Well 37 Water Supply Resiliency Project

WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025

U.S. Department of the Interior – Bureau of Reclamation
Funding Opportunity Number R25AS00013

Applicant: Palmdale Water District
2029 East Avenue Q
Palmdale, California 93550

Project Manager: Scott Rogers, Assistant General Manager
srogers@palmdalewater.org
(661) 456-1020

October 4, 2024

TABLE OF CONTENTS

D.2.2.2. TECHNICAL PROPOSAL

Executive Summary

Date:	October 4, 2024
	Palmdale Water District
	Palmdale, Los Angeles County, California
	Water District
	Task B: Increasing the Reliability of Water Supplies Through Groundwater
	II
	Category A

Project Summary

Palmdale Water District (PWD or District), located in the western part of the Mojave Desert in Los Angeles County, California, will construct the **Well 37 Water Supply Resiliency Project** (Well 37 Project or Project), a new water supply well and conveyance pipeline to extract a reliable water supply of approximately 1,936 acre-feet per year (AFY) during dry years. The new well will increase locally controlled, drought resilient water supply to PWD by extracting stored water during years of imported water shortages, thereby improving water supply reliability in a region that is highly dependent on imported water, which is becoming increasingly unreliable and expensive, particularly during droughts. The District plans to use the new well to extract groundwater from the Antelope Valley Groundwater Basin (AVGB) to reduce reliance on imported water during times of drought and increase the reliability of local groundwater. The Project was identified as part of the preferred alternative in the District's 2023 Strategic Water Resources Plan (SWRP), included as Attachment A. The SWRP was developed due to water supply uncertainties and to develop a sound water supply strategy to meet demands through the year 2050. The SWRP shows a 56 percent water supply shortage probability in 2025 and 100 percent water supply shortage probability in 2030. There is always the potential that severe, prolonged drought conditions could strain the demands on the AVGB. More droughts are anticipated in the region's future, with an increase in intensity and frequency of extreme weather events, such as drought, impacting both local and imported supplies. The District secures the majority of its water supply from the State Water Project (SWP), which imports water from the Bay-Delta system. In late 2021, it was announced that allocations for SWP water supply in 2022 would focus on health and safety needs, resulting in a 0 percent allocation to PWD. These drought conditions resulted in PWD's Board of Directors enacting Mandatory Stage 2 of their Water Shortage Contingency Plan (WSCP) in 2022 and forcing the District to purchase additional water supply from neighboring agencies.

Project Completion

For the Well 37 Project, the planning, environmental documentation, and design will be completed in April 2026. The construction bid process will begin following completion of environmental documentation and design, with an estimated construction start date of January 2027. Construction will take 16 months and be complete by April 2028.

Federal Facility

The proposed Project is not located on a Federal facility.

Relevant Background Information

The District is a municipal and industrial services water supplier that meets the water demand of its almost 28,000 service connections through a combination of treated surface water from the imported SWP, local surface water, and groundwater pumped from water supply wells. The District's service area includes the central and southern portions of the City of Palmdale and adjacent unincorporated areas of Los Angeles County.

Water Supplies

The District currently receives potable and non-potable water from three main sources: (1) surface water imported from the SWP (including transfers) and from Littlerock Reservoir, (2) groundwater pumped from the AVGB, and (3) tertiary-treated recycled water from the Sanitation Districts of Los Angeles County (LACSD) District 20 Palmdale Water Reclamation Plant (WRP). A summary of all District water supplies is provided in **Table 1**.

TABLE 1: PWD WATER SUPPLIES (2014-2023)

Year	Surface Water (AF)*	Groundwater (AF)	Recycled Water (AF)	Other (AF)	Total (AF)
2014	10,442	12,397	-	-	22,839
2015	6,876	11,227	30	-	18,133
2016	11,155	8,473	20	-	19,649
2017	16,009	4,355	4	-	20,368
2018	14,632	6,058	12	-	20,702
2019	16,345	4,425	4	-	20,774
2020	13,706	7,589	6	-	21,301
2021	12,700	9,844	43	-	22,586
2022	10,038	8,540	25	-	18,602
2023	13,453	4,506	2	-	17,960
Total Water Supply for 2014-2023 in AF =					202,914
Average Annual Water Supply = 20, 291.4 AF					

**Includes all surface water supplies, including transfers and exchanges.*

Surface Water

The District's SWP contractual surface water allocation is 21,300 AFY. Allocations of SWP imported water differ each year based primarily on hydrology, current storage, and releases to be made throughout the year to meet SWP contractual and regulatory requirements. Between 2014 and 2023, PWD's SWP allocations ranged from 5 percent to 85 percent (1,065 AFY to 21,300 AFY), which reflects two drought periods during this time frame. In both 2021 and 2022, the California Department of Water Resources (DWR) reduced SWP contractors to a 5 percent allocation, including PWD. Following a wet winter in early 2023, SWP allocations were increased to 100 percent; however, due to California's ongoing vulnerability to drought, PWD anticipates that additional supplies or a reduction in use will be needed to meet demands in future years. Based on baseline projections in the District's 2023 SWRP, PWD's SWP allocation is projected to be an average between 51 percent and 56 percent through 2050.

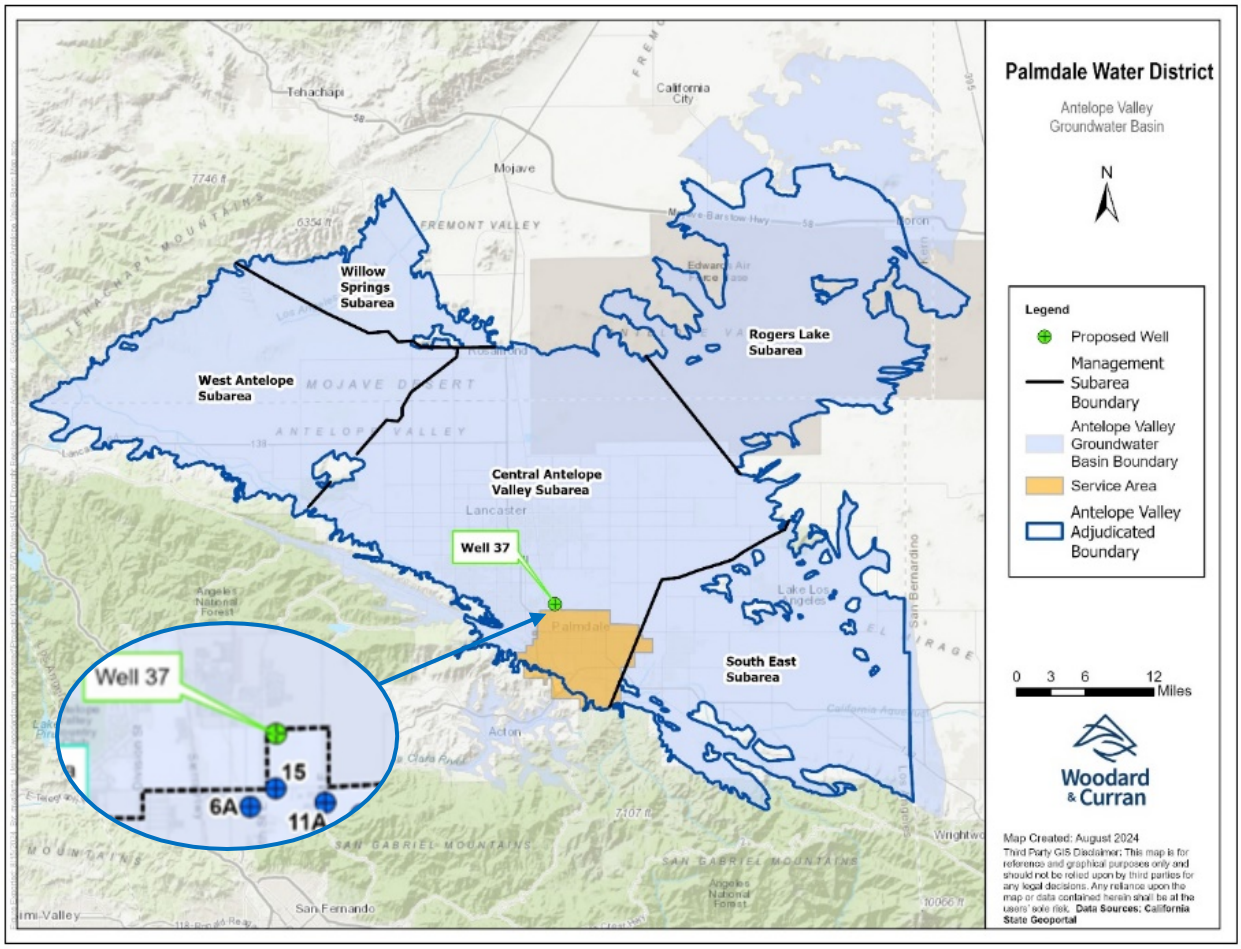
Littlerock Creek is the primary tributary stream that supplies local surface water to the PWD service area, flowing north from the San Gabriel Mountains along PWD's southern boundary. The District and Littlerock Creek Irrigation District (LCID) jointly hold long-standing water rights to divert 5,500 AFY from Littlerock Creek. Per an agreement between the two districts, the first 13 cubic feet per second (cfs) of Littlerock Creek flows are available to LCID. Any flow above 13 cfs is shared between the two districts with 75 percent going to the PWD and 25 percent to LCID. The Littlerock Reservoir is currently managed by PWD to intercept flows from Littlerock Creek. LCID and PWD are each entitled to 50 percent of the Littlerock Reservoir's storage capacity, which was recently upgraded to increase storage capacity to 3,500 AF. Water is conveyed from Littlerock Reservoir to Lake Palmdale via the Palmdale Ditch, an eight and a half mile long mostly open ditch, before being conveyed to and treated at PWD's Leslie O. Carter Water Treatment Plant (WTP). Surface water runoff to the Littlerock Reservoir is seasonal and varies widely from year to year. Although Littlerock Creek flows during winter and spring months, this is buffered by Littlerock Reservoir, allowing this water to be available throughout the year. Climate change is expected to have an impact on streamflows as precipitation patterns change and drought conditions become more extreme, and is projected to result in a streamflow reduction of approximately 4.4 percent by 2050. The District anticipates using half of the average available yield from Littlerock Reservoir, or 4,000 AFY. Of that amount, up to 25 percent is projected to be lost to seepage and evaporation, for a remaining available local surface water supply of 3,000 AFY.

Groundwater

The District's groundwater supply comes from the south-central part of the AVGB, identified as Basin No. 6-44 in the DWR Bulletin 118, as shown in **Figure 1**. The District's groundwater pumping for the years 2011-2021 was approximately 8,000 AFY on average

and accounted for approximately 48 percent of water supplied to its customers. Groundwater is treated with chlorine disinfection and pumped directly into the distribution system.

FIGURE 1: PWD AND AVGB BOUNDARIES



The District is one of the entities involved in the adjudication of groundwater rights for the AVGB that began in 2004 to prevent further declines in groundwater levels. The adjudication, completed in 2015, determined the AVGB was in a state of overdraft and defined the AVGB boundaries, established a safe yield, and quantified allowable groundwater production. In accordance with the adjudication, the Antelope Valley Watermaster was formed to implement the Judgment, administer the adjudicated water rights, and manage groundwater resources within the adjudicated portion of the AVGB.

Recycled Water

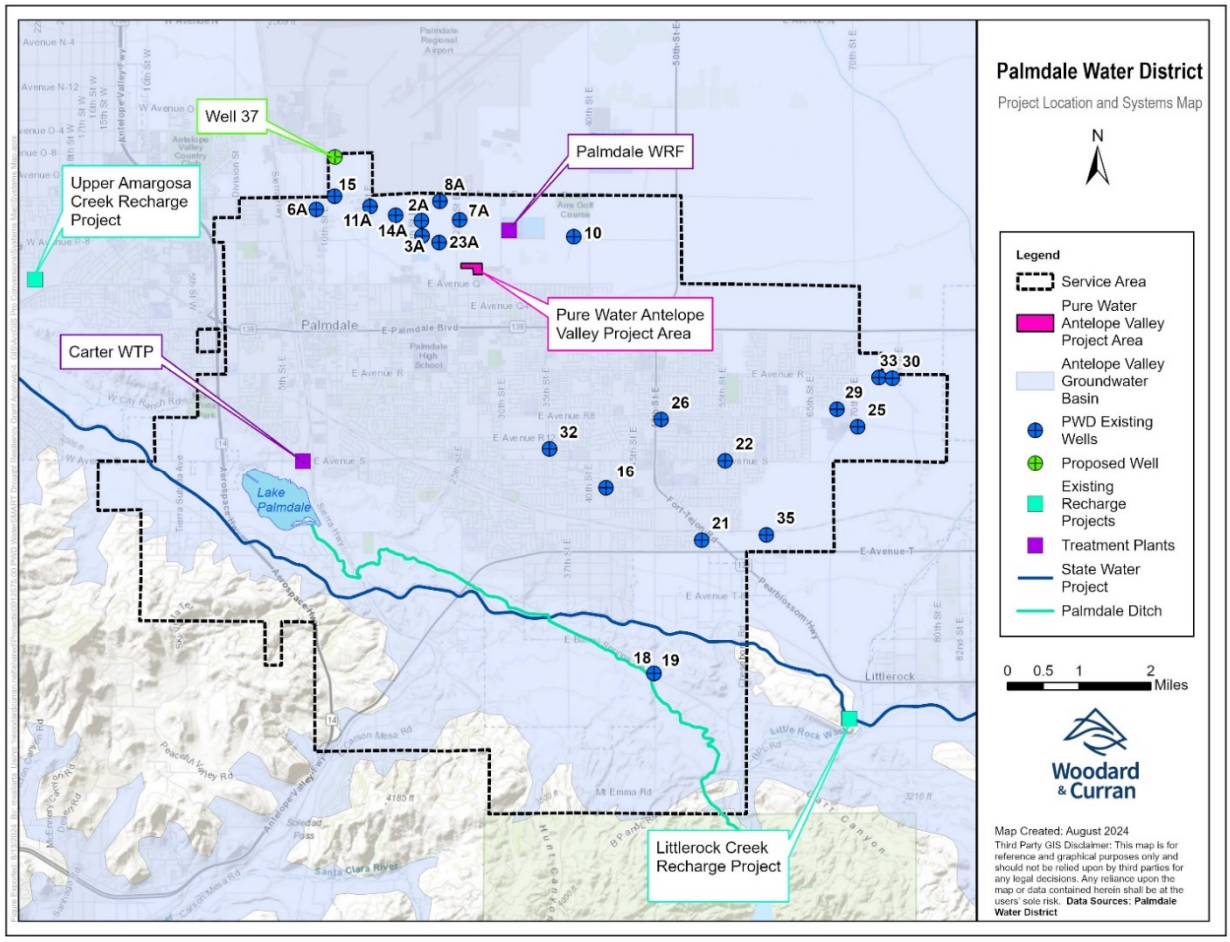
In 2012, the Palmdale Recycled Water Authority (PRWA) was established to manage recycled water generated and used within the PWD service area. The PRWA boundaries consist of the overlap of City of Palmdale and PWD boundaries. The PRWA is a joint

powers authority comprised of the PWD and City of Palmdale and manages all aspects of recycled water use, including agreements to obtain recycled water, planning, design, construction of support facilities, and financing. Recycled water available for use within the PWD service area is supplied by the LACSD Palmdale WRP located in the City of Palmdale. The Palmdale WRP currently provides tertiary treatment for approximately 12,000 AFY of wastewater generated in and around the City of Palmdale and produces an average of 10,700 AFY of Title 22 recycled water. A contract with LACSD entitles PWD to up to 5,325 AFY of recycled water. The WRP is owned and operated by LACSD District 20.

Project Location

The Well 37 Project is in the northern portion of PWD's service area in Los Angeles County, California, approximately 30 miles northeast of the City of Los Angeles. Well 37 is located at latitude 34.607685 and longitude -118.111608. The District completed a Well Site Assessment study in November 2020 and identified the north wellfield for the new well as this area generally exhibits higher production capacities than other areas of PWD's service area. A location map is provided as **Figure 2**.

FIGURE 2: PROJECT LOCATION MAP



Project Description

The Well 37 Project consists of constructing and equipping a new water supply well and pipeline to increase the long-term reliability of water supply by providing additional groundwater pumping capacity during drought periods. The new well will have an estimated capacity of 1,500 gallons per minute (gpm) based on the test data compiled for selected production wells within the vicinity of the well site. The District estimates the new well will be running 80 percent of the time, resulting in 1,936 AFY of groundwater yield.

Based on the 2015 basin adjudication, PWD has a groundwater production right to pump up to 2,770 AFY from the AVGB. The District has been in full compliance since 2016. In addition to its groundwater production right, PWD is temporarily entitled to a share of a federal reserved groundwater right to pump up to 1,450 AFY. The federal government has the authority to utilize that right at any time, but it is assumed that PWD will be able to pump 1,450 AFY until 2050, according to the 2023 SWRP. The District is also entitled to additional pumping based on a return flow credit from imported water use. This amount is projected to be 4,220 AFY through 2025 and will decrease to 4,100 AFY by 2050. The District's total groundwater supply, including agency production rights, federal reserved water rights, and return flow credit, can be as much as 8,440 AFY, decreasing to 8,320 AFY by 2050.

The District will construct an advanced water treatment plant (AWTP) as part of the Pure Water Antelope Valley (AV) Project—a multi-year project that will use 5,325 AFY of recycled water by installing additional treatment and injecting the purified water into the AVGB to bolster local water supplies—which will allow PWD to directly inject purified water into the AVGB. The purified water from the AWTP will be conveyed by pipelines into two injection wells located downgradient from the AWTP site. After the required residence time for groundwater, as required by the California State Water Resources Control Board (State Water Board), Division of Drinking Water (DDW), groundwater will be extracted downgradient using the new Well 37 and existing groundwater wells to supply potable water during dry periods. Additionally, PWD has successfully stored imported SWP water in the AVGB using the Upper Amargosa Creek Recharge Project, a collaborative effort to transport water from the California Aqueduct to a series of recharge ponds for replenishing the AVGB. The District also recharged imported SWP water supply into the AVGB in 2023 as part of the Littlerock Creek Recharge Pilot Project (see **Figure 2** for location of recharge projects). The District is anticipated to continue participating in the Littlerock Creek Recharge Project in the future.

The Project consists of the design, drilling, and equipping of Well 37, which will reach 800 feet to 1,000 feet below ground surface (bgs). The proposed well includes installation of a disinfection system, electrical equipment, pump and motor, and construction of a well building, piping, and other related appurtenances. The well casing and louvered screen

will be constructed of stainless-steel. Prior to drilling, a 36-inch outside diameter (OD) conductor casing will be installed within a 48-inch diameter borehole to a minimum depth of 50 feet in the well. The conductor casing will be sealed with 10.3-sack sand-cement grout to satisfy Los Angeles County requirements. After drilling is completed, a vertical pump, column pipe, pump bowl and intake will be installed in the well. For the well, the pump discharge head, pump to waste piping, flow meter, flow control valve, electrical equipment, and disinfection equipment will be installed in a building set on a concrete pad. Connection to the distribution system will be made from the well discharge piping to the existing 12" Cement Mortar-Lined and Coated (CMLC) Steel pipe in 10th Street East. The pumping rate will be approximately 1,500 gpm for Well 37.

The electrical equipment will consist of a service entrance, motor starter section, and low voltage center. The disinfection equipment will consist of a sodium hypochlorite generator, salt tank, sodium hypochlorite tank and chemical metering pump. Following the installation of the above items, startup and testing will occur and an operations and maintenance (O&M) manual will be developed.

The goal of the new well is to improve water supply reliability in a region that is highly dependent on imported water, which is becoming increasingly expensive and constrained due to long-term drought conditions in California. During the 2020-2022 drought, PWD experienced severe drought conditions, which jeopardized water supply reliability due to reduced SWP allocations. When PWD receives reduced SWP allocations, it is critical that groundwater supplies be available and reliable. PWD's groundwater pumping has accounted for 48 percent of water supply since 2011. During drought conditions, groundwater production could increase to up to 60 percent to offset the lack of imported water. If any existing wells fail, the Project will reduce the probability of inadequate supplies to meet PWD's demands.

The primary objective of the Project is to provide additional local supply during drought periods when imported water supplies are reduced or not available. California is prone to prolonged drought periods due to its highly variable precipitation, which is characterized by multi-year wet or dry periods, making future average precipitation difficult to predict. The Project will reduce PWD's reliance on imported water during drought periods.

Applicant Category and Eligibility

The District is a municipal and industrial services water supplier (Category A) located in Los Angeles County, California, a U.S. Bureau of Reclamation (Reclamation) state.

