepage pit, and cesspool
- 500 feet - Sewage lagoon, percolation/evaporation pond, petroleum transmission line

Also, where possible, the top of a well should terminate above the estimated level of a 100-year flood caused by drainage or runoff from surrounding land.

[3] Task Force is made up of stakeholders, communities and partners, and Federal/State resource agencies.

The State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) does allow variations from these requirements if additional precautions are taken. Therefore, exceptions of the standards may be acceptable but require approval by DDW.

For the second set of regulations, a well that is planned to produce potable water must follow Title 22 CCR. CCR Section 64560 is a well site control zone with a 50-foot radius around the site that can be established for protecting the source (well) from vandalism, tampering, or other threats. Any activity not directly related to the operation and maintenance of the well and the water system is prohibited within the control zone; therefore, EVWD must have legal control of the land in the well control zone. Any form of legal control (e.g., ownership, perpetual easement, etc.) is acceptable provided it gives EVWD complete jurisdiction over all activities within the control zone.

Figures 4 and 5 provide detailed views showing locations of the features and their associated regulatory horizontal separation setback (i.e., buffer) for Site A and Site B, respectively. A conceptual 50-foot control zone is also shown for the proposed new well at each site. As shown, the sites have the potential to meet both sets of regulatory requirements described above. Also, the proposed well location at Sites A and B lies outside of the nearest 100-year flood zone associated with Plunge and Oak Creeks.

2.3 Construction Constraints

There are minimum requirements for a site to be suitable for drilling and construction activities associated with a new well. For example, a working space (i.e., construction footprint) of 10,000 sq. ft. is generally considered to be the minimum size needed for the drilling contractor. However, all sites have limitations or other forms of construction constraints and special accommodations may be required for and/or by the driller. The following factors are typical constraints to well drilling and construction:

- Minimum available space (total size and dimensions)
- Site access
- Proximity to nearest potable water supply
- Options to dispose of drill cuttings and/or effluent water
- Proximity to underground and overhead obstructions
- Proximity to nearest residential dwelling
- Proximity to nearest groundwater well

To determine the construction constraints, each site was evaluated spatially using the proposed well location, and a combination of GIS, Google Maps, and Google Earth and the site-specific information provided in Section 2.1. For purposes of comparison, the details for Sites A and B are listed below in Table 2.

Table 2. Summary of Construction Constraints

Construction Constraint	Site A	Site B
Minimum Available Space		
Total Size	8,100 sq. ft. (approx.)	10,000 sq. ft.
Dimensions	90' x 90'	50' x 200'
Site Access	Through existing gate, improved roadway, and surface	Loose, unimproved ground; will require temp. improvements
Nearest Underground Utility		
Type	Drain line, 24" R.C.P.	Water main
Distance from proposed well	25'-30'	75'
Overhead Obstructions	None	None (powerlines outside of proposed construction footprint)
Nearest Potable Water Supply		
Source	Fire hydrant	Riser
Distance	200'	400'-500'
Required Street Crossing?	Yes, at intersection of Calle Del Rio St. and Vista Clara St.	Yes, across Cone Camp Rd.
Disposal of Drill Cuttings	Haul offsite to certified disposal landfill	Spread onsite
Disposal of Well Development/Testing Water	Onsite, into 24" RCP drain line	Onsite, into temporary earthen basin
Nearest Residential Dwelling[4]	150'	200'
Nearest Groundwater Well	850' (Plant No. 142)	1,700' (Plant No. 142)

2.4 Hydrogeologic Conditions

Geologic Setting

The generalized surficial geology of the study area is shown on Figure 6. The valley-fill materials which comprise the Bunker Hill Basin generally consist of channel wash deposits, younger alluvium, and older alluvium. These unconsolidated sediments were derived from a basement complex of igneous and metamorphic consolidated rocks, which underlie the valley-fill and outcrop in the San Bernardino Mountains, San Gabriel Mountains, and Crafton Hills. The thickness of the valley-fill within the Bunker Hill Basin ranges from a few tens of feet to more than 1,200 feet[5]. Based on ground surface elevations and review of available information from

[4] Prior to drilling and constructing the well, a noise impact study should be conducted, and the results used to determine the appropriate means (e.g., temporary sound walls, etc.) to specify for the drilling contractor to mitigate construction-related noises.

[5] U.S. Geological Survey Open-File Report 2005-1278.

others[6], the total thickness of valley-fill materials is estimated to be 550 feet at Site A and 630 feet at Site B. Where saturated, zones of unconsolidated gravel and sand yield large amounts of water to wells.

The San Andreas Fault system, which includes sub-parallel faults, is located at the base of the San Bernardino Mountains. The primary strand of the San Andreas Fault acts as an impediment to subsurface inflow of groundwater from the mountain front into the Basin. As shown on Figure 6, Site A is located between the primary strand of the San Andreas Fault (north) and a sub-parallel fault (south), and Site B is located approximately 1,000 feet south of the sub-parallel fault; however, there are no indications that the sub-parallel fault acts as a barrier to groundwater flow.

Water Levels

Groundwater in the study area generally flows by gravity drainage from northeast to southwest, towards the Santa Ana River channel at a hydraulic gradient of approximately 0.014 ft/ft. Recharge to the Basin is from infiltration of runoff from the adjacent mountains and by percolation of precipitation and water spread in streambeds and spreading grounds.