Evaluation Criteria

Evaluation Criterion A. Severity of Actual or Potential Drought or Water Scarcity Impacts

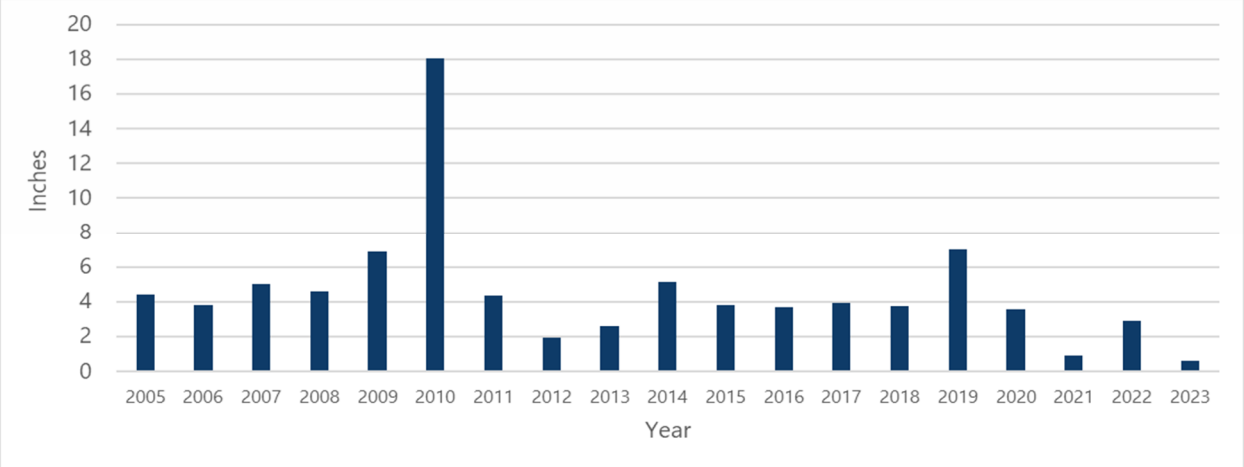
Describe recent, existing, or potential drought or water scarcity conditions in project area.

Is the project in an area that is currently suffering from drought, or which has recently suffered from drought or water scarcity?.

The State of California is currently not experiencing drought conditions according to the U.S. Drought Monitor. However, California has experienced recurring droughts over the last 20 years due to its high precipitation variability, which is reflected in local precipitation data as shown in **Figure 3**. This variability has increased in recent decades and has been linked to atmospheric river storms and drought. Additionally, higher temperatures are causing less precipitation to fall as snow, which accelerates spring melt and diminishes the Sierra Nevada snowpack and snowmelt runoff. California's Sierra Nevada snowpack provides approximately 60 percent of Southern California's water resources (Scott, 2018). The reduced snowpack will make it difficult for the state to meet its water demands because there is not enough runoff to fill the State's reservoirs. According to the Public Policy Institute of California, climate change will continue to make droughts more intense and is expected to result in more variable weather and precipitation patterns, increasing the severity and frequency of droughts.

The State of California has experienced three droughts in the last 20 years: 2007 to 2009, 2012 to 2016, and 2020 to 2022. All three drought periods resulted in declarations of statewide drought emergencies, which called for Californians to reduce their water use. Available data (2005–2023) from the Palmdale Station No. 197 monitoring precipitation reinforces these drought periods, as well as extensions of low precipitation years overlapping the periods.

FIGURE 3: LOCAL ANNUAL PRECIPITATION (2005 – 2023)



Source: California Irrigation Management Information System data provided from Station No. 197, Los Angeles Region, 2005 – 2023

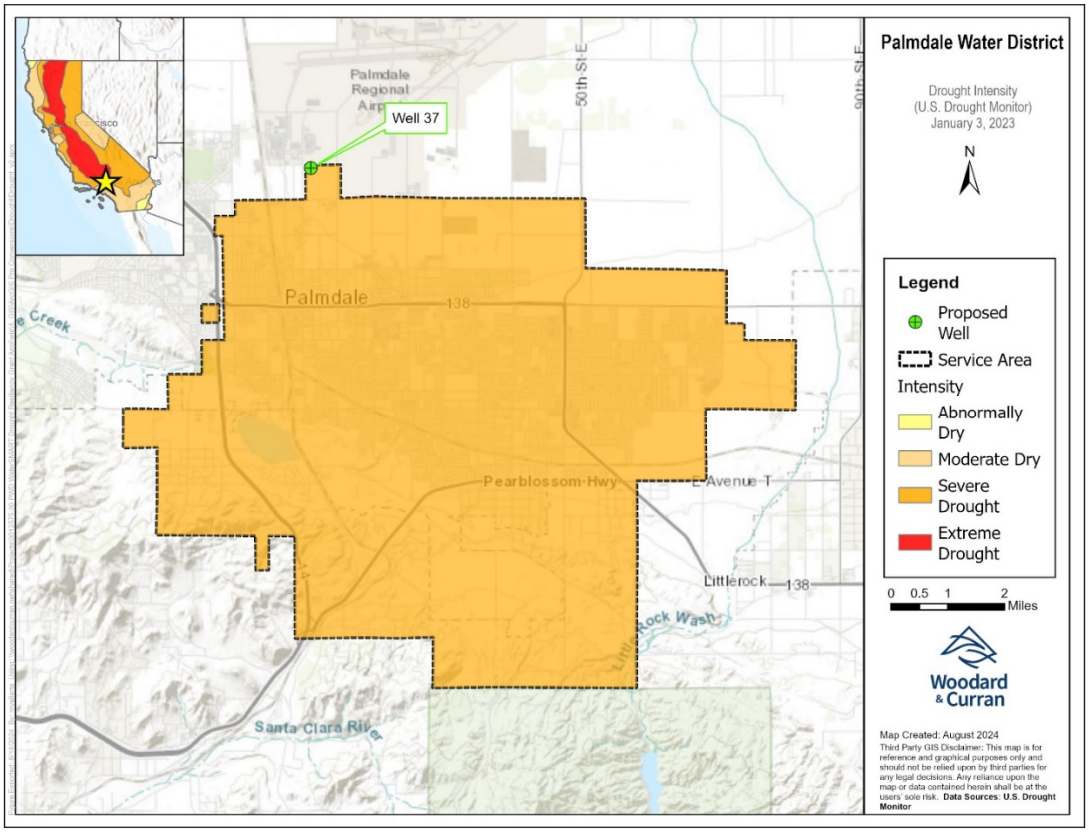
The District is in the western part of the Mojave Desert within the greater Antelope Valley, a region that experiences frequent droughts. Below is a summary of recent historical periods of drought:

- During the 2007-2009 drought, SWP allocations were set at 15 percent.
- During the 2012-2016 drought, SWP deliveries were reduced to 5 percent of allocations statewide in 2014 and to 20 percent of allocations in 2015.
- According to the U.S. Drought Monitor, PWD's service area during the 2020 to 2022 drought experienced severe drought conditions (see **Figure 4**). The 2020 to 2022 drought threatened PWD's water supply reliability namely for imported SWP water.
    - In December 2021, DWR announced that allocations for SWP would focus on health and safety needs for 2022, resulting in a 0 percent allocation to PWD. These drought conditions resulted in PWD's Board of Directors enacting Mandatory Stage 2 of their WSCP in 2022, which limited outdoor watering days and times and increased the water conservation target to 20 percent.
    - In the District's 2020 WSCP, PWD evaluated the water supply reliability assuming a 5-year drought from 2021-2025 and anticipated that demands in years 2021 and 2023 would be greater than supplies. For example, in 2023, PWD estimated 17,475 AF of water available compared to the customer demand projected at 19,620 AFY, leaving PWD with a shortfall of 2,145 AF (an 11 percent shortage).

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.

Due to the severe winter storms in 2022 and early 2023, DWR increased SWP allocations to 100 percent and PWD has since lifted its emergency drought restrictions. Although the emergency drought restrictions have been lifted, California is known to have rapid shifts between weather extremes, which cause both droughts and floods. Following the severe 2012-2016 drought, California experienced several months of heavy precipitation according to a 2018 study published by the Nature Climate Change. This study projected that California would experience a 25 percent to 100 percent increase in extreme weather shifts in this century. Based on this projection, more droughts are anticipated in California's future. Climate change has the potential to affect not only local demand and supplies, but to reduce the amount of water available for import. Warmer temperatures will lead to a higher demand for water within PWD's service area and throughout California. An increase in intensity and frequency of extreme weather events, such as drought, can impact both local and imported supplies. PWD secures the majority of its water supply from SWP, which imports water from the Bay-Delta system. Rising sea levels can increase the risk of damage to the Bay-Delta from storms and erosion of levees which decreases imported water reliability.

FIGURE 4: DROUGHT INTENSITY IN PWD SERVICE AREA (JANUARY 2023)



What are the ongoing or potential drought or water scarcity impacts to specific sectors in the project area if no action is taken and how severe are those impacts? Impacts should be quantified and documented to the extent possible.

Whether there are public health concerns or social concerns associated with current or potential conditions.

The District supplies water to residential, commercial/industrial, landscape irrigation, U.S. Air Force, NASA, several defense contractors, and other sectors. Approximately 80 percent of demand comes from the residential sector, based on average demand data from 2017-2020. Given the potential for reduced water availability in SWP during drought, the reliability of the water supply would be compromised. Through 2050, PWD's SWP allocation is projected to be between 51 percent and 56 percent. PWD anticipates demands will exceed existing supplies in certain single and multiple-dry year conditions. Since the residential sector has the highest water demand, it is anticipated to bear the brunt of the drought impacts. Residential uses require large volumes for daily activities, such as drinking, cooking, and bathing. As drought conditions persist, residents will face restrictions on water use, and reduced water availability could lead to higher water rates, which would be a financial burden on households. The District's service area is also categorized as 46 percent disadvantaged by geographic area and 69 percent by

population (75,787 out of 109,305) based on the information presented below in *Evaluation Criterion E*. With an average median household income within PWD's service area of $55,129, and the lower-bound medium household income of $48,135, drought conditions pose an increased burden on communities that must choose between competing demands on their more limited resources.

Additionally, drought conditions could increase the risk of wildfires due to the dry, hot weather and dried out vegetation, providing the necessary fuel for wildfires to spread rapidly. According to PWD's Final 2022 Local Hazard Mitigation Plan (LHMP), areas within PWD's service area and surrounding areas have had a history of wildfires. The Final 2022 LHMP lists PWD's infrastructure that is vulnerable to wildfires and other hazards, such as tank and booster stations, wells, and service connections from the SWP.

Whether there are ongoing or potential environmental impacts (e.g., impacts to endangered, threatened or candidate species or habitat).

In the Bay-Delta, natural flows are altered by the operation of the SWP, impacting aquatic species' health, including the Delta Smelt. The Bay-Delta Conservation Plan, developed as a plan for habitat conservation in the Delta, notes that various habitat types exist in the area including tidal and nontidal wetlands, floodplains, and riparian habitat. Additionally, species such as the Delta Smelt become entrained in the pumps used to bring flows to Southern California. The Delta Smelt was listed as "threatened" under the Federal Endangered Species Act and the California Endangered Species Act (CESA) in 1993, and in 2009, the CESA status was changed to "endangered". Imported water demand during statewide droughts when Delta flows are reduced will continue to impact the Delta pumping during the drought, thus impairing the condition of the Delta Smelt habitat.

Whether there are local or economic losses associated with current water conditions that are ongoing, occurred in the past, or could occur in the future.

Drought conditions can significantly affect the reliability and affordability of water supply. The District currently serves nearly 28,000 connections in multiple sectors, including residential, commercial/industrial, Federal, and landscape irrigation. According to the 2020 UWMP, approximately 80 percent of PWD's demand comes from the residential demand category, while 20 percent comes from commercial, industrial, landscape irrigation, sales to other agencies, non-revenue, and others. During periods of drought, there is always the risk that residential customers will not have adequate supplies for drinking water and other critical household uses. Similarly, commercial uses, including retail businesses, can experience a loss of revenue during droughts. Taken together, these potential impacts of drought can severely affect the quality of life for residents through household reductions and economic losses in the form of salaries and tax revenue. The District also supplies water to various businesses, such as construction and retail, in the Antelope Valley. According to the 2023 Roundtable Report for Antelope Valley, the City

of Palmdale's business sectors, which include autos and transportation, building, federal government (Department of Defense Plant 42) and contractors, and construction, restaurant and hotels etc., generated approximately $2.9 billion. The business sector relies heavily on water for various operational needs, including manufacturing processes and cooling systems. As drought conditions persist, businesses could encounter disruptions in production processes, which could reduce output, resulting in economic losses.

Whether there are other water-related impacts not identified above (e.g., tensions over water that could result in a water-related crisis or conflict).

Since the adjudication of the AVGB, there has been no crisis, conflict, frequent tension, or litigation over groundwater in the AVGB. The Antelope Valley Watermaster was created to address issues related to the management and regulation of groundwater resources in the AVGB. The 2023 SWRP shows a 56 percent water supply shortage probability in 2025 and 100 percent water supply shortage probability in 2030. There is always the potential that severe, prolonged drought conditions could strain the demands on the AVGB and cause tension among the parties to the Judgement.

Evaluation Criterion B. Project Benefits

Sub-Criterion B1. Project Benefits

What is the estimated quantity of additional supply the project will provide and how was this estimate calculated? Clearly state quantity in AFY as average annual benefit over ten years.

The Well 37 Project will provide 1,936 AFY of additional supplies. This quantity was calculated based on the recommended design pumping rate of 1,500 gpm (or 2,420 AFY) from Well 37 operated for drought supplies, estimated at 80 percent of the time. While future groundwater supplies are anticipated to be available in all years, PWD's total projected water supplies would vary by water year types due to projected cutbacks to SWP allocations of imported surface water. The Project will achieve the most benefits during dry years when PWD's SWP allocations are expected to be reduced.

What percentage of the total water supply does the project's water yield represent? How was this estimate calculated? It is recommended to use your 10-year average that was presented in the Executive Summary to calculate this percentage.

The estimated quantity of water the Project will generate is approximately 1,936 AFY. This quantity was calculated based on the recommended design pumping rate of 1,500 gpm from Well 37 and operated for drought supply. The Project accounts for 9.54 percent (**Table 2**) of the 10-year average annual supply per Table 1. This quantity of groundwater supply will be available in all year types (i.e., dry, average, and wet years) as an average annual benefit over ten years but the intent is that it will only be extracted during dry years or drought periods.

TABLE 2: PROJECT WATER YIELD AND PERCENTAGE OF TOTAL WATER SUPPLY

Total Project Water Yield in AFY	1,936
Average Annual Water Supply in AFY	20,291.4
Percentage Yield	9.54%

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.

For many years, PWD has proactively developed local water sources to help meet the needs of customers. Imported water supplies are particularly vulnerable to drought and are becoming increasingly unreliable as a result of factors such as climate change. During dry conditions, imported water deliveries from SWP are reduced to conserve water supplies. For example, during the historically dry months of January and February in 2022, DWR reduced SWP allocations to 5 percent of requested supplies at a time when local supplies were stretched thin and water demand rose because of the ongoing statewide drought. In 2022, PWD's groundwater production was 8,540 AF, which was higher-than-normal to offset lower imported water availability. During future drought periods, it is anticipated that SWP water supplies will be similarly limited.

Groundwater is a critical component of PWD's water supply portfolio. The Well 37 Project will build long-term water supply reliability and resilience to drought as the new well will increase PWD's groundwater pumping capacity and reduce reliance on the variable, unreliable imported SWP supplies. The well will ensure the groundwater will be pumped sustainably per the basin's adjudication. In addition, when the Pure Water AV Project comes online, the well can access the purified water stored from injection wells and extract the water during dry years, thus ensuring reliable high-quality water when imported water is limited, unreliable, or unavailable. Unlike imported water that is directly affected by hydrologic conditions, groundwater supply is more drought resistant as it takes longer for the major deep water supply aquifers to be impacted by weather fluctuations, and thus, provides a buffer against precipitation variability.

How many years will the project continue to provide benefits?

With the use of ASTM A778 304L stainless-steel materials, the well will have an expected service life of approximately 75 years and will provide benefits for that duration.

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

Groundwater is a critical component of PWD's water supply portfolio. The Well 37 Project will build long-term water supply reliability and resilience to drought as the new well will increase PWD's groundwater pumping capacity and reduce reliance on the variable,

unreliable imported SWP supplies. The well will ensure the groundwater will be pumped sustainably per the basin's adjudication. In addition, when the Pure Water AV Project comes online, the well can access the high-quality purified water stored from injection wells and extract the water during dry years, thus ensuring reliable water when imported water is limited, unreliable, or unavailable.

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

The new well will provide an additional, local, reliable water supply source and will be critical to alleviating the dependence on imported water, particularly in times of drought. In addition to increasing drought resilience of PWD's water supply, the Well 37 Project will be useful as PWD moves forward with its long-term water supply project of groundwater augmentation.

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

The estimated capacity of Well 37 is 1,500 gpm, or approximately 2,420 AFY. Specific capacity and pumping test data were compiled for selected production wells within the vicinity of the well site and were utilized to provide an indication of the potential yield of the aquifer system around the proposed well area. Instantaneous discharge rates for wells within one mile of the proposed well site range from 300 to 2,000 gpm (Technical Memorandum Well Site Assessment for Well Nos. 36 and 37, **Attachment B**). **Table 3** presents specific capacity data for the Project area ranging from 3 to 80 gpm per foot (gpm/ft), suggesting aquifer transmissivities ranging from 5,000 to 172,000 gallons per day per foot (gpd/ft), and averaging approximately 91,500 gpd/ft. These specific capacity and transmissivity values in the Project area indicate the presence of productive aquifers of good yield within the vicinity of the proposed well site.

TABLE 3: SUMMARY OF SELECTED WELL CONSTRUCTION DETAILS WITHIN THE VICINITY OF THE WELL 37 PROJECT

Well Name	Well Depth (feet bgs)	Pumping Rate (gpm)	Specific Capacity (gpm/ft)	Aquifer Transmissivity (gpd/ft)
2A	900	1,500	60	126,000
3A	848	1,544	48	99,000
4A	830	499	26	51,000
6A	1,010	296	3	5,000
7A	920	2,000	37	113,000
8A	960	1,977	68	145,000
11A	900	1,161	40	81,000

Well Name	Well Depth (feet bgs)	Pumping Rate (gpm)	Specific Capacity (gpm/ft)	Aquifer Transmissivity (gpd/ft)
14A	900	1,479	80	172,000
15	800	1,750	40	81,000
23A	840	743	22	42,000

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

Well 37 will extract an average of 1,936 AFY. Prior to the adjudication of the AVGB, PWD had the capacity to pump 12,000 AFY. Since the Judgement, PWD has remained in compliance. The Project will increase PWD's groundwater pumping capacity from 12,000 AFY to 13,936 AFY. However, PWD will not exceed their groundwater right of 8,440 AFY to remain compliant with the Judgement.

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

Well 37 will be used as the primary water supply during drought conditions to meet the demand when there is a lack of surface water supplies and will increase the 12,000 AFY of total groundwater pumping capacity to 13,936 AFY. Although PWD would have the capacity to pump 13,936 AFY of groundwater with the new well, they will not exceed their groundwater right of 8,440 AFY. In addition, PWD will utilize Well 37 when there is a lack of surface supplies during non-dry years to ensure that their service area demands are met.

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

Yes, PWD participates in the Upper Amargosa Creek Recharge Project. The Upper Amargosa Creek Recharge Project is a joint effort between PWD, the City of Palmdale, Antelope Valley-East Kern (AVEK), and the Los Angeles County Waterworks District 40 to convey water from the California Aqueduct to a series of recharge ponds and replenish the AVGB. Currently, PWD has a right to recharge slightly over 200 AFY and is contributing to the Upper Amargosa Creek Recharge Project. Additionally, in 2023, California's Executive Order (EO) N-4-23 eased permitting requirements for water agencies to store water underground. This prompted PWD and AVEK to store approximately 6,000 AF of water at Littlerock Creek via the Littlerock Creek Recharge Pilot Project. Given the success of the pilot project, PWD is anticipated to pursue this as a permanent recharge project.

The District is one of the parties involved in the adjudication of groundwater rights for the AVGB that began in 2004 to prevent further declines in groundwater levels. The

adjudication was completed in 2015 and determined the AVGB was in a state of overdraft and define the AVGB boundaries, established a safe yield, and quantified allowable groundwater production. In accordance with the adjudication, the Antelope Valley Watermaster was formed to implement the Judgement, administer the adjudicated water rights, and manage the groundwater resources within the adjudicated portion of the Antelope Valley.

The AVGB underlies an extensive alluvial valley in the western Mojave Desert. The AVGB is composed of three large sediment-filled structural basins separated by extensively faulted, elevated bedrock. Natural recharge also contributes to a large source of recharge to the AVGB and occurs primarily from percolation of perennial runoff from the surrounding mountains and hills (Durbin, 1978; Todd Groundwater, 2020; Siade et al, 2014). The effective base of the upper principal aquifer is anticipated to occur at a depth of 800 to 1,000 feet in the vicinity of the proposed well site. Based on recent historical water levels measured at nearby Well 15, the depth to groundwater in the vicinity of the proposed well site is anticipated to range from between 570 to 646 feet within the upper principal aquifer. The design for the proposed water supply well is shown in **Table 4**.