WSC reviewed hydrographs for wells at Plant No. 125 and Plant No. 142 provided in a technical memorandum (TM) by Geoscience Support Services, Inc. (provided to WSC by EVWD), titled "Assessment of East Valley Water District Wells No. 120, 125, and 142." These hydrographs indicate that over the past 30-40 years, static water levels at well No. 125 ranged from approximately 50 to 400 feet below ground surface (bgs) and from approximately 100 to 375 feet bgs at well No. 142. The high degree of water level variation is primarily associated with regional conditions (i.e., natural and artificial recharge and discharge [pumping] conditions). Sites A and B are in the vicinity of these wells and groundwater level conditions should be expected to be the same for a new production well constructed at either potential site.

Production Potential

A common practice for estimating the production potential of a new well is to review the transmissivity of the aquifers from which the well will produce groundwater. Transmissivity can be calculated from data collected during a pump test of a well. Since an estimated transmissivity, or the data used to calculate transmissivity, was not available for the wells located within the study area, the production potential of a new well at Sites A and B was assumed to be comparable to the historical pumping capacity of wells Plant No. 142 and Plant No. 125.

Review of available historical data indicated the pumping capacity of wells No. 142 and No. 125 ranges from approximately 500 to 2,000 gallons per minute (gpm). According to the TM by

[6] Useable Groundwater in Storage Estimation for the San Bernardino, Rialto-Colton, Riverside, and Arlington Groundwater Basins – Summary Report. Prepared for the San Bernardino Valley Municipal Water District. May 8, 2020.

Geoscience referenced above in the water level discussion, the wide range of pumping rates for these wells is primarily controlled by local water level conditions, and to some extent the inefficiencies associated with an aging well. The highest pumping rates correlate to times when water levels were above the uppermost well screen interval, and the lowest yields occur when water levels are within or even below the screen depth.

The production potential for a well located at Site A or Site B should be at a minimum, equal to the maximum rate for wells No. 142 and No. 125. It should be noted that modern methods for well design and construction, combined with a good understanding of water level conditions in the study area, may result in a more consistent and reliable yield for a new production well.

Interference with Vicinity Production Wells

When siting a new production well, it is necessary to consider the potential for well interference. In general, production wells that produce from the same aquifer should be spaced as far apart as possible to minimize pumping interference. If wells are spaced too closely together, the areal extent of water level decline associated with pumping (i.e., cone of depression) may intersect each another. When this occurs, the wells are said to interfere with one another. This condition of pumping interference may result in increased pumping level drawdown, which in turn increases lift and decreases the maximum yield of the wells.

Proximity to Areas of Poor Groundwater Quality

There are known areas in the Bunker Hill Basin with poor groundwater quality. Contaminant plumes, including the Crafton-Redlands plume, Norton Air Force Base plume, Muscoy and Newmark Superfund sites, and the Santa Fe plume are well delineated but are distant from Sites A and B. The closest plumes, Norton and Crafton-Redlands are located more than 3 miles southwest (i.e., down-gradient) of Sites A and B.

Also, a critical permitting process for a new drinking water supply well includes completion of the State Board's DDW Drinking Water Source Assessment and Protection (DWSAP) Program. The DWSAP Program has two primary elements: Drinking Water Source Assessment and Source Protection. The primary objectives are to (1) identify the possible contaminating activities (PCAs) within a (2) delineated area around the new well and (3) determine the PCAs, if any, the new well is most vulnerable.

To identify PCAs within the study area, point source locations were queried from the State Water Resources Control Board GeoTracker GAMA and the Department of Toxic Substances Control EnviroStor online databases. Based on this search completed by WSC, no PCAs were identified within a 1-mile radius of Site A or Site B.

3.0 Findings

Key findings from the evaluation of Sites A and B are summarized below.

3.1 Site A – EMWD Plant No. 129

- A production well can be located in the open area at the west side of the site, between the booster station building and the north water reservoir.
- The available open space is slightly less in size than the preferred minimum of 10,000 square feet for the construction layout, and the driller may need to stage equipment onsite in other areas.
- The proposed location for the new well should meet all regulatory horizontal setback from utilities and control zone minimum requirements.
- The proposed well location is approximately 850 feet from the existing production well at Plant No. 142, and pumping interference could increase drawdown in both wells by as much as 10 feet.
- The base of the valley-fill alluvium in this location is estimated to be 550 feet bgs.
- Based on water level trends at Plant No. 142, the top of screen for the new well may need to be a minimum of 350 feet bgs to maintain pumping levels above the screen.
- A noise impact study will be needed to determine noise mitigation measures (e.g., sound walls, etc.) for drilling, construction, development, and testing activities.
- A source for construction water is within 200 feet, and development and testing water may be discharged to an existing onsite drain line under NPDES and other regulatory requirements.
- Drill cuttings and fluids will need to be contained onsite and eventually hauled and disposed of offsite at an approved facility.

3.2 Site B – SBVMWD Property

- The size of the property (320,000 square feet) is more than sufficient to install a new production well.
- A temporary right of entry or easement with SBVMWD will be required to construct a new well, conveyance pipelines and other related facilities. Also, a permanent easement or lease will be required for the ongoing operation of the well.
- Except for the potential requirement of temporary sound walls for noise mitigation, the site has no critical construction constraints.
- The new well can be located onsite to meet all regulatory horizontal setback and control zone minimum requirements.
- Nearest production wells, Plant No. 125 and Plant No. 142, are approximately 4,000 feet and 1,700 feet, respectively, from the proposed well location, and pumping interference is anticipated to be insignificant.
- The base of the valley-fill alluvium in this location is estimated to be 630 feet bgs.
- Based on water level trends at Plant Nos. 125 and 142, the top of screen for the new well may need to be a minimum of 350 feet bgs to maintain pumping levels above the screen.