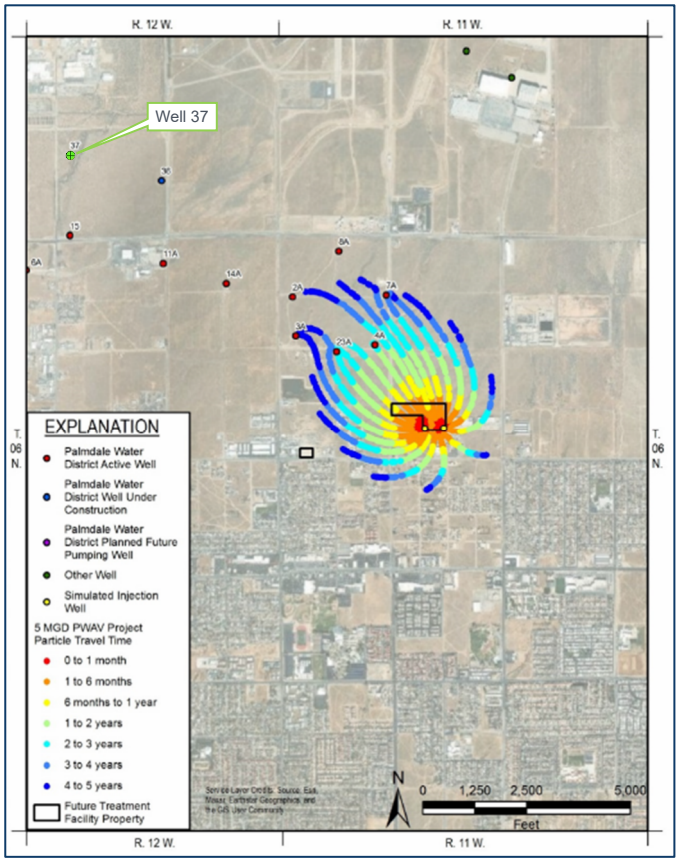
TABLE 4: PROPOSED WELL DESIGN DETAILS

Depth Interval (feet bgs)	Borehole Diameter (inches)	Casing Diameter (inches)	Casing Wall Thickness (inches)
0.5-50	48	36	3/8
0-600	34	-	-
600-603	34	-	-
603-1,030	34/30	-	-
+1 -610	34	3	Sch. 40
+1-698*	34	2	Sch. 40
+2-620	34	20 ID	3/8
620-700	34	20 ID	5/16
700-1,000	30	20 ID	5/16
1,000-1,010	30	20 ID	5/17
1,010-1,030	30	-	-

**The anticipated depth of the sounding tube entrance box is 696 to 698 feet*

As mentioned, the Pure Water AV Project will construct a new injection well to be used for the injection of purified water. The location of the injection well has been confirmed at the same site as the full scale AWTP. In the technical memorandum Summary of Numerical Groundwater, Modeling Results, prepared for the Pure Water AV Project, (**Attachment C**) indicates that Well 37 would be in the path of travel of the injected water as seen in **Figure 5**.

FIGURE 5: PURE WATER AV GROUNDWATER MODELING RESULTS – SIMULATED PARTICLE PATH LINES AND ESTIMATED UNDERGROUND RETENTION TIMES



Source: Stantec and Montogomery & Associates, 2023. Summary of Numerical Groundwater Model Results – Pure Water Antelope Valley

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.

The District has been pumping in compliance with the adjudication of the AVGB and will continue operations within its water right allocation. The Well 37 Project will support the overall water sustainability in the region and sustainable management of the local groundwater supplies. The new well will be monitored for groundwater levels every month to ensure the aquifer is managed sustainably and the well will not cause overdraft. In addition, as part of the implementation of mitigation measures as indicated in the Water System Master Plan (WSMP) Final Program Environmental Impact Report (PEIR), PWD will coordinate with the Antelope Valley Watermaster engineer to determine operational criteria for the new well to ensure that the well does not result in a net deficit of aquifer volume or a lowering of the groundwater table below permitted use, thus mitigating any significant adverse impacts to other parties that have rights to pump in the AVGB.

The District participates in the groundwater monitoring associated with the U.S. Geological Survey (USGS) and California Statewide Groundwater Elevation Monitoring (CASGEM) programs through the AV State Water Contractors Association. The District is a party to the adjudication and "cannot bring material injury to the basin" A monitoring well and tracer study be required as part of the Title 22 permit for the Project to show travel time and validate the groundwater modeling done from the planning stage.

Sub-Criterion B.3. Additional Project Benefits

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?

No. The Well 37 Project does not include other natural hazard risk reductions for hazards such as wildfires or floods.

Will the proposed project establish and use a renewable energy source?

No. The Well 37 Project does not establish and use a renewable energy source.

Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation?

No. The Well 37 Project will not reduce greenhouse gas (GHG) emissions by sequestering carbon in soils, grasses, trees, and other vegetation.

Does project include green/sustainable infrastructure to improve climate resilience?

No. The Well 37 Project does not include green or sustainable infrastructure to improve community climate resiliency.

Does project seek to reduce or mitigate climate pollutions such as air or water pollution?

Yes. While drought condition impacts on various water supplies can vary, it is possible Well 37 will provide drought resiliency with little or no reduction in SWP supply. Overall, the Well 37 Project would generate a smaller greenhouse footprint compared to imported SWP water supplies. Importing water over long distances is an energy-intensive process and releases carbon emissions that are the root cause of climate change. The 2020 Annual Review of the SWP includes data on annual water deliveries, hydropower generated, and power used from 2020 – 2021 (California Water Commission, 2021). An analysis of the relationship between water delivered and power used showed that on average, 2.71 Megawatt hours (MWh) of energy are used for every AF of water delivered by the SWP. An average of 65 percent of the power used by the SWP is generated from hydropower from the SWP. Thus, with Well 37 operational and the 1,936 AF of water offsets needed deliveries from the SWP, 5,249 MWh of energy would be saved, 1,837 MWh of which come

from non-hydropower sources that contribute to GHG emissions. The national weighted average carbon dioxide marginal emission rate for delivered electricity in 2019 was 1,562 pounds CO_2 per MWh which accounts for losses during transmission and distribution (U.S. EPA, 2020). Thus, the potential GHG emission reductions from offsetting 1,936 AF of SWP water deliveries would be 1,302 metric tons of CO_2.

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?

Yes, the Well 37 Project will serve to protect water supplies and associated uses by improving the long-term water supply reliability and maintaining the local groundwater pumping capacity. As the Project withdraws groundwater, PWD will operate within its pumping rights in support of sustainable management of sources and will reduce reliance on imported supplies from the SWP. With implementation of a mitigation measure similar to Mitigation Measure HYD-3 from the PEIR Amendment for Well 36, PWD will coordinate with the Antelope Valley Watermaster Engineer to determine operational criteria for the well to ensure that the well does not result in a net deficit of aquifer volume or a lowering of the groundwater table below permitted use that could result in land subsidence.

Does the proposed project contribute to climate change resiliency in other ways not described?

Yes, the Well 37 Project will contribute to climate change resiliency by providing a local, reliable water supply to meet the service area's demand. Water demand in the PWD service area is primarily met with imported water from the SWP and groundwater. Imported water supplies are becoming increasingly unreliable as a result of climate change. Although California is already subject to highly variable precipitation patterns, climate change will lead to intensified patterns, increasing the severity and frequency of droughts. Drought conditions can lead to severe SWP cutbacks. In December 2021, for example, SWP deliveries were reduced to 0 percent of allocations for 2022. The allocation was increased to 15 percent in January 2022 due to the December storms, but they were reduced back to 5 percent in March 2022 due to a historically dry January and February with no significant storms having been forecasted in March 2022. The Project will contribute to climate change resiliency by increasing PWD's pumping capacity, making groundwater supplies available during times of drought.

Sub-Criterion B.3.b. Ecological Benefits

Does the project seek to improve the ecological climate change resiliency of a wetland, river, or stream in the face of climate change?

No. The Well 37 Project does not seek to improve the ecological climate change resiliency of a wetland, river, or stream in the face of climate change.

Identify ecological benefits expected to result from project implementation.

No. The Well 37 Project will not result in specified ecological benefits.

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.

Yes, while it is not certain that the Project will significantly improve the Delta Smelt status, reducing imported water demand during statewide droughts when Delta flows are reduced will reduce the impact of Delta pumping during the drought, thus improving the condition of the Delta Smelt habitat in the Bay-Delta. Species such as the Delta Smelt become entrained in the pumps used to bring flows to Southern California. The Delta Smelt was listed as "threatened" under the Federal Endangered Species Act and the CESA in 1993, and in 2009, CESA status was changed to "endangered".

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.

Yes. The District currently serves nearly 28,000 connections in multiple sectors, including residential, commercial/industrial, Federal and landscape irrigation. According to the 2020 Urban Water Management Plan, approximately 80 percent of PWD's demand comes from the residential demand category, while 20 percent comes from commercial, industrial, landscape irrigation, sales to other agencies, non-revenue, and other. The Project will improve water supply reliability during droughts for all PWD customers. Residential customers will have adequate supplies for drinking water and other critical household uses. Commercial uses include retail businesses, which can experience a loss of revenue during droughts. The Project will ensure that retail businesses have enough water supply to continue the daily operations of their businesses and ensure revenue even during droughts. The Project will provide supply redundancy and operational flexibility to meet demand in all sectors by providing reliable and affordable supply during droughts.

Will the project benefit a larger initiative to address sustainability?

Yes. The AVGB was exempted from the 2014 Sustainable Groundwater Management Act because the basin was adjudicated. The AVGB has had a history of over-pumping due to a combination of urban growth and increased irrigated acreage (Todd Groundwater, 2023). In 2011, the Court ruled that the AVGB was in overdraft and required a physical solution to bring the basin into balance. The AVGB adjudication, finalized in 2015, established respective water rights among groundwater producers, and ordered a ramp down of production to the native basin safe yield. The Well 37 Project—in coordination with recharge via injection wells from the Pure Water AV Project—will support the long-term sustainable management of the local groundwater supplies and reduce groundwater level declines and subsidence.

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

Yes. Since the adjudication of the AVGB, there has been no crisis, conflict, frequent tension, or litigation over groundwater in the AVGB. Additionally, PWD has been pumping in compliance with the adjudication of the AVGB since 2016 and will continue operations of the existing wells and the new well within its water rights. The Antelope Valley Watermaster was also created to address issues related to the management and regulation of groundwater resources in the AVGB. Additionally, the Project will provide an additional amount of water supply during times of drought and will help prevent water-related crisis during water supply shortages.

Evaluation Criterion C. Planning and Preparedness

Plan Description and Objective: Is your proposed project supported by a specific planning document? If so, identify the plan by name and describe the plan, including:

When was the plan developed? How often is it updated?

The Well 37 Project is supported by the PWD SWRP. The first SWRP was prepared in 2010. The update of the SWRP began in 2022 and was completed in 2023. The SWRP is a "living" document and will be revisited regularly and updated as needed. The SWRP is meant to serve as a guide to the PWD Board of Directors and staff as PWD develops and updates a variety of other planning documents including its urban water management plan, water system plan, financial and other planning documents.

What is the purpose and objective of the plan?

The District prepared and has updated its SWRP to develop a sound water supply strategy to meet the demands of both current and future customers through the year 2050 due to water supply uncertainties in the State and continued growth. The objective of the SWRP is to provide answers to key questions, including the following:

- How much water will PWD need to meet current and future demands?
- Where will the water come from?
- What facilities will be needed?
- What will it cost and where will the money come from?
- What happens when circumstances change?

What is the geographic scope of the plan?

The PWD SWRP covers the entire geographic area of the District's service area.

Explain how the applicable plan addresses drought.

The District's updated 2023 SWRP addresses drought by preparing a long-term water supply strategy that meets the needs of PWD's customers under water supply

uncertainties due to prolonged periods of drought. PWD relies on a combination of groundwater, local surface water, imported water, and recycled water to meet demand. The SWRP estimates supply shortages are expected to occur every year starting in 2030.

Describe the plan's drought-focused elements.

Analysis Methodology and Climate Change

The SWRP provides a listing of uncertainties and potential impacts that may influence the way the SWRP is implemented, as well as responses that PWD may take to address the uncertainties. One critical uncertainty identified is climate change. The potential impacts include a reduction in reliability of imported supplies, creation of more variability in local precipitation, and an increase in demand due to increasing temperatures. The District's response is to pursue strategies to increase local supply sources and increase local storage of supplies. As part of developing this SWRP, tools were developed that can inform implementation of the preferred alternative. External conditions in the context of baseline assessment are related to hydrologic and weather variability, including climate change impacts, and how they affect demand and supply availability.

A systems model was developed for PWD using Water Evaluation and Planning (WEAP) software, an integrated water resources planning tool used for visualizing and dynamically simulating complex systems. This systems model evaluates PWD's ability to meet future service area needs through 2050.

The DWR 2021 Delivery Capability Report (DCR) estimates the near and long-term availability of SWP water supplies based on a computer model that simulates monthly operations of the SWP system. Climate change is expected to increase outdoor water demand due to higher temperatures and higher evapotranspiration rates. In the SWRP, the District used the prepared sets of adjustment factors DWR developed to be used to adjust precipitation and evapotranspiration for use in water supply planning and are downscaled from Global Climate Models (GCMs) to allow for regional planning.

Drought-Focused Elements

The District evaluated several water resources options available to address projected water supply shortages, including imported water, groundwater, recycled water, local surface water, banking, and conservation. The District evaluated these 11 options with respect to a variety of factors and multiple criteria, which included "Drought Reliability – Frequency" and "Drought Reliability – Depth" , among many other criteria. Drought Reliability – Frequency quantitatively considered the potential likelihood of shortages in 2050 and Drought Reliability – Depth considered the average depth of shortage during droughts in 2050. In general, groundwater and recycled water supplies tend to be less vulnerable to drought conditions than imported and local surface water supplies. As a

result, alternatives that incorporate recycled water injection into the AVGB reduced the potential likelihood of shortages during drought conditions. These alternatives tended to score higher than alternatives that did not incorporate recycled water injection.

Adaptive Management

Implementation of the SWRP will be a long-term process and is expected to face uncertainty in the future. While the SWRP was developed under certain assumptions that account for uncertainty, conditions may change and alter how the SWRP is implemented. The District will apply an adaptive management approach as a tool to ensure successful implementation of the SWRP. Adaptive management is a flexible management strategy that employs monitoring and experience to inform decision making in the face of uncertainty. Adaptive management will allow PWD to periodically assess how internal and external conditions have changed and determine if and how implementation should change to achieve SWRP goals and objectives.

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

Who was involved in developing the plan? Identify specific entities or organizations and describe their involvement.

As part of the development of the SWRP, the District created a *Strategic Water Resource Plan Update Engagement Plan* (Engagement Plan) to identify types and specific stakeholders, as well as to design a process for engagement. The SWRP development also included public outreach through website content development, press releases, social media content, and talking point/key message development through the planning process. Understanding various types of stakeholders is important in understanding engagement needs. Some stakeholders simply need to be informed. Other stakeholders that may have insight regarding or be impacted by the SWRP. District staff has identified the following types of stakeholders. Key stakeholders included other water agencies, such as AVEK; sanitation districts, including Los Angeles County Sanitation District No. 20; City of Palmdale; elected officials, community members, and engaged citizens. **Table 5** below outlines stakeholder descriptions and involvement from the Engagement Plan.

TABLE 5: STAKEHOLDERS AND ENGAGEMENT PROCESS

Type of Stakeholder	Stakeholders Involved	Engagement Process
Type 1: *Those PWD needs information from, will have data exchanges with, and could provide potential project development feedback*	Other water agencies, sanitation districts, Antelope Valley Water Master engineer	One-on-one conversations with PWD staff and the plan development team as needed

Type 2: *Those involved in key decisions, will weigh options, will provide support or direction*	Internal PWD leadership; Board of Directors subcommittees	Meeting helped with appropriate PWD leaders at key applicable decision points
Type 3: *Those who will provide input or comments*	Ambassador Academy (community members), Chambers of Commerce, AV Edge (business group), City of Palmdale	Presented a summarized plan during a public workshop and had an opportunity to submit comments
Type 4: *Those who need to be informed*	Engaged citizens; social media followers including Nextdoor; customers (newsletters); news media; local school districts (personnel); employees	Informed of the decisions and actions of the effort as the project concluded

Was the plan prepared with input from stakeholders with diverse interests? Describe the process used for interested stakeholders to provide input during the development of the plan.

Yes, the PWD SWRP was developed through a collaborative process with a diverse group of stakeholders. PWD identified key stakeholders that may have insight regarding or be impacted by the PWD SWRP and shared progress and milestones throughout the planning process. As mentioned above (and described in more detail in Table 5) stakeholders included other water agencies, sanitation districts, municipalities, District, local, state, and federal elected officials, business associations and groups, and a range of other community members and engaged citizens.

PWD facilitated stakeholder meetings to solicit feedback during different development stages of the SWRP. Stakeholders were encouraged to provide input during the discussion portion of the meetings. In addition, PWD also facilitated a public workshop that reviewed the contents of the SWRP. Members of the public were also invited to submit comments via email, though none were received.

If the plan was prepared by an entity other than the applicant, describe whether and how the applicant was involved in the development of the plan or why they were not part of the planning process.

Not applicable—the PWD SWRP was prepared by the District.

Plan Support for Project: Describe to what extent the proposed project is supported by the identified plan, including:

Does the plan identify the proposed project by name and location as a potential mitigation or water management action?

The SWRP identified the need for production wells as part of the plan's Preferred Alternative (11). As noted previously, the location for Well 37 was identified downgradient from the site of the full scale AWTP, in the technical memorandum Summary of Numerical Groundwater, Modeling Results, prepared for the Pure Water AV Project (**Attachment C**). To maximize benefits, Well 37 will be in the path of travel of the injected water (**Figure 5)**.

The SWRP evaluated several water resources options available to address projected water supply shortages, including imported water, groundwater, recycled water, local surface water, banking, and conservation. This process resulted in 11 alternatives that were evaluated based on their ability to meet complex water resources challenges and to achieve the goals of the SWRP, which was to develop a sound water supply strategy to meet water demands through the year 2050. A multi-criteria evaluation method was used to compare the alternatives' ability to meet the goals of the SWRP, which included drought reliability, cost efficiency, and water quality, among many other criteria. Alternative 11 ranked the highest and it was the preferred alternative since it maximizes local supplies that are less susceptible to drought impacts, provides facilities to meet demand and increases storage of water in the AVGB to meet demands during time of imported water shortage. The Well 37 Project is a component of Alternative 11 and will construct a new groundwater production well to extract water stored in the AVGB.

Explain how the proposed project was prioritized in the plan over other potential projects/measures.

The Well 37 Project is included as part of the Preferred Alternative (Alternative 11) as prioritized among all the alternatives considered. Evaluation criteria and associated metrics were developed based on the various objectives established for the SWRP. The evaluation criteria are both quantitative and qualitative. For the purposes of this SWRP, all criteria are considered equally important for most decision-makers and are therefore equally weighed to evaluate the alternatives. **Table 6** provides the nine quantitative and qualitative evaluation criteria.

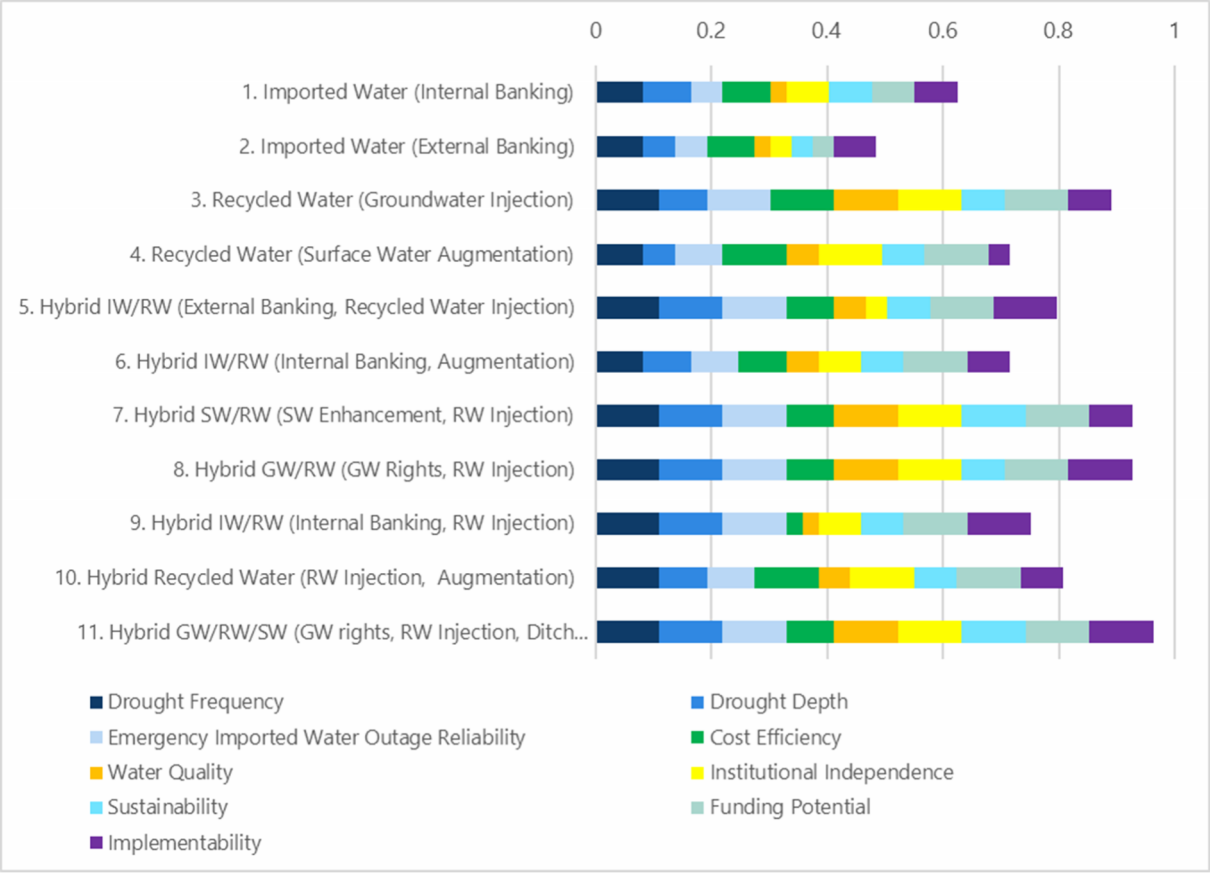
TABLE 6: PROJECT ALTERNATIVES EVALUATION CRITERIA

Quantitative	Qualitative
Drought Reliability – Frequency	Institutional Independence
Drought Reliability – Depth	Sustainability
Emergency Imported Water Outage Reliability	Funding Potential
Cost Efficiency	Implementability
Water Quality	

The SWRP includes a summary of the scores for each of the 11 alternatives under each of the nine evaluation criteria. In each case, the points for each criterion were multiplied by

the criteria weight for each criterion. With all criteria weighted equally, the differences between alternatives depended on which one was more balanced and higher ranked in more criteria. **Figure 6** below summarizes the evaluation criteria scoring results and identifies the Preferred Alternative (Alternative 11).

FIGURE 6: ALTERNATIVES SCORES



The Preferred Alternative (Alternative 11) selected through the SWRP process is one which maximizes local supplies and facilities to meet future growth and increases storage of water in the AVGB. The Preferred Alternative includes as one of its strategies the installation of new production and injection wells. The alternative directs PWD to proceed with installing additional well capacity to both pump stored water during years when SWP allocations are low and meet demand growth. To offset increased production, PWD will proceed with installing injection wells to be used for the injection of purified water from the Pure Water AV Project.

If the proposed project is not specifically identified in the plan.

Not applicable—the Well 37 Project is specifically identified in the SWRP as part of the Preferred Alternative (Alternative 11) to address drought and other areas of evaluation.

Evaluation Criterion 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.

The Well 37 Project will be completed and operational in three years. A detailed project implementation schedule for each required task for drilling and completion of the production well is outlined in **Table 7** below.

TABLE 7: WELL 37 PROJECT SCHEDULE

Tasks *Milestones*	**Start Date**	**Completion Date**
Task 1: Project Management	**October 2025**	**May 2028**
Milestone 1A: *Invoices and Associated Backup Documentation*	*October 2025*	*May 2028*
Milestone 1B: *Reporting*	*October 2025*	*May 2028*
Task 2: Environmental Compliance	**October 2025**	**August 2026**
Milestone 2A: *California Environmental Quality Act*	October 2025	April 2026
Milestone 2B: *Amendment to the Water Master Plan Programmatic Environmental Impact Report*	October 2025	April 2026
Milestone 2C: *Finding of No Significant Impact (FONSI)*	April 2026	August 2026
Task 3: Permitting and Approvals	**October 2025**	**August 2026**
Milestone 3A: *Monitoring of Permit Approval Process*	October 2025	August 2026
Task 4: Design	**October 2025**	**August 2026**
Milestone 4A: *Preliminary Design Report*	October 2025	December 2025
Milestone 4B: *60% Design*	January 2026	March 2026
Milestone 4C: *90% Design*	April 2026	June 2026
Milestone 4D: *100% Design*	July 2026	August 2026
Task 5: Contract Bidding	**August 2026**	**December 2026**
Milestone 5A: *Bid Documents*	August 2026	August 2026
Milestone 5B: *Project Advertisement*	September 2026	November 2026
Milestone 5C: *Award of Contract*	December 2026	December 2026
Milestone 5D: *Notice to Proceed*	December 2026	December 2026
Task 6: Construction	**January 2027**	**April 2028**
Milestone 6A: *Pre-construction Meeting*	January 2027	January 2027

Milestone 6B: *Contractor Mobilization*	January 2027	January 2027
Milestone 6C: *Substantial Completion of Facilities*	February 2028	March 2028
Milestone 6D: *Commissioning/Start-up*	March 2028	April 2028
Task 7: Closeout	**April 2028**	**May 2028**
Milestone 7A: *Notice of Substantial Completion*	April 2028	May 2028
Milestone 7B: *Initiation and Completion of the Punch List*	April 2028	May 2028
Milestone 7C: *Contract Record Drawings*	April 2028	May 2028

Describe any permits or approvals that will be required. 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.

Table 8 lists required permits and approvals for the proposed Well 37 Project and the status of the approval process. The District is in the process of obtaining all the necessary permits for the Project. An Environmental Impact Report (EIR) has been completed, but an amendment will need to be issued to be compliant with the National Environmental Policy Act (NEPA). Los Angeles County will process the well drilling permit for Well 37 in April 2026. The District will submit a permit amendment application for Well 37 upon review and completion of 50-percent design plans. Construction of the proposed well will be completed in accordance with DWR California Well Standards and will comply with conditions set by the County of Los Angeles well permit, ensuring well structural stability to the maximum extent possible. With implementation of mitigation measures, geologic instability impacts would be less than significant for long-term wells.

The proposed Project will have a land disturbance of less than one acre. Prior to construction, PWD's hired well drilling contractor will apply for the listed Well Permit and Drilling Permit. Waste fluids generated during development and testing of the new well must be legally disposed of at designated discharge points by means of temporary above-ground piping. Waste waters during testing would be conveyed to a designated discharge point, either the percolation basin (for low flows) or an unlined drainage channel north of the Project site in accordance with a permit with the Regional Water Quality Control Board. Additionally, it will be necessary to investigate the need for a National Pollutant Discharge Elimination System (NPDES) permit to allow discharges to land surface, and to obtain encroachment and/or Right-of-Entry permits from the City of Palmdale to facilitate installation of temporary conveyance piping to the discharge point. The location of the proposed well within the Project site currently meets all applicable minimum setback requirements as stipulated by the State Water Board DDW and the County of Los Angeles.

TABLE 8: SUMMARY OF REQUIRED PERMITS AND APPROVALS

Permitting Agency	Type of Permit or Approval	Regulated Activity	Status
Federal			
U.S. Bureau of Reclamation	FONSI	Environmental	Start April 2026
State			
State of California	EIR/CEQA	Environmental	PEIR Amendment Well 37 NOD – April 2026 CEQA Well 37 NOD – April 2026
State Water Resources Control Board	NPDES Construction General Permit/SWPPP Approval	Permit: Land disturbance greater than 1 acre	Likely not needed; however, final determination will be made as design progresses
State Water Resources Control Board	Water Supply Permit Amendment	—	Well 37 – Permit Amendment December 2025
Regional			
Regional Water Quality Control Board	General Permit for Construction Discharges	Permit: Discharge requirements during construction and testing	Exempt
Antelope Valley Watermaster	New Extraction Point	Extraction from the Antelope Valley Groundwater Basin	April 2026
Los Angeles County	Well Drilling Permit	Protection of the Groundwater Basin	April 2026

Identify and describe any engineering or design work performed specifically in support of the proposed project.

PWD completed the Technical Memorandum Well Site Assessment Well Nos. 36 and 37 for the Project in November 2020 (**Attachment D**) to assess the suitability of the Project site for installation of new groundwater production wells. Well 37 design is anticipated to begin in October 2025 and the final design is expected to be complete by August 2026.

Describe any land purchases that must occur before the project can be implemented, and the status of the purchase.

The drilling and construction activities will occur on land owned by PWD. It is anticipated that no land purchases are required for the Well 37 Project**.**

If the project is completely or partially located on Federal land or at a Federal facility.

Not applicable. The Project is not located on Federal land, either in whole or in part.

Describe any new policies or administrative actions required to implement the project.

No new policies or administrative actions are required to implement the Well 37 Project.

Evaluation Criterion E. Presidential and Department of the Interior Priorities

Benefits for Disadvantaged Communities

Use the White House Council on Environmental Quality's CEJST to identify the disadvantaged communities that will benefit from your project.

Figure 7 identifies the Well 37 Project location in relation to disadvantaged communities (DAC) based on data from the Climate & Economic Justice Screening Tool (CJEST).

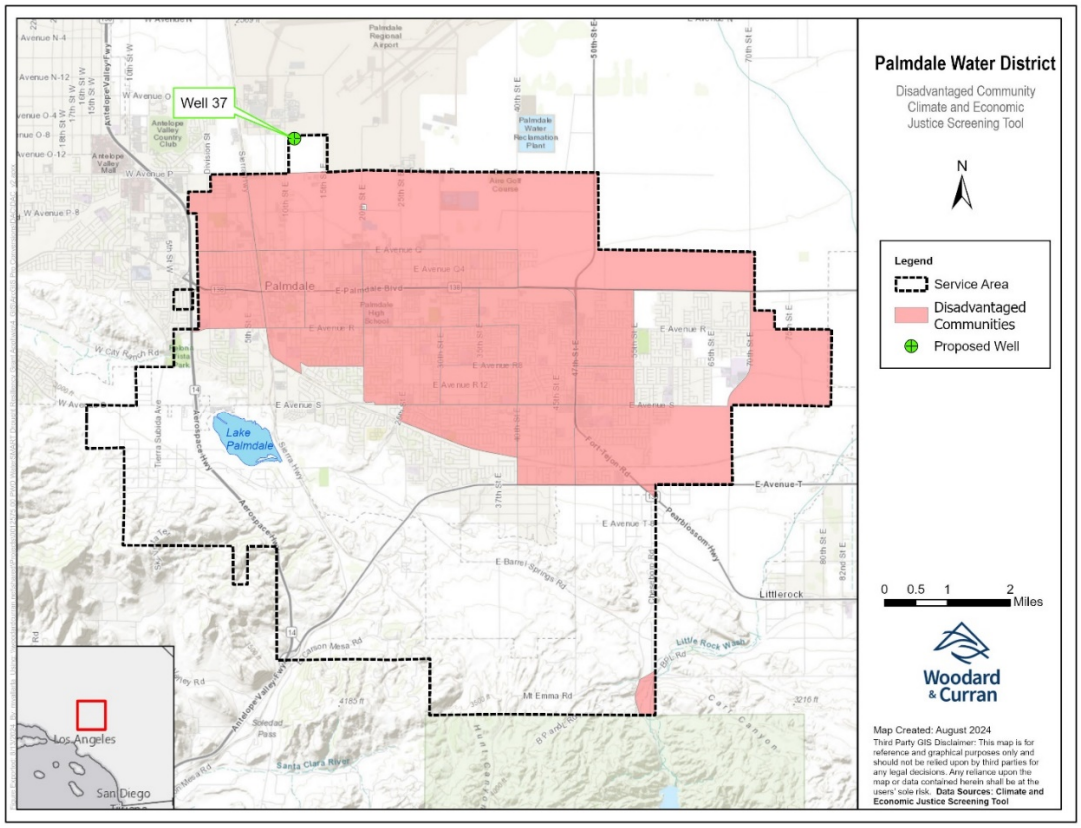
If applicable, describe how the proposed project will directly serve and/or benefit a disadvantaged community.

The District's service area is categorized as 46 percent disadvantaged by geographic area and 69 percent by population (75,787 out of 109,305) based on the CEJST as shown in Figure 7. Additionally, in 2023, the State Water Board designated PWD's service area as a large, DAC per State standards. The average median household income within PWD's service area is $55,129, and the lower-bound medium household income of $48,135.

The drilling of the new production well will increase groundwater capacity by 1,500 gpm (or 2,420 AFY) and will directly benefit the DACs within PWD's service area by providing them a reliable water source during droughts. This project will improve the long-term water supply reliability and increase groundwater pumping capacity for the entire service area, which is approximately 46 percent DACs. A clean and reliable water supply is essential to the community's health and provides economic growth opportunities in the PWD.

This project will help communities in one or more of the economic thresholds, such as low-income and workforce development outcomes, and including poverty and unemployment. EO 14008 section 223 outlines the *Justice 40 Initiative,* which requests that federal investments with a goal of 40 percent of the overall benefits flow to disadvantaged communities, with one of the recommendations providing critical clean water infrastructure.

FIGURE 7: DISADVANTAGED COMMUNITIES



The Well 37 Project aligns with the EO's goal and benefits the local community. Federal investment in infrastructure helps keep water and sewer rates lower for the communities that need it most, such as PWD. The CEJST defines low income for people in households where income is less than or equal to twice the federal poverty level, not including students enrolled in higher ed. Census tracts must be above the 65th percentile to meet this burden criteria. Additionally, Section 219 of the EO works to help secure an equitable economic future by investing in communities to help mitigate climate change and prepare for impacts. The Well 37 Project increases PWD's water supply reliability by reducing its dependence on imported water during times of drought and helps prepare the community for drought impacts by providing a reliable source.

Leveraging grant funding for project implementation will help minimize financial impacts to PWD ratepayers, a significant portion of which are DACs.

Tribal Benefits

Does the proposed project directly serve and/or benefit a Federally Recognized Tribe?

No. The Well 37 Project does not directly serve and/or benefit a Tribe.

Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?

No. There are no tribes within the PWD service area.

Evaluation Criterion F. Nexus to Reclamation

Does the applicant have a water service, repayment, or O&M contract with Reclamation?

No. The District receives imported water from the SWP and is not a contractor.

If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means?

No. The District is not a Reclamation contractor and does not receive water via Reclamation facilities.

Will the proposed work benefit a Reclamation project area or activity?

No. The Project is not anticipated to provide benefits to a Reclamation project or activity.

Is the applicant a Tribe?

No. The District is not a Tribe.

Evaluation Criterion G. Stakeholder Support for 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 a strong level of stakeholder support among local agencies whose overlapping jurisdictions make up PWD's service area for the Project. The City of Palmdale acknowledges and supports that its residents in PWD's service area will benefit from the Project by building regional resilience towards water supply shortages or disruptions caused by prolonged droughts or catastrophic events. Additionally, two other municipal systems, LCID and AVEK, have interties with PWD's distribution system and work together to recharge the basin, allowing these communities to convey water supplies between service areas and bring benefits to the AVGB, respectively. Both LCID and AVEK strongly support the Project. This Project helps these communities by creating a diverse water portfolio and helps adjacent communities should they need to distribute drinking water through their systems in the event of emergencies or operational needs.

The District is also part of the Antelope Valley Integrated Water Resource Management (IRWM) Group. This group comprises local agencies that all utilize the same potable water source, the AVGB. The objective of this group and the IRWM Plan is to manage local water supplies while improving water quality, quantity, and reliability. The proposed Project

helps the IRWM Group meet their objectives, and all agencies that are part of this group strongly support the proposed project. These stakeholders understand that managing the aquifer together is an essential step to reaching the goals of the IRWM Group. These stakeholders are a mix of small irrigation districts, regional water agencies, municipalities, nonprofit organizations, and other interested citizens, some of whom provide potable water to the community within the Antelope Valley. While these stakeholders are not providing cost-share contributions, all stakeholders in the group are aware of this Project and support the addition of two new production wells. One of IRWM's priorities is to provide funding support to existing agencies and stakeholders and coordinate planning efforts, which this project offers.

The Project also receives support from the business community through the Antelope Valley Economic Development & Growth Enterprise (AV EDGE).

No stakeholders are providing financial support for the Well 37 Project through cost-share contributions or other types of contributions.

Performance Measures

The Well 37 Project's primary benefits include improved supply reliability and possibly reduce the need for imported water, including during drought periods. Benefits and performance measures are shown in **Table 9**. The performance of the Project will be measured by the amount of water extracted by Well 37. Water extraction will be measured using electromagnetic flow meters. There will be a flow meter on the discharge line, which will measure the flow delivered to the distribution system. Analysis of the amount of water pumped during different hydrologic year types (e.g., dry, normal, wet) will indicate the water supply benefit provided by the Project during drought periods.

TABLE 9: BENEFITS AND PERFORMANCE MEASURES

Primary Benefits	Description	Measurement	Performance Measure
Improved Supply Reliability	Groundwater represents a more reliable, drought resistant local water supply as compared to other sources.	Use of a dedicated flow meter to measure AFY of additional groundwater pumped from Well 37.	Additional 1,936 AFY of pumped groundwater from Well 37.
Decreased Dependence on Imported Water	Groundwater use directly offsets the need for imported water supplies.	Use of a dedicated flow meter to measure AFY of additional groundwater pumped from Well 37.	Additional 1,936 AFY of pumped groundwater from Well 37.

D.2.2.3. BUDGET NARRATIVE

Costs and Funding Sources

The Well 37 Project cost is estimated to be $9,666,061 including the planning, design, and construction. The District is requesting $3,000,000, or 31 percent of the total proposed cost, from Reclamation as Federal grant under this funding opportunity, with the remaining $6,666,061, or 69 percent, provided by PWD as non-federal cost share. **Table 10** summarizes the total cost and funding request for the Project under this grant application. The cost-share requirement for the Project will be made through local funds contributed by PWD. The District plans to secure the local funds for Well 37 with a bond.

TABLE 10: BUDGET SUMMARY

Summary			
Budget Object Category	**Total Cost**	**Federal Estimated Amount**	**Non-Federal Estimated Amount**
Personnel	$48,376		
Fringe Benefits	$3,440		
Travel	$0		
Equipment	$0		
Supplies	$0		
Contractual	$0		
Construction	$9,614,245		
Other Direct Costs	$0		
Total Direct Costs	$9,666,061		
Indirect Charges	$0		
Total Costs	**$9,666,061**	**$3,000,000**	**$6,666,061**
Cost Share Percentage		**31%**	**69%**

Table 11 summarizes the total cost and funding request for the Project under this grant application. The cost-share requirement for the Project will be made through local funds contributed by PWD.

TABLE 11: SUMMARY OF NON-FEDERAL AND FEDERAL FUNDING SOURCES

Funding Sources	Amount
Non-Federal Entities	
Palmdale Water District	$6,666,061
Non-Federal Subtotal	**$6,666,061**
Requested Reclamation Funding	**$3,000,000**

Budget Narrative

Personnel

Salary and wages include standard rates for PWD staff, exclusive of fringe benefits. The budget included in this category is associated with grant administration for PWD to ensure compliance with the reporting requirements of the grant agreement. This includes Financial Reports, through Form SF-425, Interim Performance Reports submitted semi-annually, and the Final Performance Report at the close of the project in this funding request. Salaries and wages for PWD staff managing grant administration are presented in **Table 12**. The Project Manager for the Project is Scott Rogers, the Assistant General Manager of PWD. The cost of regulatory permitting includes coordination with regulatory agencies for permitting, environmental compliance coordination for state clearing house, water permit amendment, and extraction permit.

TABLE 12: SALARIES AND WAGES

Name	Title	Base Wage/ Hour	Est. Hours	Total Cost[1]
Grant Administration				
Scott Rogers	Assist. Gen. Manager	$181	48	$8,688
Mariksa Marin	Junior Engineer	$53	80	$4,240
Subtotal				$12,928
Regulatory Permitting				
Scott Rogers	Assist. Gen. Manager	$181	108	$19,548
Mariksa Marin	Junior Engineer	$53	300	$15,900
Subtotal				$35,448
Total				**$48,376**

[1] *Cost calculations are rounded to the nearest dollar amount.*

Fringe Benefits

The budget included in this category is associated with PWD staff benefits other than salaries and wages. The Fringe Benefits were calculated as a percentage of the base salary of the personnel involved in this Project expressed in dollars per hour (rounded up to the nearest dollar amount), as summarized in **Table 13**. Fringe benefits include medical insurance, disability insurance, workers compensation insurance, and retirement benefits.

TABLE 13: FRINGE BENEFITS

Name	Title	Compensation/ Hour	Est. Hours	Total Cost[1]
Scott Rogers	Assist. Gen. Manager	$5	156	$780
Mariksa Marin	Junior Engineer	$7	380	$2,660
Total				**$3,440**

[1]*Cost calculations are rounded to the nearest dollar amount.*

Travel

No travel is included in the budget. Travel costs incurred by consultants and contractors are incorporated into the Construction section below.

Equipment

No equipment is anticipated to be purchased by PWD in the budget. Equipment used by contractors is included in the Construction section below.

Supplies

No materials and supplies costs by PWD are included in the budget. Costs associated with materials and supplies are captured in the Construction section below and not expected to be directly incurred by PWD.

Contractual

Contractual costs incurred by consultants and contractors are incorporated into the Construction section below.

Construction

Construction costs for Well 37 were estimated from an engineer's estimate in September 2023 and include an escalation factor of 5 percent. Construction costs for the Well 37 Project in the funding request include environmental costs of $31,394, total design and permitting costs of $1,009,011, and total drilling and equipping costs of $8,573,841, as shown in **Table 14**, with additional detail provided in **Attachment E**.

TABLE 14: DETAIL OF CONSTRUCTION COSTS

Service	Total Cost	Description
Construction		
Well 37 Design and Permitting	$1,009,011	Project design and costs for permitting activities

Well 37 Environmental Documentation	$31,394	Preparation and filing of PEIR Amendment; Coordination with Reclamation on FONSI
Well 37 Drilling	$3,394,833	Costs for furnishing all labor, equipment, and materials needed for the drilling, construction, development, and testing of one new potable water supply well. Well construction activities to include site preparation, borehole drilling, geophysical logging, isolated aquifer zone testing, borehole reaming, casing installation, gravel envelope installation, annular seal installation, well development, and completion of the well head.
Well 37 Equipping	$5,179,007	Costs for all labor, equipment, and material to equip a new potable water supply well. Well equipping activities to include, but not limited to, site work, well building and foundation, installation of pump, piping, valves, and appurtenances startup and testing.
Total Construction Costs	**$9,614,245**	

Other Direct Costs

The Project does not include any costs in this Budget Object Category.

Indirect Charges

The Project does not include any costs in this Budget Object Category.

D.2.2.4. ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts, as well as any other past, present, or reasonably foreseeable future developments that you are aware of that will affect these same resources in the surrounding area.

In 2018, PWD prepared the WSMP Final PEIR to analyze potential environmental impacts of the implementing the WSMP (California State Clearinghouse Number 2017021042). An Addendum to the PEIR was prepared in 2021 to evaluate another well project (Well 36)

already in construction and adjacent to the location for Well 37. The District will follow the same process for preparing an addendum to the PEIR for Well 37. Construction of Well 37 has the potential to impact the surrounding environment in the same manner as described in the PEIR and Addendum for Well 36. **These similar anticipated impacts are described in the following paragraphs.**

The Well 37 Project will have minimal aesthetic resources, including scenic vistas and lighting. Well 37 will be in an undeveloped lot as evaluated in the WSMP PEIR and will not obstruct scenic views from designated roadways. Construction of the Well 37 Project will also involve 24-hour drilling for approximately one month. Mitigation measures will be implemented to reduce visual and lighting impact.