- A source for drilling/construction water is within 500 feet, and there are options to discharge development and testing water onsite (temporary basin or sprinkler system).
- Drill cuttings could be dewatered and spread onsite, if approved by the property owner.
- The site is located within a ¼-mile and up-gradient from the proposed Oak Creek Spreading Basins. Additional analysis may be required to determine potential pumping impacts by the new well to the planned recharge project.

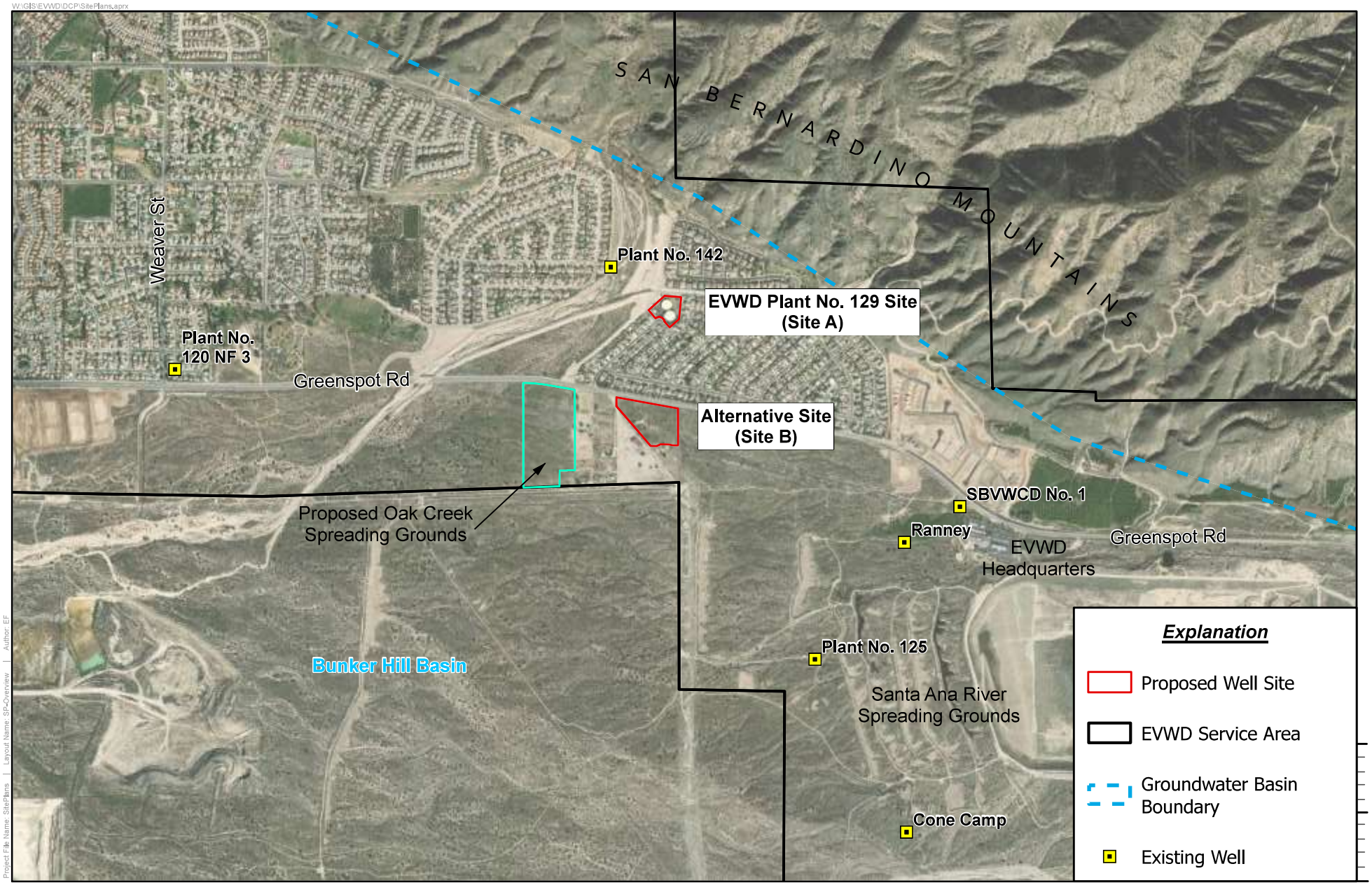
4.0 Recommendations

This feasibility evaluation was intended to provide EVWD with a high-level assessment of two potential sites for the construction of a new groundwater production well. Based on the criteria used and the findings of this evaluation, Sites A and B are both suitable for a new production well. If EVWD desires to construct a new well at both sites, WSC recommends that results of post-construction pumping tests from the first installed well are used to determine and estimate the potential for pumping interference.

Upon selection of the site for a new well, WSC recommends that a preliminary design technical memorandum is completed to form the basis of design for the well. The memorandum should include plans that are equivalent to 30% design. The intent of the preliminary design is to provide sufficient information to EVWD to start the well permitting process with DDW and as a first step for the technical specifications and front-end documents for the drilling and construction of the new well. At a minimum, this preliminary design technical memorandum should provide details for the following site-specific items:

- Proposed location of the new well
- Recommended drilling method and borehole testing (e.g., geophysical logs, isolated aquifer zone testing, falling head tests, etc.)
- Permitting requirements
- Required construction-related mitigation measures
- Site configuration and layout of drilling equipment and working space
- Acceptable source for construction water and conveyance requirements
- Discharge considerations (i.e., estimated volumes) and acceptable point of discharge for well development and testing effluent water
- Preliminary well design (depths, diameters, dimensions, materials)
- Engineer's estimate of construction costs
- Preliminary construction schedule

A draft of the preliminary design document should be submitted to EVWD for review and commenting and followed with a review meeting and submittal of a final memorandum.