Air quality impacts are anticipated to be minimal. Construction and operational emissions would be mitigated to remain below significant levels and will not conflict with growth projections or air quality regulations in the area. Construction activities would comply with dust control requirements and utilize best control technology.

The Well 37 Project Area does not contain protected habitats, corridors, or sensitive tree species nor is it in a designated ecological area. However, there is potential for impacts to natural communities in the site. Mitigation measures would be implemented to avoid certain native desert vegetation species or obtaining a removal permit with preservation and mitigation requirements.

Geology and soils of the project site were assessed in the WSMP PEIR, covering aspects like earthquake risks, soil quality, and erosion potential. Proper mitigation strategies will ensure minimal environmental impacts during construction. Mitigation Measure GEO-2 involves a geotechnical report for well design, addressing soil type, expansion, and subsidence risks. The Well 37 Project will also comply with well standards and county permits, ensuring structural stability. Land disturbance larger than one acre would require a Storm Water Pollution Prevention Plan (SWPPP) for erosion control and there will be no septic tanks or reclaimed water systems. Waste fluid discharge will comply with regulations and mitigation measures. Thus, the Well 37 Project will not create new geological or soil impacts or alter the previous analysis.

GHG emissions generated by the construction and operation of the Well 37 Project are not expected to exceed environmental thresholds set by the Antelope Valley Air Quality Management District (AVAQMD) and the main source of GHG emissions will be during construction, which is temporary. Construction equipment will comply with relevant regulations and the Well 37 Project's operational emissions are anticipated to be similar to current power consumption. Therefore, the Well 37 Project will not generate significant GHG emissions.

Development and operation of the well would involve the temporary handling and disposal of hazardous materials during construction, which will comply with regulations to minimize potential impacts. The Well 37 Project is near an active State response site, but PWD will coordinate with relevant agencies to prevent any contamination. Additionally, measures are in place to prevent impacts on airport operations (Department of Defense Plant 42 and contractors) during construction and the Well 37 Project will adhere to all applicable standards and regulations. Therefore, the Well 37 Project will not create new hazards or hazardous materials impacts.

Construction of the proposed well involves various activities that could affect water quality due to chemical introductions and sediment runoff. Measures such as SWPPP and Wet Weather Erosion Control Plan may be implemented to prevent these impacts, along with other mitigation measures. Coordination with relevant agencies will ensure groundwater levels are maintained. Additionally, the Well 37 Project's location does not pose flood hazards and aligns with the prior analysis. Thus, the Well 37 Project will not create impacts on hydrology and water quality.

Construction and drilling noise near residential areas would be managed with mitigation measures and the well house will be designed to meet noise standards. Operation of the facility will not increase ambient noise levels, and post-construction monitoring will ensure compliance with local noise ordinances.

The Well 37 Project will not introduce new transportation impacts or alter the previous analysis. Construction will lead to temporary increases in vehicle trips and miles traveled. Mitigation measures include traffic management plans, traffic counts, and coordination with emergency services to minimize disruptions. Construction activities may slow traffic, but road closures are not anticipated. The Well 37 Project's location within the airport area will not impact air traffic safety and operation of wells will not significantly affect traffic.

The WSMP PEIR assessed potential impacts on tribal cultural resources and Mitigation Measure TCR-1 mandates an AB 52 consultation before well development. There are no tribes identified in the project area, but if tribal cultural resources are identified, mitigation measures would be developed in consultation with a California Native American Tribe.

> ***Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?***

No. There are no species listed or proposed to be listed as a Federal threatened or endangered species or critical habitat in the Well 37 Project area as stated in the PEIR.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"? If so, please describe and estimate any impacts the proposed project may have.

No. There is no riparian habitat, federally protected wetlands, wildlife corridor, nursery site, or locally protected tree species present at the Well 37 Project site. In addition, the Well 37 Project site is not within the Antelope Valley Significant Ecological Areas (SEA) or San Andreas Rift SEA. Therefore, development of Well 37 would not create new or additional impacts to biological resources, or change the analysis and conclusions provided in the WSMP PEIR.

When was the water delivery system constructed?

In the late 1800s, the Palmdale Water Company dug the first irrigation ditch to divert water from Littlerock Creek. The ditch was 6-1/2 miles long, 6 feet deep, and 8 feet wide. The Palmdale Irrigation District (PID) was formed in 1918 by the public's vote under Division 11 of the Water Code of the State of California to supply irrigation water to the approximately 4,500 acres of agricultural land within its boundaries. The construction of Littlerock Dam and Reservoir was completed in 1924 with a water storage capacity of 4,200 AF. To supplement groundwater and water from Littlerock Reservoir, the PID entered into a contract in 1963 to take water from the SWP, or the California Aqueduct, becoming a SWP contractor. As a result, the capacity of Lake Palmdale was increased to handle the additional volume of water from the SWP, and a water treatment facility was constructed. At the time, PID's boundaries were expanded to encompass about 34,000 acres. By 1966, PID was providing only municipal and industrial water. The name was changed to Palmdale Water District in 1973 to reflect this new direction. Now the distribution system has over 403 miles of pipeline ranging from 4 inches to 48 inches in diameter, 23 active water wells, 14 booster pumping stations, and 20 water tanks, with a total storage capacity of 50 million gallons of water.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)?

No. The proposed Well 37 Project will not result in any modification of or effects to individual features of an irrigation system. Groundwater from the new well will be pumped directly into PWD's distribution system, following chlorine disinfection.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

No. There are no buildings, structures, or features of the Well 37 Project that are listed or eligible for listing on the National Register of Historic Places within the proposed Well 37 Project area, according to a search of the California Office of Historic Preservation's Listed California Historical Resources.

Are there any known archeological sites in the proposed project area?

Although no cultural resources were detected as part of the Cultural Study prepared for the PEIR, and while the Well 37 Project site is unlikely to contain historic architectural resources, implementation of Mitigation Measure CUL-1 would ensure that any potential impacts would be reduced to a less than significant level. Due to the undeveloped nature of the site, there is potential for impacts to cultural or archaeological resources, including those that contain human remains. Implementation of Mitigation Measures CUL-2 through CUL-6 and CUL-10 would reduce impacts to cultural and archaeological resources to a less than significant impact. The Well 37 Project site is in an area underlain by geology which has a low-to-high paleontological sensitivity, increasing with depth below 3 feet. As well development would require drilling between 800 feet to 1,000 feet bgs, implementation of Mitigation Measures CUL-7 through CUL-9 would ensure that paleontological resources are identified, construction activities are appropriate monitored, and any discoveries are mitigated. Construction of a percolation basin for discharging waste fluids during well development and testing would result in additional land disturbance than previously evaluated in the WSMP PEIR. However, implementation of the mitigation measures identified in the WSMP PEIR would ensure that any historic, cultural, archaeological, or paleontological resources are identified, construction activities are monitored, and any discoveries are mitigated to a less than significant impact. Therefore, development of the proposed Well 37 Project would not create new or additional impacts to cultural resources or change the analysis and conclusions in the WSMP PEIR.

Will the proposed project have an adverse and disproportionate effect on communities with environmental justice concerns (as discussed in E.O. 14096)?

No. The proposed Well 37 Project is not expected to have a disproportionately high and adverse effect on low income or minority populations. The Well 37 Project will benefit DACs within PWD's service area; additional water benefits from the Well 37 Project will be available to all customers in the PWD service area, which includes both low income and minority populations. By increasing reliability within PWD's system, PWD will be able to avoid rate increases and mandatory demand reductions that harm PWD customers' quality of life.

Will the proposed project limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on Tribal lands?

No. The proposed Well 37 Project is not expected to limit access to or ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

No. The Well 37 Project activities are not anticipated to contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species. Well 37 Project components will take place primarily in disturbed areas and will not disturb native vegetated communities. Therefore, it is unlikely that the Well 37 Project components will cause introduction of non-native invasive species within and surrounding the project area.

D.2.2.5. REQUIRED PERMITS OR APPROVALS

As described in response to *Evaluation Criterion D. Readiness to Proceed and Project Implementation*, the Well 37 Project will require the permits listed in **Table 8** and PWD is in the process of obtaining all the necessary permits for the Well 37 Project.

D.2.2.6. OVERLAP OR DUPLICATION OF EFFORT STATEMENT

There is no overlap between the Well 37 Project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel.

D.2.2.7. CONFLICT OF INTEREST DISCLOSURE STATEMENT

The District certifies it is not aware of any actual or potential conflict of interest with this funding request and will comply with all necessary Federal regulations.

D.2.2.8. UNIFORM AUDIT REPORTING STATEMENT

PWD (Employer Identification Number JJFZR7DXHYS9) is not required to submit a Single Audit report.

D.2.2.9. CERTIFICATION REGARDING LOBBYING

The Authorized Official's signature on the SF-424 form included in the *Mandatory Federal Forms* with this application represents the PWD's certification of the statements in 43 CFR Part 18, Appendix A-Certification Regarding Lobbying.

D.2.2.10. SF-LLL: DISCLOSURE OF LOBBYING ACTIVITY (*NOT APPLICABLE*)

This section is not applicable as PWD does not contract for lobbying activities.

D.2.2.11. LETTERS OF SUPPORT

Letters of support for the Project have been received from a number of stakeholders and included as **Attachment D**. Letters of support are included from (**Table 15**):

TABLE 15: LETTERS OF SUPPORT

Agency or Individual Providing Letter of Support	Agency or Individual Type
Rep. Mike Garcia	U.S. House of Representatives
Senator Scott Wilk	California State Senate
Assembly Member Juan Carrillo	California State Assembly
Assembly Member Tom Lackey	California State Assembly
Supervisor Kathryn Barger, Fifth District	Los Angeles County Board of Supervisors
City of Palmdale	Municipal Government
City of Lancaster*	Municipal Government
Antelope Valley – East Kern Water Agency	Water District
Quartz Hill Water District*	Water District
Los Angeles County Sanitation Districts	Sanitation District
Littlerock Creek Irrigation District*	Irrigation District
Rosamond Community Services District*	Community Services District
Antelope Valley Integrated Regional Water Management Group	Water Resources Planning Organization
Antelope Valley Economic Development & Growth Enterprise	Business Organization

**Organization support included in Antelope Valley Integrated Regional Water Management Group letter.*

D.2.2.12. LETTER OF PARTNERSHIP (*NOT APPLICABLE*)

This section is not applicable as PWD is a Category A applicant.

D.2.2.13. OFFICIAL RESOLUTION

An official resolution will be approved by the PWD Board of Directors prior to accepting an award under the NOFO. The resolution will verify the identity of the official with legal authority to enter into an agreement; the Board of Directors has reviewed and supports the application submitted; and that PWD will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

D.2.2.14. LETTERS OF FUNDING COMMITMENT (*NOT APPLICABLE*)

This section is not applicable as PWD is providing the cost-share funding for the Well 37 Project.

Attachments

A—2023 Strategic Water Resources Plan

B—Technical Memorandum Well Site Assessment for Well Nos. 36 and 37

C—Summary of Numerical Groundwater Model Results – Pure Water Antelope Valley

D—Letters of Support

E—Estimated Construction Costs for Well 37 Water Supply Resiliency Project

Attachment A

2023 Strategic Water Resources Plan (SWRP)
Palmdale Water District

STRATEGIC WATER RESOURCES PLAN

June 2023

0012222.00

Palmdale Water District

Woodard & Curran

woodardcurran.com

5. ALTERNATIVE DESCRIPTIONS AND EVALUATION

The purpose of this SWRP is to facilitate robust decision-making when implementing projects that aim to meet future service area demands. The following sections describe the development and evaluation process used to identify a preferred alternative to guide future project implementation. The alternatives development and evaluation process is shown in **Figure 5-1** and described in greater detail in the following sections.

Figure 5-1: Alternatives Development and Evaluation Process

5.1 Alternatives Development

The central component of this SWRP evaluation is the alternatives, each of which are comprised of a group of options presented in Chapter 4. There are multiple methods and approaches to assembling alternatives using the options. The alternatives were developed and differentiated by their use of unique combinations of water resource types such as imported water, groundwater, local surface water, and recycled water. Different combinations of supply types were then coupled with storage options, additional production, distribution, and other elements were added to each alternative to reflect PWD's water system and resources future. This process resulted in eleven alternatives, summarized in **Table 5-1**. The eleven alternatives were developed and evaluated based on the ability to meet complex water resources challenges and achieve SWRP goals.

5.1.11 Alternative 11 – Hybrid Groundwater/Recycled Water/Surface Water

Alternative 11 focuses on increasing local water supply reliability by recharging recycled water supplies, maximizing local water supplies, and purchasing groundwater production rights to augment existing groundwater supplies. Under this alternative, PWD would store up to 32,500 AF of Tier 1 imported water, recycled water, and groundwater carryover in the Basin. This includes 5,000 AFY of recycled water supplies recharged into the Basin as well as up to 1,600 AFY of imported water recharged via the Upper Amargosa Water Project. PWD would purchase 1,000 AFY of groundwater production rights from other pumpers in the Basin. Seven new wells are assumed to be needed to pump the stored water in the Basin (assuming a capacity of 1.7 mgd per well), in addition to five well replacements identified in the Well Rehabilitation Program. In addition, PWD would implement Palmdale Ditch enhancements to reduce conveyance losses and increase local water supply, resulting in an average increase of 1,500 AFY of local surface water.

A map of the potential components under this Alternative is shown in **Figure 5-22**. **Figure 5-23** shows, on average, the amount and type of supply that will be used under this alternative to meet demand in 2050. The projected water supply shortage frequency and depth of unmet demand is summarized in **Section 5.1.12** below.

Figure 5-22: Alternative 11 Facility Locations

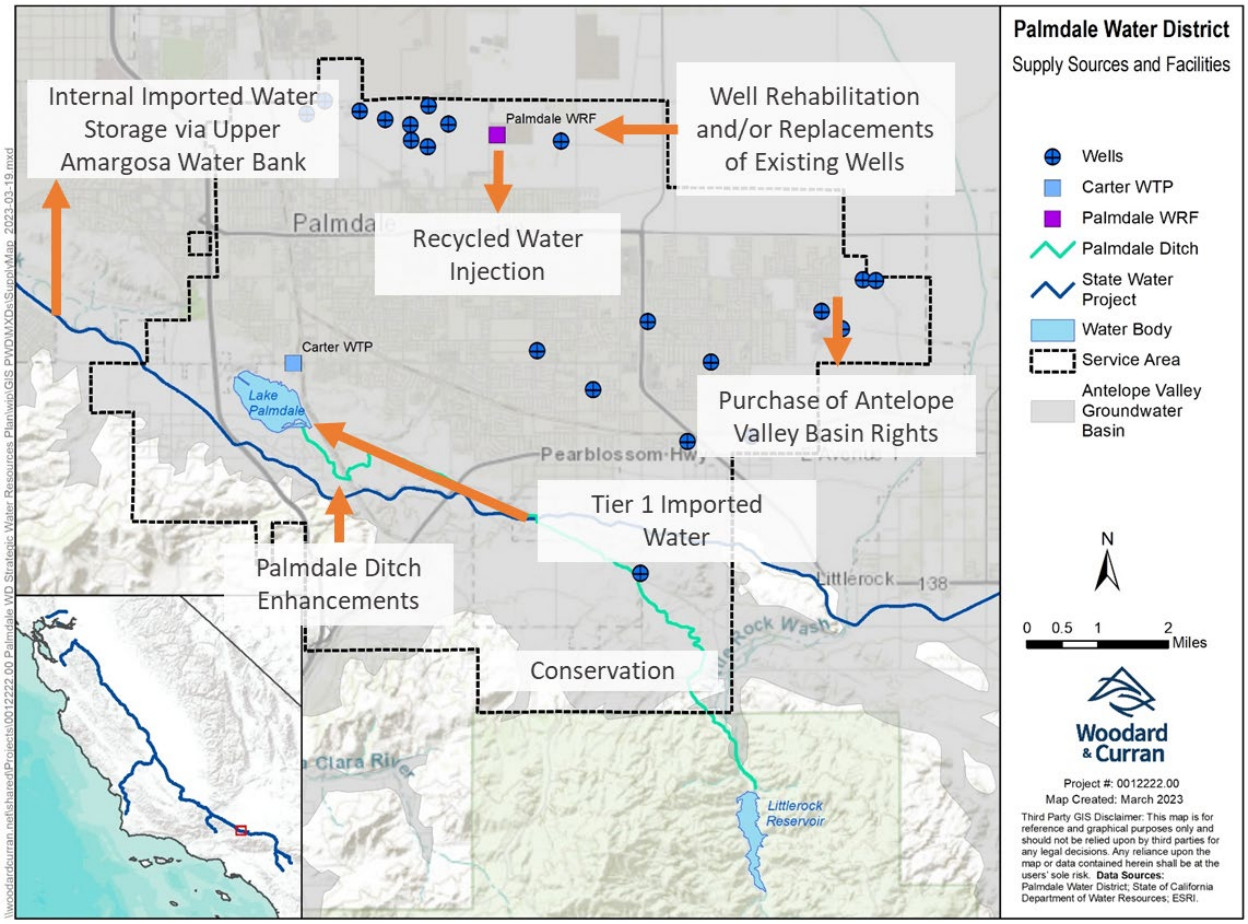


Table 5-4: Evaluation Criteria

Criteria	Metric	Points			
Quantitative		*1 point*	*0.75 points*	*0.50 points*	*0.25 points*
Drought Reliability – Frequency	Likelihood of experiencing of shortage of 20% or more in 2050	No shortage	1% to 5%	5% to 10%	Over 10%
Drought Reliability – Depth	Average depth of shortage in 2050	Less than 3%	3% to 8%	9% to 15%	Over 15%
Emergency Imported Water Outage Reliability	Shortage depth during a 12-month SWP water outage (2050 demand)	Under 10% shortage	10% to 20% shortage	20% to 30% shortage	Shortage of 30% or above
Cost Efficiency	Unit cost, including capital, O&M, and water purchase cost, for new supplies and facilities	Under $3,200/AF	$3,200/AF to $3,700/AF	$3,700/AF to $4,200/AF	Over $4,200/AF
Water Quality	Loading of TDS applied to the Basin	Under 2,020 tons TDS (less than 15% increase over baseline)	2,020 to 2,100 tons TDS (15% to 20% increase over baseline)	2,100 to 2,280 tons TDS (20% to 30% increase over baseline)	Over 2,280 tons TDS (more than 30% increase over baseline)
Qualitative		*1 point*	*0.67 points*		*0.33 points*
Institutional Independence	Institutional independence (i.e., PWD control)	PWD control of assets	Regional control of assets		External control of assets
Sustainability	Stewardship of facilities, groundwater basins and/or reservoirs	Improves stewardship of facilities and groundwater basins and reservoirs	Improves stewardship of facilities or groundwater basins or reservoirs		Does not improve stewardship
Funding Potential	Eligibility for funding programs	Current/known funding programs	Assumed future funding programs		Limited funding likely

Criteria	Metric	Points		
Implementability	Ease of completing environmental documentation and regulatory/permitting compliance Phasing potential and adaptability	Environmental and permitting expected to be less complicated and high phasing potential	Environmental and permitting expected to be somewhat complicated or high phasing potential	Environmental and permitting expected to be more complicated

5.2.2 Alternative Evaluation

The evaluation results are most helpful to decision-makers when they highlight the differences between alternatives in their ability to meet SWRP objectives. This section presents the evaluation results based on each alternative's overall ability to achieve objectives established during the planning period.

5.2.2.1 Drought Reliability – Frequency

Drought Reliability – Frequency quantitatively evaluated for each of the supply alternatives on its anticipated reliability in drought conditions. This evaluation considered the potential likelihood of shortages in 2050. This criterion was calculated as the percentage of years experiencing a shortage that exceeds 20% of demand for each supply alternative.

In general, groundwater and recycled water supplies tend to be less vulnerable to drought conditions than imported and local surface water supplies. As a result, alternatives that incorporate recycled water injection into the Basin reduced the potential likelihood of shortages during drought conditions. These alternatives tended to score higher than alternatives that did not incorporate recycled water injection.

Table 5-5: Drought Reliability – Frequency Evaluation Results

Alternative	Drought Reliability Frequency (percent of years experiencing shortage exceeding 20% of demand)	Points
1. Imported Water (Internal Banking)	4%	0.75
2. Imported Water (External Banking)	5%	0.75
3. Recycled Water (Groundwater Injection)	0%	1.00
4. Recycled Water (Surface Water Augmentation)	2%	0.75
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	0%	1.00
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	2%	0.75
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	0%	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	0%	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	0%	1.00
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	0%	1.00
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	0%	1.00

5.2.2.2 Drought Reliability – Depth

Drought Reliability – Depth quantitatively evaluated for each of the supply alternatives on its anticipated reliability in drought conditions. This evaluation considered the average depth of shortage during droughts in 2050. This criterion was calculated as the AFY of shortage for each supply alternative during droughts.

As previously mentioned, groundwater and recycled water supplies are generally less susceptible to drought impacts compared to local surface water supplies and imported water supplies. Furthermore, diverse water supply portfolios tend to also be more resilient to drought conditions. Therefore, hybrid alternatives that incorporate recycled water injection into the Basin have the potential to decrease the average shortage depth during drought conditions. These alternatives have generally scored higher than those that do not include diverse portfolios with recycled water injection.

Table 5-6: Drought Reliability – Depth Evaluation Results

Alternative	Drought Reliability Depth (average depth of demand during drought years as the percent of demand)	Points
1. Imported Water (Internal Banking)	8% of demand	0.75
2. Imported Water (External Banking)	9% of demand	0.50
3. Recycled Water (Groundwater Injection)	3% of demand	0.75
4. Recycled Water (Surface Water Augmentation)	9% of demand	0.50
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	2% of demand	1.00
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	8% of demand	0.75
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	2% of demand	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	no shortage	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	2% of demand	1.00
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	6% of demand	0.75
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	no shortage	1.00

5.2.2.3 Emergency Imported Water Outage Reliability

Emergency Imported Water Outage Reliability quantitatively evaluated each of the supply alternatives on its ability to meet water demands in the event a catastrophic event disrupts imported water availability. This

evaluation considered the water supply shortage depth during a 12-month SWP water outage. This criterion was calculated as a percentage of shortage for each supply alternative based on the 2050 water demand.

Alternatives that are heavily reliant on imported water supplies are more vulnerable to shortages in the event a catastrophic event disrupts the SWP conveyance infrastructure, resulting in an imported water outage. Consequently, alternatives that are less dependent on imported water supplies scored higher because they are generally more resilient to emergency imported water outages.

Table 5-7: Emergency Imported Water Outage Reliability Evaluation Results

Alternative	Emergency Imported Water Outage Reliability (shortage depth during a 12-month imported water outage as percent of demand)	Points
1. Imported Water (Internal Banking)	23% of demand	0.50
2. Imported Water (External Banking)	24% of demand	0.50
3. Recycled Water (Groundwater Injection)	9% of demand	1.00
4. Recycled Water (Surface Water Augmentation)	13% of demand	0.75
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	9% of demand	1.00
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	15% of demand	0.75
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	8% of demand	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	0% of demand	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	9% of demand	1.00
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	12% of demand	0.75
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	0% of demand	1.00

5.2.2.4 Cost Efficiency

Cost Efficiency quantitatively evaluated each of the supply alternatives on cost efficiency measured as the total cost needed to produce an average (across the combined supply sources) unit of supply in AFY. The total cost to implement each alternative was estimated by annualizing any individual costs to purchase water, capital costs to build necessary facilities, as well as operational and maintenance (O&M) costs associated with any existing and new facilities required for the alternative to function. The combined unit costs were spread across the average annual volume of supply to calculate the average present value unit cost ($/AF) for each alternative.

Table 5-8: Cost Efficiency Evaluation Results

Alternative	Unit Cost ($/AF)[1]	Points
1. Imported Water (Internal Banking)	$3,400	0.75
2. Imported Water (External Banking)	$3,400	0.75
3. Recycled Water (Groundwater Injection)	$3,700	0.75
4. Recycled Water (Surface Water Augmentation)	$3,300	0.75
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	$4,600	0.25
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	$4,200	0.50
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	$3,300	0.75
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	$3,100	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	$3,600	0.75
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	$3,600	0.75
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	$2,900	1.00

1. Unit costs include the capital and O&M costs for all projects described in the alternatives description above. For example, Alternative 3: Recycled Water (Groundwater Injection) includes the costs for AV Pure Water, conveyance of imported water to the Amargosa Water Bank recharge facilities, and new wells required to produce any stored water.

5.2.2.5 Water Quality

Water Quality quantitatively evaluated each of the supply alternatives on the overall water quality associated with each alternative's supply mix. This was estimated by calculating the total amount of salts (total dissolved solids [TDS]) delivered into the service area by each alternative's supply mix. The total anticipated TDS loading to the groundwater basin was calculated in tons per year for each supply alternative and compared to the baseline scenario.

Advanced treated water and imported water supplies both introduce additional TDS into the Basin. Tertiary effluent from the PWRP has an average TDS concentration of 471 milligrams per liter (mg/L). Advanced treatment is assumed to reduce TDS concentrations by more than 95 percent, resulting in an estimated concentration of 24 mg/L (PWD, 2022). TDS concentrations for imported water from the SWP are significantly higher, estimated at approximately 300 mg/L (PWD, 2021a). As a result, alternatives that focus on maximizing local surface water and groundwater supplies scored the highest because they do not introduce a new source of TDS into the Basin. Alternatives that focus on recycled water scored higher than alternatives that primarily rely on imported water supply, particularly alternatives with internal imported water storage, because they introduce less TDS into the Basin.

Table 5-9: Water Quality Evaluation Results

Alternative	Water Quality (TDS loading in tons/yr)	Points
1. Imported Water (Internal Banking)	2,740 tons/yr	0.25
2. Imported Water (External Banking)	2,570 tons/yr	0.25
3. Recycled Water (Groundwater Injection)	2,000 tons/yr	1.00
4. Recycled Water (Surface Water Augmentation)	2,110 tons/yr	0.50
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	2,130 tons/yr	0.50
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	2,250 tons/yr	0.50
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	2,000 tons/yr	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	2,000 tons/yr	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	2,450 tons/yr	0.25
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	2,200 tons/yr	0.50
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	2,000 tons/yr	1.00

5.2.2.6 Institutional Independence

Institutional Independence qualitatively evaluated each of the supply alternatives on the level of dependence on non-PWD entities. Considerations included control over the facilities required for implementation and supplies generated. Alternatives with components such as external banking that involve outside agencies are dependent upon those agencies for success.

In general, PWD has greater control over local water supplies such as recycled water, groundwater, and local surface water, and less control over external water supplies such as imported water. As a result, alternatives that maximize local water supplies directly managed by PWD scored the highest. Alternatives that rely on imported water supplies and external imported water storage tended to score the lowest.

Table 5-10: Institutional Independence Evaluation Results

Alternative	Institutional Independence (based on reliance on other agencies)	Points
1. Imported Water (Internal Banking)	Banking agreement with AVEK (within region) Imported water purchase agreements	0.67
2. Imported Water (External Banking)	Banking agreement outside the region Imported water purchase agreements	0.33
3. Recycled Water (Groundwater Injection)	No reliance on new partnerships or agreements	1.00
4. Recycled Water (Surface Water Augmentation)	No reliance on new partnerships or agreements	1.00
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	Banking agreement outside the region	0.33
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	Banking agreement with AVEK (within the region)	0.67
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	No reliance on new partnerships or agreements	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	No reliance on new partnerships or agreements	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	Banking agreement with AVEK (within region)	0.67
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	No reliance on new partnerships or agreements	1.00
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	No reliance on new partnerships or agreements	1.00

5.2.2.7 Sustainability

Sustainability qualitatively evaluated each of the supply alternatives on the stewardship of facilities, groundwater basins, and reservoirs. Considerations included the ability to replenish local resources or improve the condition of existing resources.

Alternatives that improve local resource conditions by enhancing PWD's infrastructure, such as the Palmdale Ditch and Littlerock Reservoir, tended to score higher under this criterion. Alternatives that do not have an impact on local facilities, basins, or reservoirs, such as alternatives that primarily focus on increasing imported water supplies and rely on external banking, tended to score lower.

Table 5-11: Sustainability Evaluation Results

Alternative	Sustainability (based on stewardship of facilities, groundwater basins and/or reservoirs)	Points
1. Imported Water (Internal Banking)	Improves stewardship of groundwater basin	0.67
2. Imported Water (External Banking)	Doesn't improve stewardship of facilities, groundwater basins and/or reservoirs	0.33
3. Recycled Water (Groundwater Injection)	Improves stewardship of groundwater basin	0.67
4. Recycled Water (Surface Water Augmentation)	Improves stewardship of facilities (Carter WTP)	0.67
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	Improves stewardship of groundwater basin	0.67
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	Improves stewardship of facilities (Carter WTP)	0.67
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	Improves stewardship of reservoirs and groundwater basin and Carter WTP	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	Improves stewardship of Carter WTP and groundwater basin	0.67
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	Improves stewardship of groundwater basin	0.67
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	Improves stewardship of Carter WTP and groundwater basin	0.67
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	Improves stewardship of Carter WTP, Palmdale Ditch and groundwater basin	1.00

5.2.2.8 Funding Potential

Funding Potential qualitatively evaluated each of the supply alternatives on the eligibility and competitiveness for common water supply funding sources. The evaluation of fundability considered State and federal funding programs such as Drinking Water State Revolving Fund (SRF), Clean Water SRF, Sustainable Groundwater Management, Title XVI Water Reclamation and Reuse, WaterSmart, and other known sources of funding.

Over the past few years, funding programs have focused on maximizing local water supplies to reduce reliance on imported water supplies. As a result, integrated alternatives that include options to maximize groundwater, recycled water, and/or local surface water supplies tend to be more competitive for funding, and therefore score higher, than alternatives that primarily focus on increasing imported water supplies.

Table 5-12: Funding Potential Evaluation Results

Alternative	Funding Potential (based on known and potential funding opportunities)	Points
1. Imported Water (Internal Banking)	Potential future funding for local water bank development	0.67
2. Imported Water (External Banking)	Low potential for future funding	0.33
3. Recycled Water (Groundwater Injection)	Current/known funding programs (recycled water)	1.00
4. Recycled Water (Surface Water Augmentation)	Current/known funding programs (recycled water)	1.00
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	Current/known funding programs (recycled water)	1.00
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	Current/known funding programs (recycled water)	1.00
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	Current/known funding programs (recycled water)	1.00
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	Current/known funding programs (recycled water)	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	Current/known funding programs (recycled water)	1.00
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	Current/known funding programs (recycled water)	1.00
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	Current/known funding programs (recycled water)	1.00

5.2.2.9 Implementability

Implementability qualitatively evaluated each of the supply alternatives on the ease of implementation. Considerations included ease of completing environmental documentation and regulatory and permitting compliance requirements associated with accessing, producing, and conveying the supply mix within each alternative. This criterion also evaluated the supply alternatives' phasing potential and adaptability to uncertainty, such as changes in demand trends, hydrology and supply availability, facility needs and costs, regulations, and decision-maker priorities.

Table 5-13: Implementability Evaluation Results

Alternative	Implementability (based on permitting requirements and phasing potential)	Points
1. Imported Water (Internal Banking)	Uncomplicated environmental permitting, but low phasing potential	0.67
2. Imported Water (External Banking)	Uncomplicated environmental permitting, but low phasing potential	0.67
3. Recycled Water (Groundwater Injection)	Less complicated permitting and environmental docs required for RW injection, low phasing potential	0.67
4. Recycled Water (Surface Water Augmentation)	More complicated permitting and environmental docs req'd for lake augmentation with RW, low phasing potential	0.33
5. Hybrid Imported Water/ Recycled Water (External Banking, Recycled Water Injection)	Less complicated permitting and environmental docs req'd for RW injection, and potential for phasing	1.00
6. Hybrid Imported Water/Recycled Water (Internal Banking, Surface Water Augmentation)	More complicated permitting and environmental docs req'd for lake augmentation with RW, but with potential for phasing	0.67
7. Hybrid Surface Water/Recycled Water (Surface Water Enhancement, Recycled Water Injection)	More complicated permitting & environmental docs req'd for removing sediment from Littlerock Reservoir due to existing habitat, but with potential for phasing	0.67
8. Hybrid Groundwater/ Recycled Water (Groundwater Rights, Recycled Water Injection)	Less complicated permitting and environmental docs req'd for RW injection, and potential for phasing	1.00
9. Hybrid Imported Water/Recycled Water (Internal Banking, Recycled Water Injection)	Less complicated permitting and environmental docs req'd for RW injection, and potential for phasing	1.00
10. Hybrid Recycled Water (Recycled Water Injection, Surface Water Augmentation)	More complicated permitting and environmental docs req'd for lake augmentation with	0.67

Alternative	Implementability (based on permitting requirements and phasing potential)	Points
	RW, but with potential for phasing	
11. Hybrid Groundwater/ Recycled Water/ Surface Water (Groundwater rights, Recycled Water Injection, Palmdale Ditch Enhancement)	Less complicated permitting and environmental docs req'd for RW injection, and potential for phasing	1.00

5.2.3 Alternative Summary Scores

Table 5-14 shows the summary of the scores for each alternative under each of the nine evaluation criteria. In each case the points contained in the table above are multiplied by the criteria weight for each criterion. With all criteria weighted equally, the differences between alternatives depend on which one is more balanced and higher ranked in more areas. **Section 5.3** below incorporates the evaluation criteria results and identifies a preferred alternative.

Table 5-14: Alternative Evaluation Weighted Scores

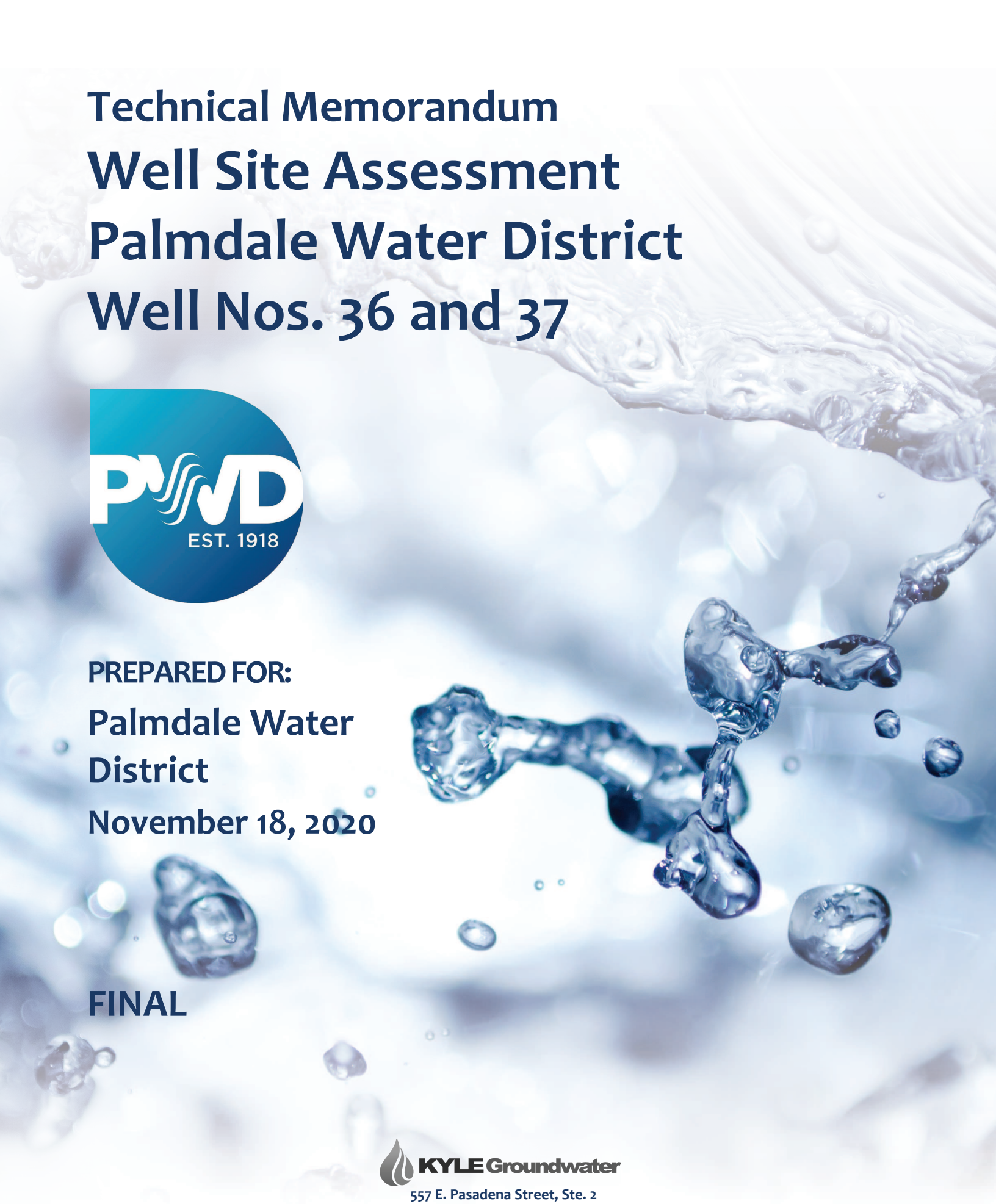
	Criteria Weight	1. Imported Water *Internal banking*	2. Imported Water *External banking*	3. Recycled Water *Groundwater injection*	4. Recycled Water *Surface water augmentation*	5. Hybrid Imported Water/ Recycled Water *Imported water external banking, recycled water injection*	6. Hybrid Imported Water/Recycled Water *Imported water internal banking, recycled water surface water augmentation*	7. Hybrid Surface Water/Recycled Water *Surface water enhancement, recycled water injection*	8. Hybrid Groundwater/ Recycled Water *Groundwater rights, recycled water injection*	9. Hybrid Imported Water/Recycled Water *Imported water internal banking, recycled water injection*	10. Hybrid Recycled Water *Recycled water injection, recycled water surface water augmentation*	11. Hybrid Groundwater/ Recycled Water/Surface Water *Groundwater rights, recycled water injection, Palmdale Ditch enhancement*
Drought Reliability – Frequency	11.1%	0.08	0.08	0.11	0.08	0.11	0.08	0.11	0.11	0.11	0.11	0.11
Drought Reliability – Depth	11.1%	0.08	0.06	0.08	0.06	0.11	0.08	0.11	0.11	0.11	0.08	0.11
Emergency Imported Water Outage Reliability	11.1%	0.06	0.06	0.11	0.08	0.11	0.08	0.11	0.11	0.11	0.08	0.11
Cost Efficiency	11.1%	0.08	0.08	0.08	0.08	0.03	0.06	0.08	0.11	0.08	0.08	0.11
Water Quality	11.1%	0.03	0.03	0.11	0.06	0.06	0.06	0.11	0.11	0.03	0.06	0.11
Institutional Independence	11.1%	0.07	0.04	0.11	0.11	0.04	0.07	0.11	0.11	0.07	0.11	0.11
Sustainability	11.1%	0.07	0.04	0.07	0.07	0.07	0.07	0.11	0.07	0.07	0.07	0.11
Funding potential	11.1%	0.07	0.04	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Implementability	11.1%	0.07	0.07	0.07	0.04	0.11	0.07	0.07	0.11	0.11	0.07	0.11
Total Weighted Score		**0.62**	**0.49**	**0.86**	**0.69**	**0.74**	**0.69**	**0.93**	**0.95**	**0.81**	**0.78**	**0.99**

Attachment B

Technical Memorandum Well Site Assessment for Well Nos. 36 and 37

Palmdale Water District

Technical Memorandum
Well Site Assessment
Palmdale Water District
Well Nos. 36 and 37



PREPARED FOR:

Palmdale Water District

November 18, 2020

FINAL

KYLE Groundwater
557 E. Pasadena Street, Ste. 2
Pomona, CA 91767 | 626-379-7569
www.kylegroundwater.com

4.0 PRELIMINARY WELL DESIGN CRITERIA

The following sections outline preliminary procedures, protocols, and design elements that are anticipated for installation of a municipal water supply well at either of the proposed well sites. It should be noted the design details presented herein are preliminary and must be refined following drilling and testing of the pilot borehole.

4.1 RECOMMENDED WELL DRILLING METHOD

Prior to drilling, it is recommended that a 36-inch outside diameter (OD) conductor casing be installed within a 48-inch diameter borehole to a minimum depth of 50 feet. The conductor casing will be sealed with 10.3-sack sand-cement grout to satisfy Los Angeles County requirements.

A two-pass well drilling method is recommended and will consist of drilling and enlargement of a pilot borehole utilizing the reverse circulation rotary drilling method. This drilling method offers clean and representative lithologic samples and provides for relatively stable large-diameter boreholes. It is recommended that a 17.5-inch diameter pilot borehole be drilled first to an anticipated depth of approximately 1,200 feet bgs, within which, borehole geophysics and isolated aquifer zone testing will be conducted. Information gathered during drilling and testing of the pilot borehole will be utilized to prepare a final well design should it be decided to proceed with well installation. Following the final design phase, the pilot borehole will be reamed (i.e., enlarged) to diameters of 34- and 30-inches to accommodate the well casing and screen, and ancillary tubing.

4.2 PRELIMINARY WELL DESIGN

The anticipated design for a municipal water supply well within the study area is shown on Figure 11 and summarized in the following table. It should be noted that this design is conceptual at this time and will require modification and refinement based on the results of drilling and testing.

Preliminary Well Design Details

Depth Interval [feet bgs]	Borehole Diameter [inches]	Casing Diameter [inches]	Casing Wall Thickness [inches]	Slot Size [inches]	Material Description
+0.5 – 50	48	36	3/8	-	ASTM A139 Grade B Mild Steel Conductor Casing
0 – 600	34	-	-	-	10.3-Sack Sand-Cement Grout Seal
600 – 603	34	-	-	-	Fine Transition Sand (#60)
603 – 1,030	34 / 30	-	-	-	Engineered Gravel Envelope (CEMEX Lapis Lustre 6 x 12)
+1 – 610	34	3	Sch. 40	-	ASTM A778 304L Stainless Steel Gravel Fill Pipe (x2)
+1 – 698*	34	2	Sch. 40	-	ASTM A778 304L Stainless Steel Sounding Tube
+2 – 620	34	20 ID	3/8	-	ASTM A778 304L Stainless Steel Blank Casing
620 – 700	34	20 ID	5/16	-	ASTM A778 304L Stainless Steel Blank Casing
700 – 1,000	30	20 ID	5/16	0.080	ASTM A778 304L Stainless Steel Ful-Flo® Louvered Well Screen
1,000 – 1,010	30	20 ID	5/16	-	ASTM A778 304L Stainless Steel Blank Casing with End Cap
1,010 – 1,030	30	-	-	-	Gravel-Filled Borehole

* The anticipated depth of the sounding tube entrance box is 696 to 698 feet bgs.