Prepared by:

WSC

Date: 9/18/2023

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References/Notes:

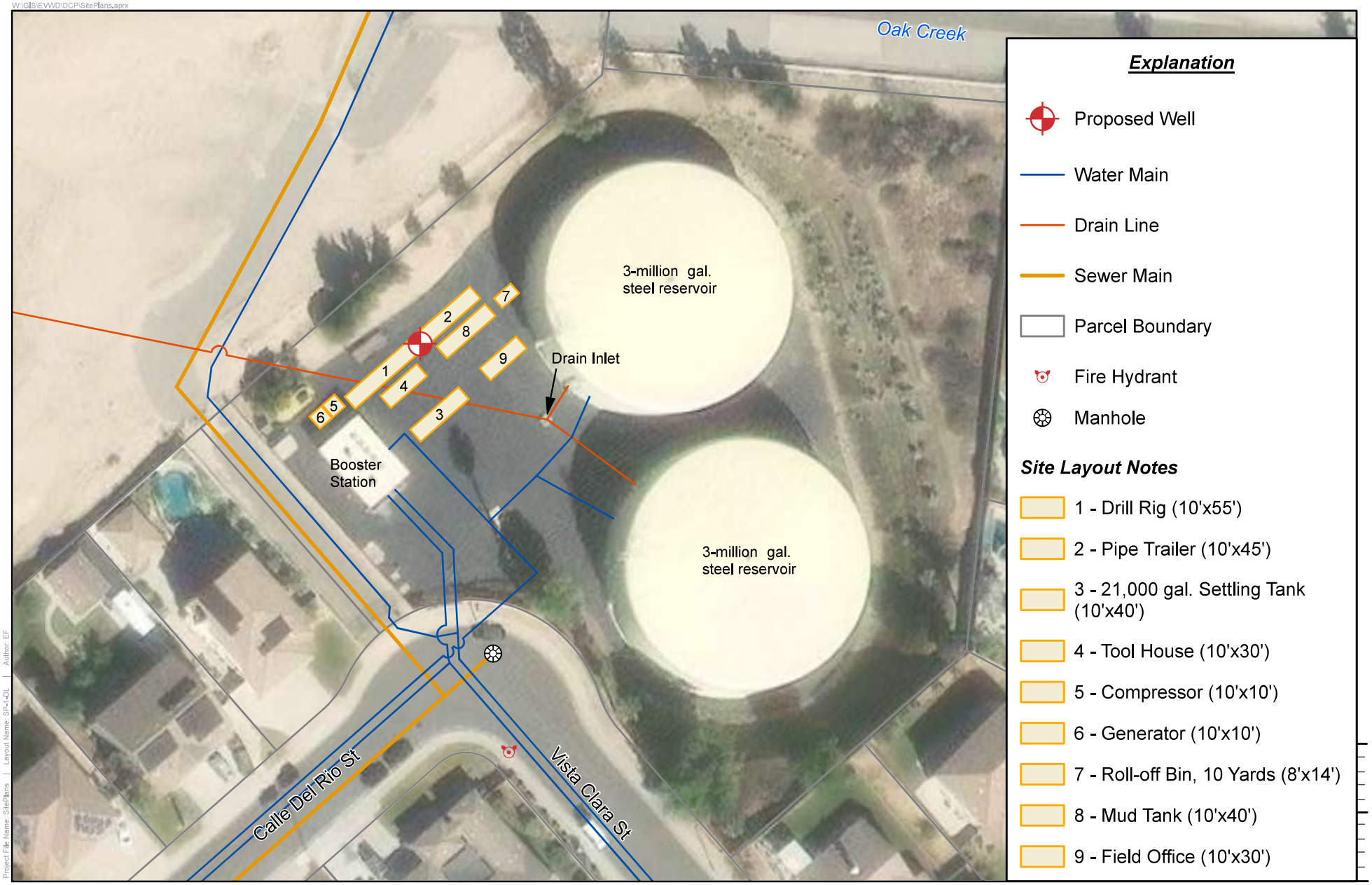
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Prepared for:

EAST VALLEY WATER DISTRICT

Figure 1
Study Area

Site Feasibility for New Groundwater Production Well



Prepared by:

WSC

Date: 9/18/2023

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References/Notes:

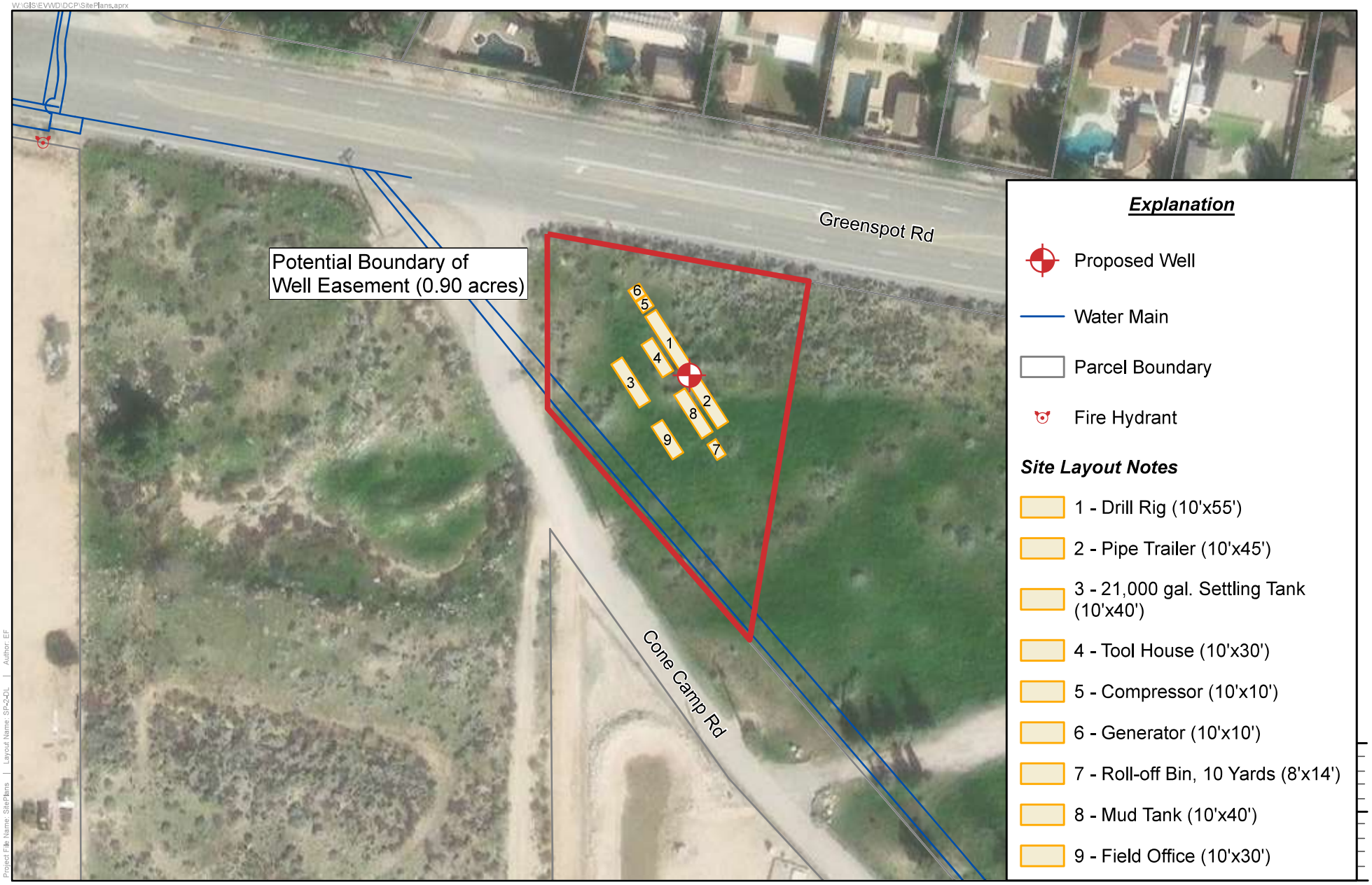
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Prepared for:

EAST VALLEY WATER DISTRICT

Figure 2
Existing Conditions and Potential Well Location - Site A

Site Feasibility for New Groundwater Production Well



Prepared by:

WSC

Date: 9/18/2023

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References/Notes:

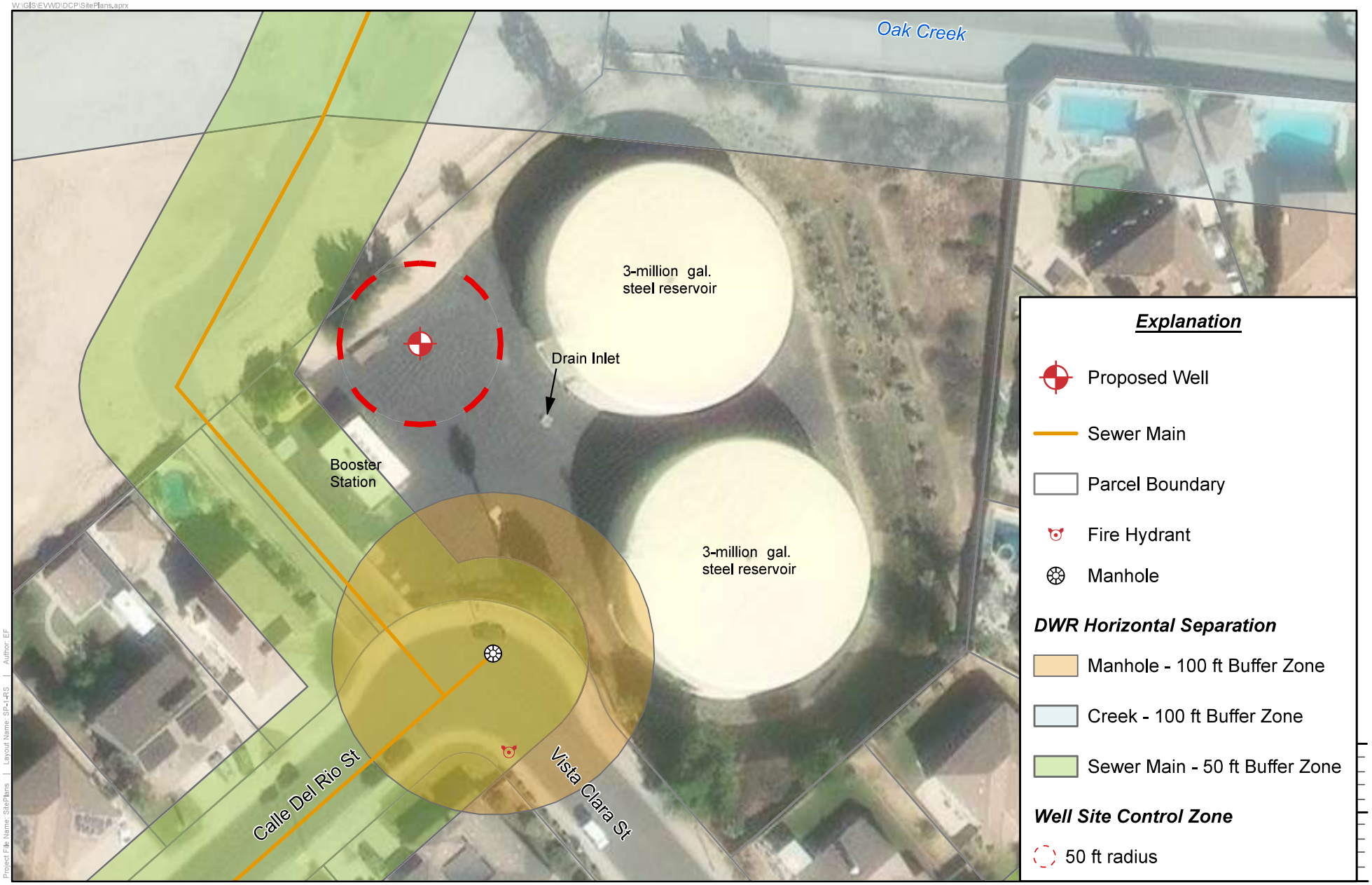
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Prepared for:

EAST VALLEY WATER DISTRICT

Figure 3
Existing Conditions and Potential Well Location - Site B

Site Feasibility for New Groundwater Production Well



Prepared by:

WSC

Date: 9/18/2023

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References/Notes:

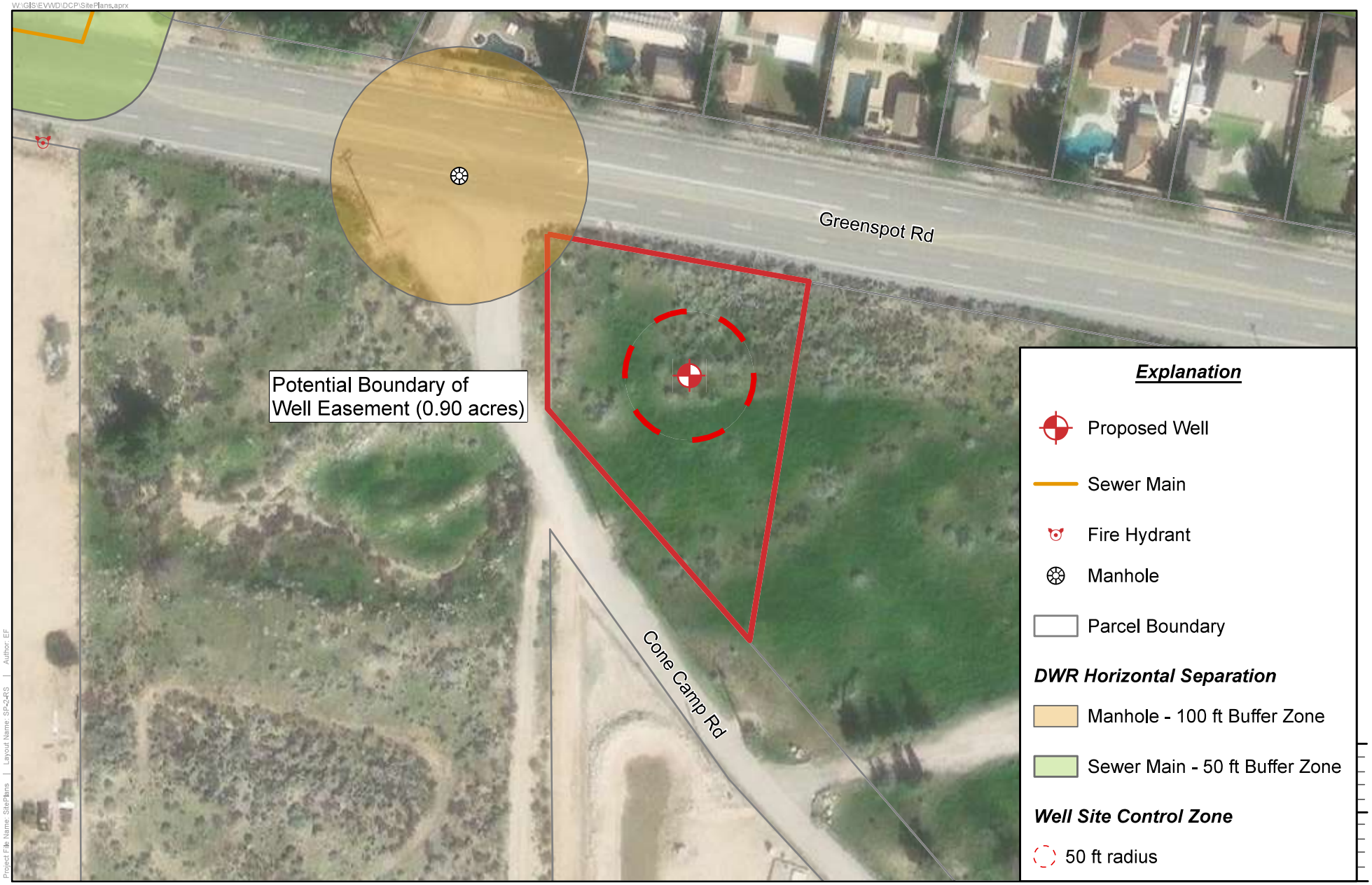
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Prepared for:

EAST VALLEY WATER DISTRICT

Figure 4
Regulatory Requirements - Site A

Site Feasibility for New Groundwater Production Well



Prepared by:

WSC

Date: 9/18/2023

N

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0 12.525 50 75 100 Feet

0 0 0 0.01 0.01 0.02 Miles

References/Notes:

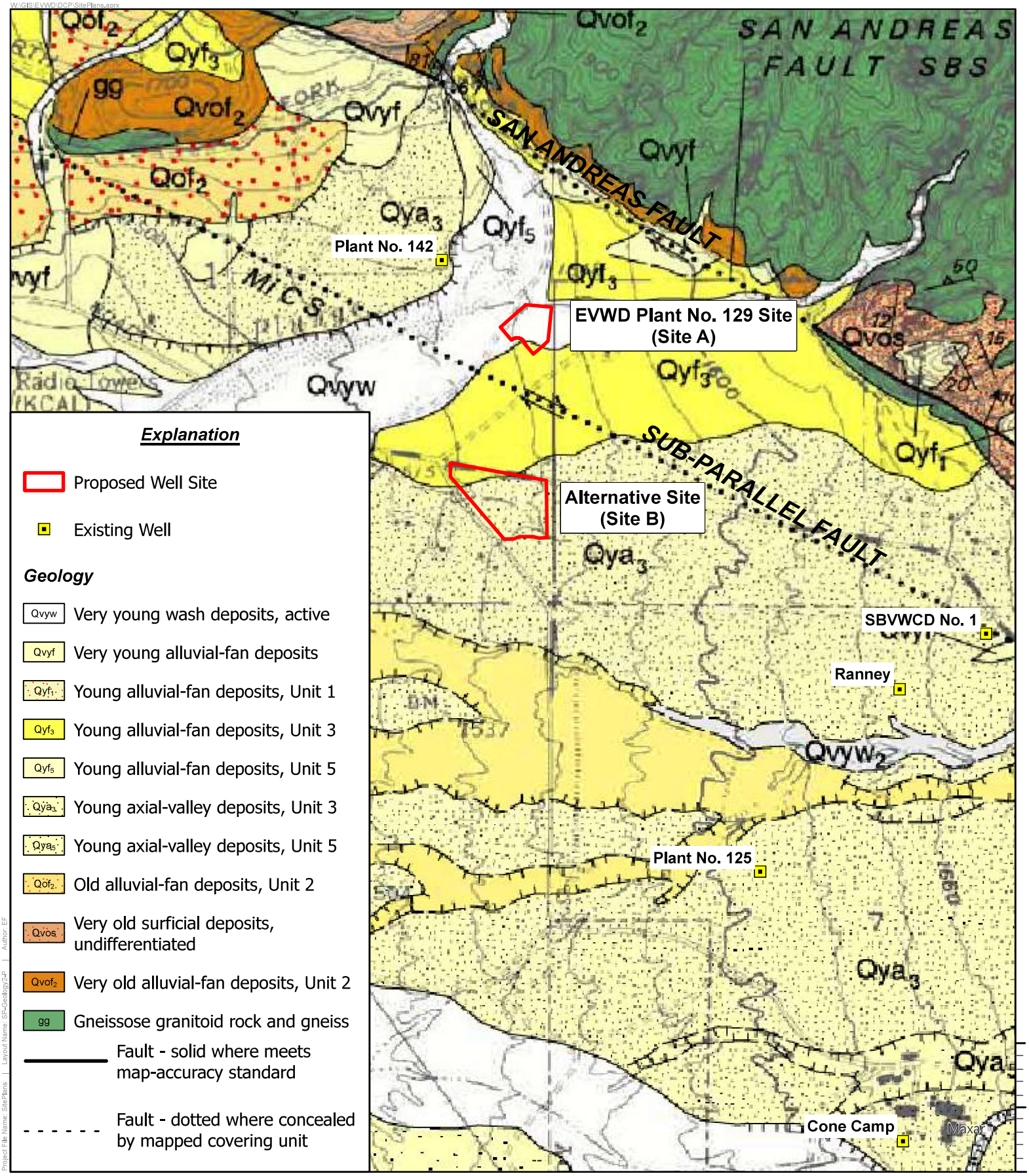
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Prepared for:

EAST VALLEY WATER DISTRICT

Figure 5
Existing Conditions and Potential Well Location - Site B

Site Feasibility for New Groundwater Production Well



Prepared by: WSC

Prepared for: East Valley Water District

N

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0 0.05 0.1 0.2 0.3 0.4 Miles