4.3 MATERIALS

In an effort to extend the life expectancy of the well and improve the quality of its service life, it is recommended that, at a minimum, all well components, with the exception of the conductor casing, be constructed of ASTM A778 304L stainless steel materials. Under favorable conditions, a well constructed of these materials will have an expected service life of approximately 75 years or greater.

4.3.1 WELL CASING & SCREEN

It is recommended that the proposed well casing and screen be a minimum 20-inch inside diameter (ID) throughout its entire length. The recommended wall thickness is 3/8-inch for the upper blank section (+2 to 600 feet bgs) to allow for greater resistance to hydrostatic forces during installation of very deep annular cement seal. The recommended wall thickness for the remaining sections of blank well casing and screen (i.e., 600 to 1,010 feet bgs) is 5/16-inch.

4.3.2 GRAVEL ENVELOPE AND SLOT SIZE

A properly engineered gravel envelope design will prevent migration of fine sediments through the well intake structure while allowing for an efficient well with minimum drawdown. Based on previous municipal well installation projects within similar aquifer materials, a CEMEX Lapis Lustre 6 x 12 gravel envelope, or approved equal, with a complimentary 0.080-inch Ful-Flo® louvered slot has proved successful and is recommended in this case. However, the final design of the gravel envelope gradation will ultimately be based on mechanical grading analysis of formation samples collected during drilling of the pilot borehole.

4.3.3 ANNULAR CEMENT SEAL

To provide additional protection against migration of surface contaminants, and to protect the upper sections of casing, it is recommended that a deep annular cement seal be installed from ground surface to a depth of approximately 600 feet bgs. The final depth of the annular cement seal will be confirmed based on the results of pilot borehole drilling and geophysical borehole logging.

4.3.4 ACCESSORY TUBING

Installation of a deep annular cement seal will necessitate the addition of two (2) 3-inch Schedule (Sch.) 40 304L stainless steel gravel fill pipes to a depth of 610 feet bgs. These gravel fill pipes will allow replenishment of the gravel envelope should it settle during well development and routine operation of the well. It is further recommended that a 2-inch Sch. 40 304L stainless steel sounding tube be installed, entering the casing at depths of 696 to 698 feet bgs through a 3-inch x 3-inch x 2-foot long manufactured transition box. This will allow access for an electric wireline water level meter or pressure transducer such that accurate water level measurements can be taken once the well is permanently equipped and operational.

5.0 CONSTRUCTION LOGISTICS

5.1 CONSTRUCTION CONSTRAINTS

Typically, the absolute minimum space required to drill and construct a new municipal supply well using the reverse circulation rotary drilling method is approximately 120 by 60 feet (i.e., 7,200 square feet), but this would require a nearby staging area for storage of equipment and materials, and would present difficulties with the drilling and construction process. An ideal space for drilling and construction is 150 by 150 feet (i.e., 22,500 square feet). The recorded areas of proposed Sites 1 and 2 are 30,542.3 and 43,492.8 square feet, respectively. As such, both sites offer more than adequate space for well drilling and maintenance operations.

The above-ground utilities present at both sites (i.e., telephone and power) must be avoided during construction but do not present any significant hazard or constraints. Additionally, there is an active natural gas pipeline that parallels the western side of 10th Street East, and although not an immediate hazard, it should be considered should heavy equipment be utilized in that area.

The proposed well sites are positioned along the general flight path for Runway 4 at Palmdale Regional Airport. Site 1 is approximately 1.1 miles from the end of the runway and Site 2 is approximately 0.8 miles from the runway. Flight safety should be considered during drilling and the mast of the rig should be equipped with flags and warning lights.

5.2 CONSTRUCTION WATER SOURCE

The proposed source of construction water at Site 1 is a fire hydrant located approximately 830 feet south of the proposed well site on the east side of 10th Street East (see Figure 12). Use of this hydrant will require the drilling contractor to provide a temporary means of conveyance from the hydrant to the well site, and any associated crossings to maintain access to other facilities. Currently, the closest source of construction water at Site 2 is a fire hydrant located approximately 2,135 feet south and west of the proposed well site that will require a traffic-rated ramp and a traffic control measures to cross E. Rancho Vista Boulevard (see Figure 12). Alternatively, new service could be installed at Site 2 to allow for simpler construction logistics.

5.3 NOISE MITIGATION

The closest sensitive noise receptors to either of the proposed well sites is a single family home located approximately 2,400 feet south of Site 1. As such, it is anticipated that noise mitigation will not be necessary at either of the proposed well sites.

5.4 CUTTINGS AND FLUIDS DISPOSAL

All drill cuttings and fluids used to drill the well (i.e., drilling mud) will be disposed of offsite by the drilling contractor. However, it will be necessary to temporarily store cuttings on site for drying prior to hauling them offsite for disposal.

5.5 DISCHARGE CONSIDERATIONS

Waste fluids generated during development and testing of any new well must be legally disposed of at designated discharge points by means of temporary above-ground piping. There are several options that will require further investigation and refinement prior to preparing the technical specifications and contract documents. Those are summarized as follows in no particular order:

- Discharge to ground surface in the vicinity of each of the proposed well sites. This will require permission from adjacent land owners to construct a temporary bermed area to contain and percolate discharges, and will require construction of some length of temporary conveyance pipeline and road crossings to convey the waste water to the designated discharge points. The minimum dimensions of the bermed area are estimated to be 400 by 400 feet assuming a maximum ponded water height of 2.5 feet and a high degree of percolation.

- Discharge to the unlined drainage channel that parallels the western boundary of the solar farm property (along 10th Street East), cutting across the northwestern corner of the property, and ultimately leading to what appears to be a large percolation pond north of the intersection of 15th Street East and Lockheed Way (see Figure 12). Site 1 would require approximately 720 feet of above-ground piping, heading south of the proposed well, to reach the channel (see Figure 12). Site 2 would require approximately 2,800 feet of above-ground piping, heading north and west of the proposed well, to reach the channel (see Figure 12). Erosion control and mitigation measures will be necessary to prevent scouring.

For either option, it will be necessary to investigate any permits and permissions that may be required (e.g., NPDES, encroachment, ROE, etc.) and the requirements thereof. The typical estimated discharge events and associated duration and volumes of waste water anticipated to be discharged for a well of this estimated capacity are summarized in the following table. These values are for planning purposes only and are subject to change based on actual conditions encountered.

Summary of Anticipated Discharges During Construction

Discharge Event	Duration		Discharge Rate	Discharge Vol.
	Work Days	Hours	[gpm]	[gal]
Isolated Aquifer Zone Testing				
Day 1	1	18	200	216,000
Day 2	2	18	200	216,000
Day 3	3	18	200	216,000
Day 4	4	18	200	216,000
Day 5	5	18	200	216,000
Initial Development Pumping				
Day 1	6	24	150	216,000
Day 2	7	24	150	216,000
Day 3	8	24	150	216,000
Day 4	9	24	150	216,000
Day 5	10	24	150	216,000

Discharge Event	Duration		Discharge Rate	Discharge Vol.
	Work Days	Hours	[gpm]	[gal]
Final Development Pumping				
Day 1	11	10	1,800	1,080,000
Day 2	12	10	1,800	1,080,000
Day 3	13	10	1,800	1,080,000
Day 4	14	10	1,800	1,080,000
Day 5	15	10	1,800	1,080,000
Day 6	16	10	1,800	1,080,000
Step Drawdown Testing				
Day 1	17	1	1,000	60,000
		2	2,000	240,000
		3	3,000	540,000
Constant Rate Test				
Day 1	18	24	2,000	2,880,000
TOTAL:	**18**	**300**	**-**	**12,366,000**

5.6 PERMITTING CONSIDERATIONS

5.6.1 REQUIRED SETBACKS

DDW and the County of Los Angeles Department of Public Health, Environmental Health Division, require that certain minimum distances be maintained between a potable water supply well and specific activities and infrastructure which may present a sanitary hazard. The most common of these minimum setback requirements include the following:

- Sanitary Sewer Line or Lateral: 50 feet
- Sewer Manhole (DDW): 100 feet
- Sewer Manhole (County of Los Angeles): 50 feet
- Storm Drain or Drainage Channel: 50 feet
- Petroleum Transmission Mains: 500 feet
- Dwelling: 25 feet

The proposed well locations currently meet all applicable minimum setback requirements as stipulated by DDW and the County of Los Angeles. However, it may be necessary to revisit these requirements should there be plans to install new sewer systems as part of the solar farm facilities.

5.6.2 CONTROL ZONE REQUIREMENT

The area of each proposed well site is sufficient to allow the location of a well within the sites to comply with the California Code of Regulations (CCR) control zone requirement, which states that the area surrounding a new municipal water supply well must be under the control of the well owner to a radius of at least 50 feet. However, it will be necessary to position the wells at an appropriate location from which the requirement will be met.

5.7 WELL SITE RECOMMENDATIONS

Both of the proposed well sites are considered feasible locations for installation of new groundwater supply wells. Site 1, located on 10th Street East, is considered most suitable for new well construction as 1) the site is more proximal to an existing construction water source, 2) the site is more proximal to the unlined drainage channel that may be utilized for discharge of waste water, and 3) the site is located farthest from potential water level interference imparted by pumping of the existing PWD wellfield. However, there have been anecdotal reports that the hydrogeology changes from east to west across the study area, becoming less productive to the west. As such, of the two proposed well sites, Site 2 is considered most favorable to PWD.

Attachment C

Summary of Numerical Groundwater Model Results – Pure Water Antelope Valley

Palmdale Water District

Summary of Numerical Groundwater Model Results - Pure Water Antelope Valley

Technical Memorandum

May 2023

Prepared for:

Palmdale Water District

Prepared by:

Stantec Team
Montgomery & Associates

4.0 Predictive Simulations

The calibrated model was used to simulate 5 and 10 MGD Pure Water AV projects. PWD will purchase a new property for the Pure Water AV full-scale treatment facility. The demonstration facility will be located on property owned by PWD. These properties are located south and southeast and upgradient of the nearest PWD pumping wells. The location of these properties is shown on Figure 10.

The following assumptions were made for the predictive simulations:

- Injection wells will be located on the treatment facility properties. This approach minimizes the cost of conveying treated water to the injection wells.
- PWD will increase pumping rates in the six closest pumping wells (wells 2A, 3A, 23A, 4A, 7A, and 8A) to the injection wells to recover all injected purified water. This highly conservative assumption was made to recognize the conceptual benefit of higher groundwater pumping with Pure Water AV groundwater augmentation and to simulate a groundwater flow condition that would approximate the shortest underground retention times expected during operation.
- Other PWD pumping wells in the model will operate at average pumping rates estimated from pumping data from 2012 to 2021.
- New PWD wells 36 and 37 will be operating before Pure Water AV starts at the locations shown on Figure 10. Based on reports from the field during ongoing construction of well 36, the estimated short-term maximum pumping rate is approximately 1,000 gpm. To estimate a future pumping rate for wells 36 and 37, the reported short-term maximum instantaneous pumping rates and long-term average pumping rates for PWD wells in the project area were compared. This comparison indicates that PWD wells typically operate over the long-term at approximately 40% of their short-term maximum pumping rate. Applying this percentage to the estimated rate suggests that wells 36 and 37 might operate at average rates of approximately 400 gpm.

Table 1 summarizes the pumping rates used for the 5 and 10 MGD predictive simulations (sorted by largest to smallest average pumping rate). The assumed pumping well rates are conceptual and are not intended to suggest a recommended future operating condition. The model can be used in the future to assist PWD with wellfield operational improvements.

Table 1. Palmdale Water District Well Pumping Rates for Predictive Simulations

Well Identifier	Estimated 10-Year Average Pumping Rates (gpm)	5 MGD Scenario Constant Pumping Rates (gpm)	10 MGD Scenario Constant Pumping Rates (gpm)
8A	750	1,760	2,780
15	660	660	660
2A	640	1,510	2,380
11A	480	480	480
3A	470	1,110	1,750
36	400	400	400
37	400	400	400
7A	380	890	1,400
14A	310	310	310
23	270	640	1,010
6	80	80	80
4A	60	130	210
10A	60	60	60

Key: gpm = gallons per minute

Table 1 includes the 10-year average pumping rates estimated from PWD pumping data, including assumed rates for future wells 36 and 37. Average pumping rates range from approximately 60 to 750 gpm. The total average pumping rate for project area wells (including wells 36 and 37) is approximately 5,000 gpm, or approximately 7 MGD.

4.1 5 MGD Scenario

The calibrated model was used to simulate the 5 MGD Pure Water AV project. For the simulation, two injection wells were assumed to operate continuously on the full-scale treatment facility property to achieve the 5 MGD discharge rate. A third injection well would be needed to ensure continuous operation if one of the simulated wells were inoperative. The two injection wells were assumed to operate at 1,750 gpm each to achieve the 5 MGD discharge capacity.

Table 1 shows the assumed 5 MGD scenario pumping rates. Pumping rates at the six closest PWD pumping wells to the injection wells were conservatively assumed to be proportionally larger to recover the 5 MGD of injected purified water. For the conceptual 5 MGD scenario, the total pumping rate of PWD wells in the project area would be approximately 8,400 gpm, or approximately 12 MGD for the 5 MGD Pure Water AV project.

Figure 11 shows simulated steady-state groundwater elevations for the 5 MGD scenario and includes two maps:

- The map on the left shows simulated steady-state groundwater elevations for a conceptual wellfield operation at 10-year average rates with wells 36 and 37 in service. This map was included as a reference to compare to simulated groundwater elevations for the future Pure Water AV project. The map indicates that pumping at average rates would maintain the pumping depression that has prevailed in the project area for more than a decade.
- The map on the right shows simulated steady-state groundwater elevations with the 5 MGD Pure Water AV project in operation, including the increase in pumping to 12 MGD.

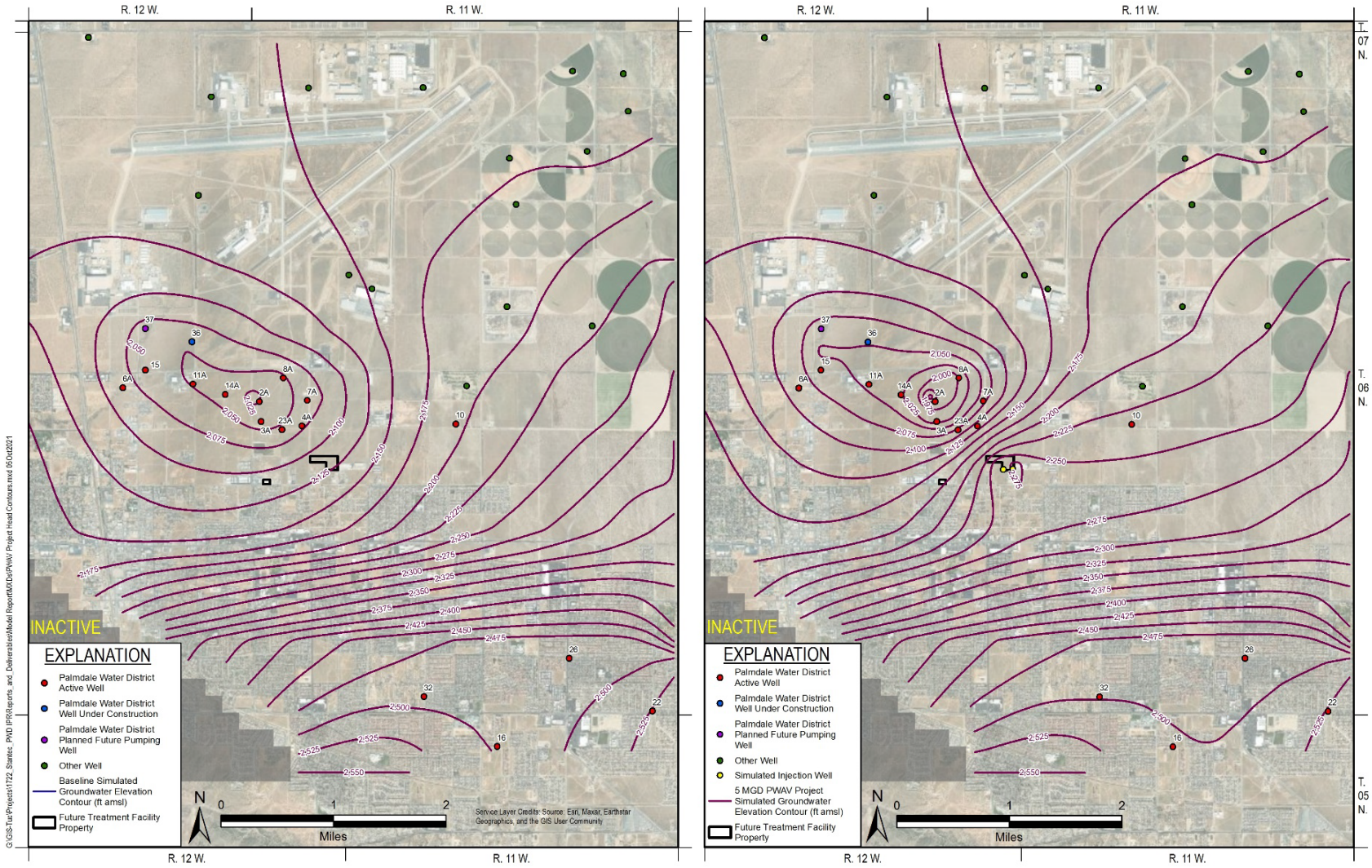


Figure 11. Simulated Steady-State Groundwater Elevations – 5 MGD Pure Water Antelope Valley Project

Figure 11 indicates the following future groundwater conditions for Pure Water AV operating at 5 MGD:

- A groundwater mound would exist around the injection wells. Ground surface elevation at the full-scale treatment facility property is approximately 2,600 feet above mean sea level. The simulated groundwater mound at the facility during 5 MGD Pure Water AV operation would rise to approximately 2,275 above mean sea level, or more than 300 ft bgs. The simulated groundwater elevation rise is the simulated groundwater elevation in the model grid cell containing the injection well. This result suggests that operating two injection wells on the facility at 1,750 gpm each would not likely cause excessive groundwater mounding in the aquifer system. However, the current model does not account for well losses which would cause the water level in the injection well to be higher than the groundwater elevation in the aquifer outside the well.
- Steep hydraulic gradients would exist between the injection wells and nearest PWD pumping wells.
- A localized cone of depression would exist near well 2A, because this is one of the six wells assumed to operate at a larger rate to recover purified water. The other wells with larger pumping rates lie between well 2A and the injection wells where gradients reflect both increased pumping and injection.

Figure 12 shows the simulated particle path lines and estimated underground retention times for the 5 MGD Pure Water AV project. The reported path lines are for layer one, where the shortest underground retention times are simulated.

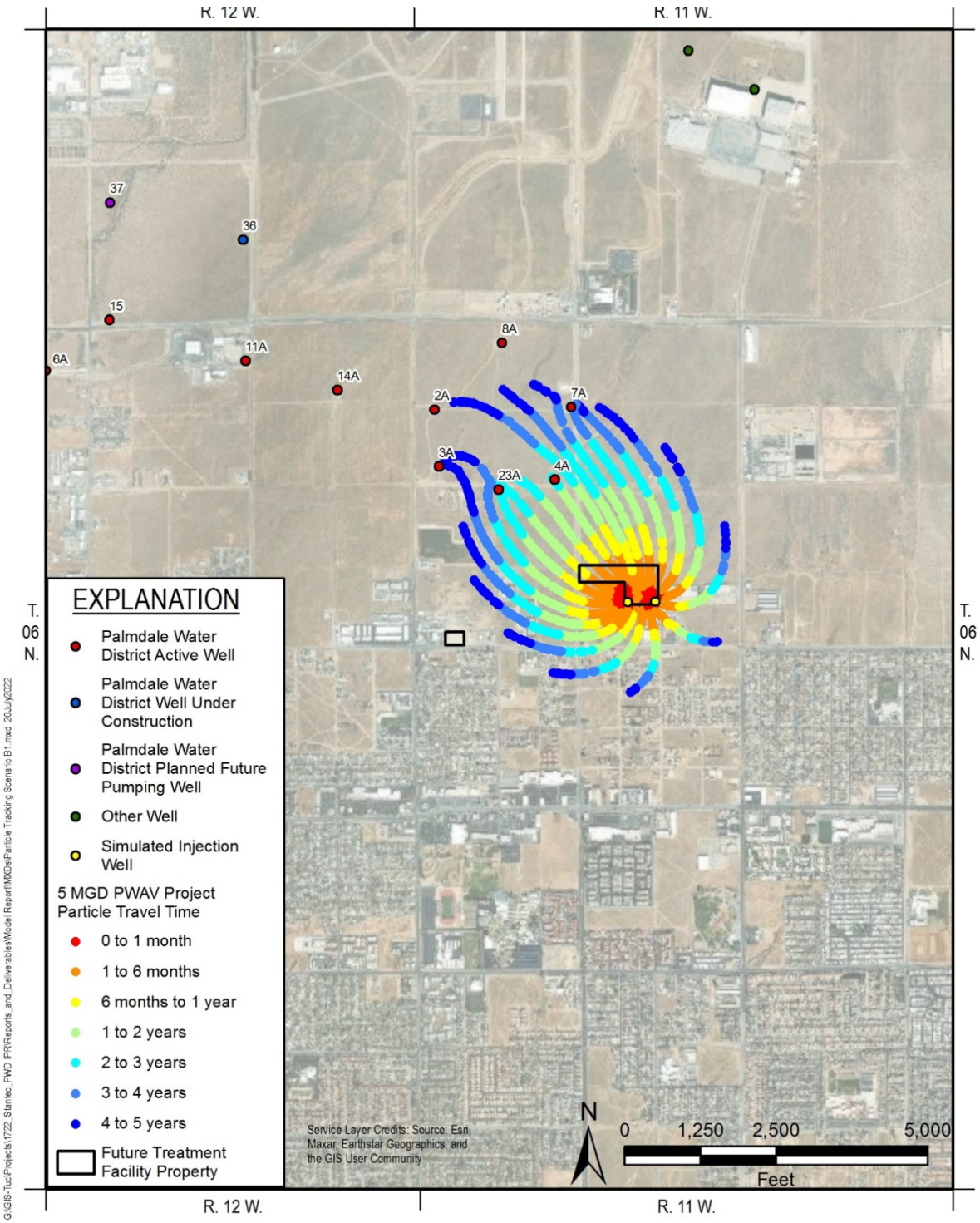


Figure 12. Simulated Particle Path Lines and Estimated Underground Retention Times for 5 MGD Pure Water Antelope Valley Project (Layer One)

Figure 12 indicates that PWD wells 2A, 3A, 4A, 7A, and 23A are simulated to pump purified water in less than five years after Pure Water AV starts. Simulated underground retention times for the four closest PWD wells are shown in Table 2.