Date: 9/18/2023

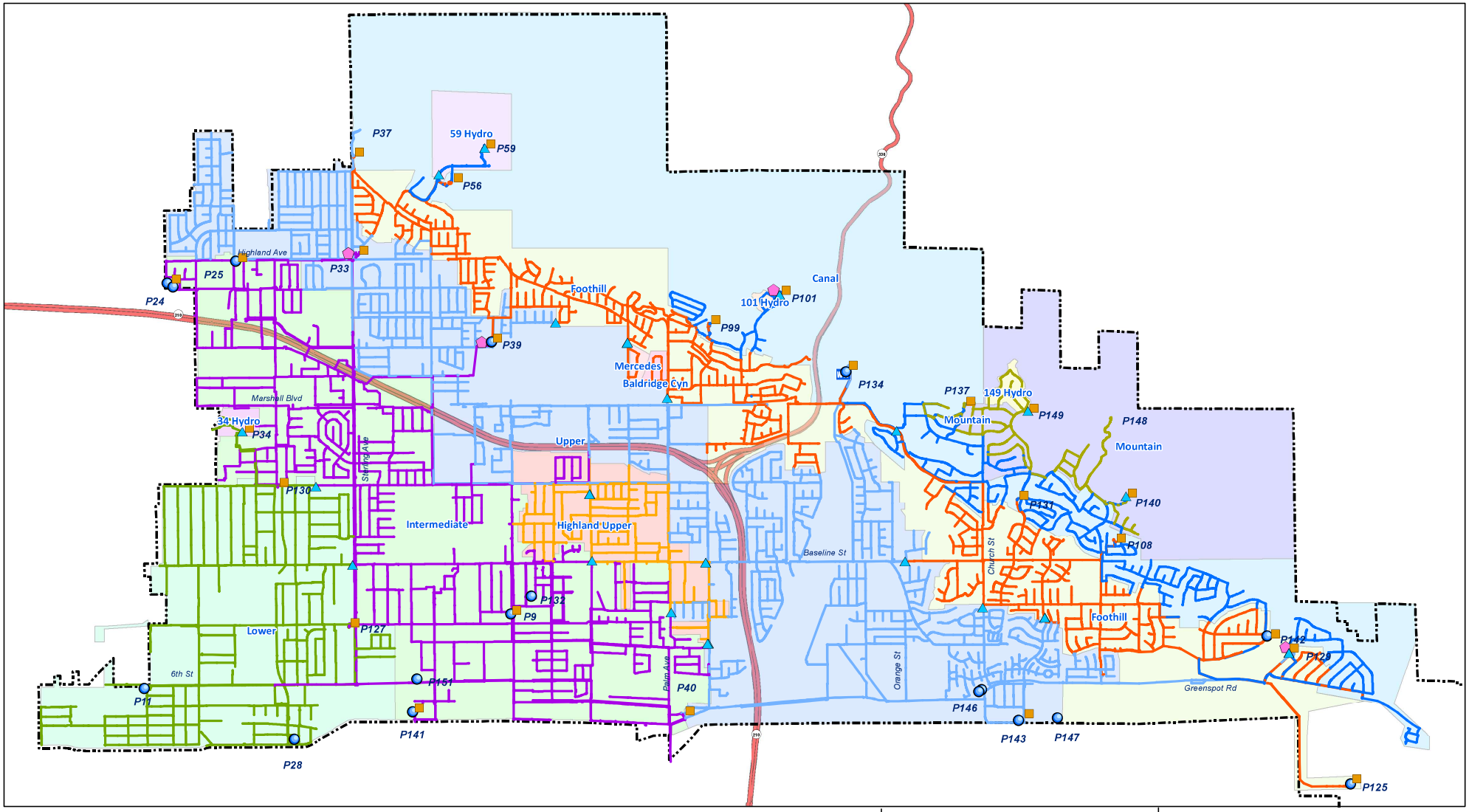
References/Notes:

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

2. Geology from USGS Redlands Quadrangle (2003)

Figure 6
Geologic Map

Site Feasibility for New Groundwater Production Well



Legend

- PRV Station
- Well
- Booster Station
- Reservoir
- WTP

Pipeline by Pressure Zone

- Lower
- Intermediate
- Upper
- Highland Upper
- Foothill
- Canal
- Mountain

- Service Area Boundary
- freeway

Note: Icons have been shifted in order to display different infrastructure in similar locations clearly.

N

0 0.25 0.5 1 Miles

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Document: V:\2245\active\224501161\GIS\MXDs\Figures\Water \Sedaru_ExistingWaterSystemFacilities.mxd by cwhelan

Date: 5/13/2019

Existing Water System Facilities

SEDARU®

Figure 2-1

8.1.4 Near-Term Water System Improvements

System improvement projects for the near-term evaluation are provided below in **Table 8-2**. The projects are also displayed on **Figure 8-2**.

Table 8-2: Near-Term Capital Improvements

Recommended System Improvements Name	Proposed Improvements				
	Size	Quantity	Unit	Trigger/Need*	Description
Transmission Improvements					
T-2	20-inch	50	LF	Sunland Development	Reconfiguration of pipe at Greenspot Rd and Santa Paula Street
Harmony Transmission Pipe	24-inch	5,500	LF	Harmony Development	Dependent on growth to the east of the system (Harmony Development).
Storage Improvements					
Foothill Zone	2.75	-	MG	Harmony Development and to meet current storage criteria of: -Operational (0.25 x MDD) -Emergency (1.0 x MDD) -Estimated fire flow 3,000 gpm @ 3 hr	Storage needed in Foothill Zone.
S-1	4.5		MG	Harmony Development	S-1 is for growth to the east of the system.
Canal 3	2.0		MG	Highland Hills and Sunland Developments	Storage needed in Canal 3 Zone.
Supply Improvements					
New Well 02	2.88 MGD	1	each	Partially supply MDD with largest source (Plant 134) out of service deficiency of 24.9 MGD	Additional well for either Intermediate, Upper, or Foothill.
New Well 03	2.88 MGD	1	each	Partially supply MDD with largest source (Plant 134) out of service deficiency of 24.9 MGD	Additional well for either Intermediate, Upper, or Foothill.
New SWTP or Well(s)	3.00 MGD	1	each	Partially supply growth in east of sytem where growth is projected in order to serve North Fork Santa Ana River Water.	New SWTP or well(s) to support growth to the east of the system.

*Information for the Trigger/Need for each project provided by EVWD staff

Notes:

1. Recommended storage quantity is for the total needed by near-term.
2. Foothill Zone includes storage for growth in east part of the system. (Total recommended storage is 6.0 MG, where 4.5 MG are dedicated to area east of existing system.)