Table 2. Simulated Underground Retention Times for 5 MGD Scenario

Palmdale Water District Well Number	Simulated Underground Retention Time in Years	Credited Underground Retention Time in Years[1]
4A	2.1	1
23A	2.3	1.1
7A	3.5	1.7
3A	4.5	2.2

Note:
[1] Credited underground travel time rounded down to be conservative.

Credited underground retention time reflects the 50% reduction applied to results from a numerical groundwater flow model. Title 22 regulations for IPR requires a minimum of two months underground retention time. Credited underground retention time for the 5 MGD scenario exceed the two-month requirement. Regulations also allow for up to six months of log virus reduction credit. Credited underground retention time for the 5 MGD scenario exceeds the six months to qualify for the maximum credit.

4.2 10 MGD Scenario

The calibrated model was used to simulate the 10 MGD Pure Water AV project. For the simulation, it was assumed that two injection wells would continuously operate on the full-scale treatment facility and one would continuously operate on the demonstration facility property to achieve the 10 MGD discharge rate. A fourth injection well would be needed to ensure continuous operation if one well is inoperative. The three injection wells were assumed to operate at 2,300 gpm each to achieve 10 MGD capacity. The model results suggest this rate is feasible with manageable groundwater elevation rise; however, confidence in this model projection is lower than that of the 5 MGD project.

Table 1 shows the simulated pumping rates for the 10 MGD scenario for wells in the project area. As previously described, the pumping rates in the six closest PWD pumping wells to the injection wells were conservatively assumed to operate at proportionally larger rates to recover all injected purified water. The total pumping rate of PWD wells in the project area would be approximately 11,900 gpm, or approximately 17 MGD for the 10 MGD Pure Water AV project.

Like Figure 11, Figure 13 shows the simulated future steady-state groundwater elevations for average pumping rates and for the 10 MGD Pure Water AV project.

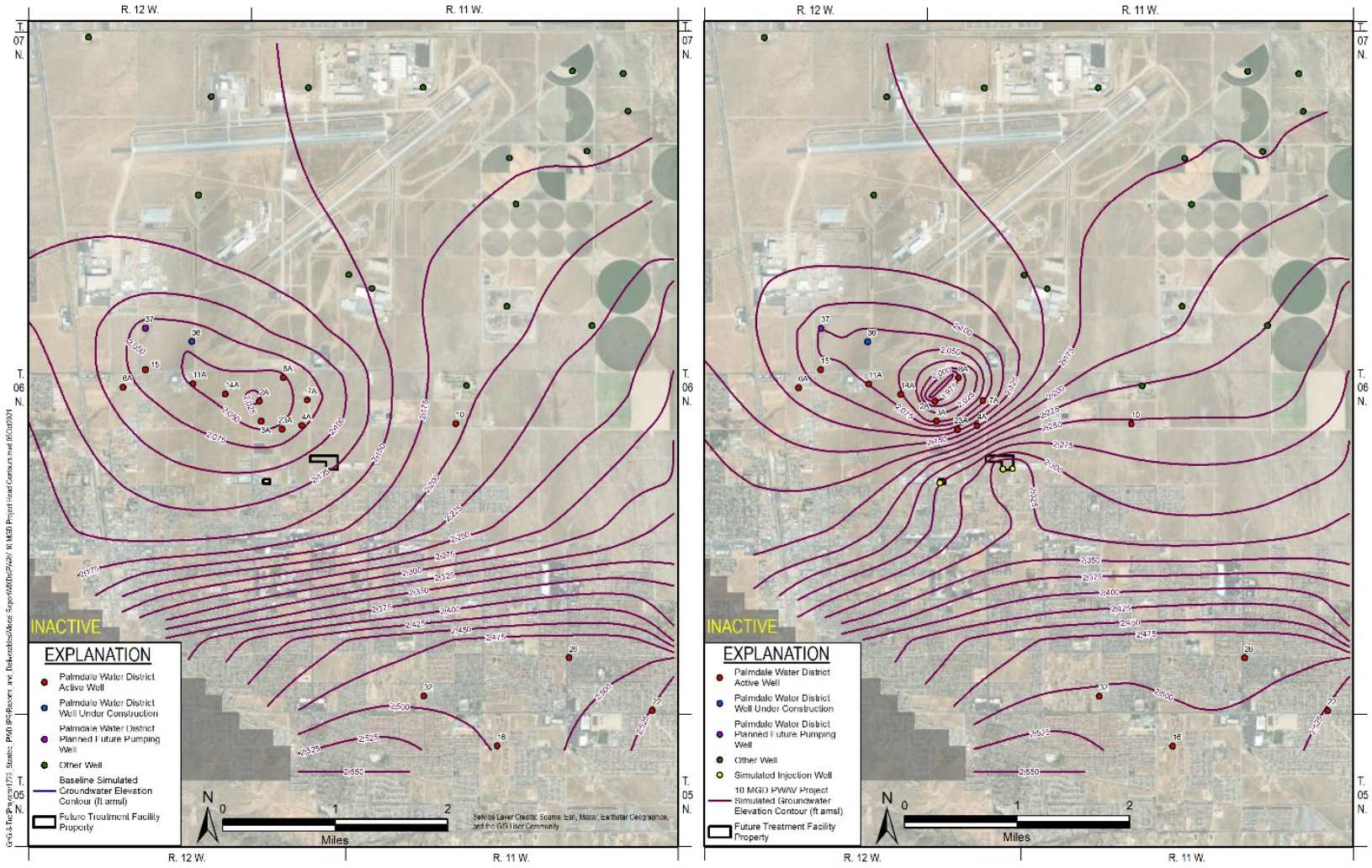


Figure 13. Simulated Steady-State Groundwater Elevations – 10 MGD Pure Water Antelope Valley Project

Figure 13 indicates the following groundwater conditions might prevail in the future with Pure Water AV operating at 10 MGD:

- A groundwater mound would exist around the injection wells. Ground surface elevation at the full-scale treatment facility property is approximately 2,600 feet above mean sea level. The simulated groundwater mound at the facility during 10 MGD Pure Water AV operation would rise to approximately 2,325 feet msl, or over 200 ft bgs, approximately 50 feet higher than for the 5 MGD scenario. The simulated groundwater elevation rise is the simulated groundwater elevation in the model grid cell containing the injection well. This result suggests that operating two injection wells on the facility at 2,300 gpm each would not likely cause excessive groundwater mounding in the aquifer system. The result also suggests that operating three injection wells on the full-scale property operating at 2,300 gpm each may also be feasible. However, the current model does not account for well losses, which would cause the water level in the injection well to be higher than the groundwater elevation in the aquifer outside the well. As a result, it was assumed that the third injection well would be constructed on the demonstration facility property.
- Steep hydraulic gradients would exist between the injection wells and nearest PWD pumping wells.
- A localized cone of depression would exist near wells 2A and 8A, because they are two of the six wells that have larger pumping rates to recover purified water. The other wells with larger pumping rates lie between wells 2A and 8A, and the injection wells where gradients reflect both increased pumping and injection.

Figure 14 shows the simulated particle path lines and estimated underground retention times for the 10 MGD Pure Water AV project. The reported path lines are for layer one, where the shortest underground retention times are simulated.

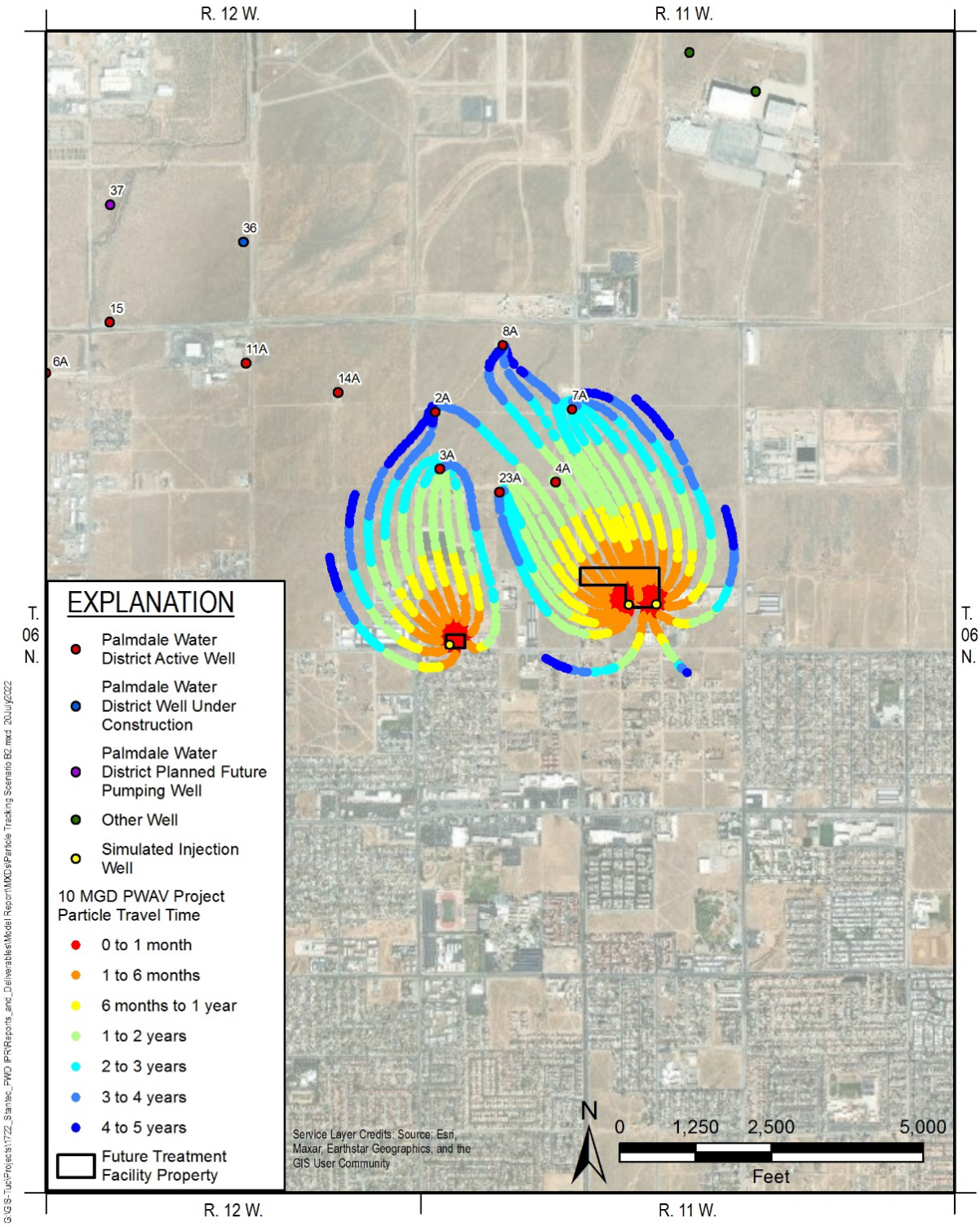


Figure 14. Simulated Particle Path Lines and Estimated Underground Retention Times for 10 MGD Pure Water Antelope Valley Project

Figure 14 indicates that PWD wells 2A, 3A, 4A, 7A, 8A and 23A are simulated to pump purified water within five years after Pure Water AV starts. PWD well 3A is projected to pump purified water from the injection well located on the demonstration facility. Simulated underground retention times for the four closest PWD wells are shown in Table 3.

Table 3. Simulated Underground Retention Times for 10 MGD Scenario

Palmdale Water District Well Number	Simulated Underground Retention Time in Years	Credited Underground Retention Time in Years[1]
4A	1.5	.7
23A	1.9	.9
7A	2.4	1.2
3A	1.8	.9

Note:
[1] Credited underground travel time rounded down to be conservative.

The simulated underground retention times for the 10 MGD scenario are shorter than those of the 5 MGD scenario. The shorter times are caused by steeper hydraulic gradients between the injection wells and the closest pumping wells. Credited underground retention time reflects the 50% reduction applied to results from a numerical groundwater flow model. Title 22 regulations for IPR require a minimum of two months underground retention time. Credited underground retention time for the 10 MGD scenario exceeds the two-month requirement. Regulations also allow for up to six months of log virus reduction credit. Credited underground retention time for the 10 MGD scenario exceeds the six months to qualify for the maximum credit.

4.3 Monitor Wells

Pure Water AV operation will require monitoring of purified water flow in the saturated zone between the injection wells and pumping wells. Title 22 regulations require at least two monitor wells to be located downgradient of the injection wells and upgradient of the pumping wells. At least one monitor well shall be located as follows:

- No less than two weeks, but no more than six months, of purified water travel time in the aquifer system
- At least one month of purified water travel time upgradient of the nearest drinking water well

Figure 15 shows the conceptual location of these monitor wells superimposed on the particle tracking maps for the 5 and 10 MGD Pure Water AV projects.

Attachment D

Letters of Support

Palmdale Water District

MIKE GARCIA
27TH DISTRICT, CALIFORNIA

WASHINGTON, DC OFFICE
144 CANNON HOB
WASHINGTON, DC 20515
(202) 225–1956

HOUSE COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON COMMERCE, JUSTICE, & SCIENCE
SUBCOMMITTEE ON DEFENSE
SUBCOMMITTEE ON ENERGY & WATER DEVELOPMENT

HOUSE PERMANENT SELECT COMMITTEE ON INTELLIGENCE
DEFENSE INTELLIGENCE & OVERHEAD ARCHITECTURE SUBCOMMITTEE
NATIONAL SECURITY AGENCY & CYBER SUBCOMMITTEE

HOUSE COMMITTEE ON SCIENCE, SPACE, & TECHNOLOGY
SUBCOMMITTEE ON SPACE & AERONAUTICS

Congress of the United States
U.S. House of Representatives
Washington, DC 20515–0527

September 12th, 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper,

I write to call your attention to the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 grant application initiated by the Palmdale Water District (PWD), located in Los Angeles County, CA. We understand the critical need for collective yet localized responses to solve the groundwater crisis here in California. PWD wishes to have its own infrastructure to access groundwater reserves, complemented by its own wastewater treatment injection into these reserves, in order to take concrete steps to conserving, reclaiming, and reusing local water supply most effectively.

The City of Palmdale, located approximately 63 miles from downtown Los Angeles, faces a crisis of water usage from a combination of increasing residential settlement and an industrial and recreational usage culture. Such internal problems require unique local solutions. We believe that taking these problems into account with a local solution of managing inflows and outflows with their Well 37 Water Supply Resiliency Project (Project) is worth considerable merit to the servicing of their water needs and conservancy goals.

We are particularly concerned about the impact on faltering state programs to connect northern California water reserves under the Delta to southern California and due to the recent budget stresses the State of California is currently under, the necessity of this project is all the more severe. Without reliable infrastructure to manage local groundwater reserves, Palmdale's hope of a sustainable water future may evaporate due to hegemonic infrastructural doctrine impacting this state.

Considering these challenges, we commend the proactive approach taken by the Palmdale Water District Works in proposing the development Well 37 Water Supply Resiliency Project (Project). It is a crucial project to address local water usage customs, conserve outflows, and provide the possibility of sustainable groundwater reserve management.

I urge you to give this proposal your full and fair consideration. Thank you for your attention to this request, and I look forward to continuing to work with you on this important matter.

Sincerely,

Mike Garcia
U.S. Member of Congress CA-27

ANTELOPE VALLEY
1043 WEST AVENUE M4, SUITE A
PALMDALE, CA 93551
(661) 839–0532

SANTA CLARITA VALLEY
27200 TOURNEY ROAD, SUITE 300
SANTA CLARITA, CA 91355
(661) 568–4855

ANTELOPE VALLEY DISTRICT OFFICE
848 W. LANCASTER BLVD., SUITE 101
LANCASTER, CA 93534
TEL (661) 729-6232
FAX (661) 729-1683

VICTOR VALLEY DISTRICT OFFICE
14343 CIVIC DRIVE, FIRST FLOOR
VICTORVILLE, CA 92392
TEL (760) 843-8414
FAX (760) 843-8348

SANTA CLARITA DISTRICT OFFICE
23920 VALENCIA BLVD., SUITE 250
SANTA CLARITA, CA 91355
TEL (661) 286-1471
FAX (661) 286-2543

California State Senate

SENATOR
SCOTT WILK
TWENTY-FIRST SENATE DISTRICT

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GOVERNMENTAL ORGANIZATION
JUDICIARY
LABOR, PUBLIC EMPLOYMENT & RETIREMENT

August 29, 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

I write in support of the Palmdale Water District's (PWD or District) application to the WaterSMART Drought Response Program - Drought Resiliency Projects for Fiscal Year 2025 for the **Well 37 Water Supply Resiliency Project (Project)**.

To achieve its objectives toward drought resiliency, the proposed Project will drill and equip a new well and construct a pipeline to connect to PWD's existing water distribution system. At Project completion, PWD can convey groundwater supplies to the PWD distribution system.

I recognize the benefits of the proposed Project to improve groundwater supply recovery flexibility by allowing PWD to extract and convey groundwater to access and fully recover its allotment of groundwater each year. By doing so, the proposed Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and continue to provide a secondary supply source in the event of State Water Project (SWP) water supply shortages or disruptions caused by prolonged droughts or catastrophic events.

The Project will provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley.

Respectfully,

Scott Wilk

Senator Scott Wilk
21 st Senate District

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0039
(916) 319-2039
FAX (916) 319-2139

Assembly
California Legislature

JUAN CARRILLO
ASSEMBLYMEMBER, THIRTY-NINTH DISTRICT

September 17, 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

I write in support of the Palmdale Water District's (PWD or District) application to the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for the **Well 37 Water Supply Resiliency Project (Project)**.

To achieve its objectives toward drought resiliency, the proposed Project will drill and equip a new well and construct a pipeline to connect to PWD's existing water distribution system. At Project completion, PWD can convey groundwater supplies to the PWD distribution system.

As the District's representative in the State Assembly, I recognize the benefits of the proposed Project to improve groundwater supply recovery flexibility by allowing PWD to extract and convey groundwater to access and fully recover its allotment of groundwater each year. By doing so, the proposed Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and continue to provide a secondary supply source in the event of State Water Project (SWP) water supply shortages or disruptions caused by prolonged droughts or catastrophic events.

The Project will provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley. If you have any questions about our support for the Project, please contact my office at 661-266-3908

Respectfully,

Assemblymember Juan Carrillo
California District 39

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0034
(916) 319-2034
FAX (916) 319-2134

DISTRICT OFFICE
41301 12TH STREET WEST, SUITE F
(661) 267-7636
FAX (661) 267-7736

Assembly
California Legislature

TOM LACKEY
ASSEMBLYMAN, THIRTY-FOURTH DISTRICT

COMMITTEES
VICE CHAIR: ELECTIONS
VICE CHAIR: GOVERNMENTAL ORGANIZATION
VICE CHAIR: PUBLIC EMPLOYMENT AND RETIREMENT
ARTS, ENTERTAINMENT, SPORTS, AND TOURISM
BUDGET
PUBLIC SAFETY
SPECIAL COMMITTEE ON LEGISLATIVE ETHICS

August 29, 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

I write in support of the Palmdale Water District's (PWD or District) application to the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for the **Well 37 Water Supply Resiliency Project (Project)**.

To achieve its objectives toward drought resiliency, the proposed Project will drill and equip a new well and construct a pipeline to connect to PWD's existing water distribution system. At Project completion, PWD can convey groundwater supplies to the PWD distribution system.

As the District's representative in the State Assembly, I recognize the benefits of the proposed Project to improve groundwater supply recovery flexibility by allowing PWD to extract and convey groundwater to access and fully recover its allotment of groundwater each year. By doing so, the proposed Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and continue to provide a secondary supply source in the event of State Water Project (SWP) water supply shortages or disruptions caused by prolonged droughts or catastrophic events.

The Project will provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley. If you have any questions about our support for the Project, please contact my office at 916-319-2034.

Respectfully,

Thomas Lackey

Assemblyman Tom Lackey, 34th District

BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

869 KENNETH HAHN HALL OF ADMINISTRATION/LOS ANGELES, CALIFORNIA 90012
Tel: 213-974-5555 Fax: 213-974-1010

KATHRYN BARGER
SUPERVISOR, FIFTH DISTRICT

September 25, 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

As the Supervisor for the Fifth District of Los Angeles County, I am writing to express my support for Palmdale Water District's (PWD) application to the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for its Well 37 Water Supply Resiliency Project (Project).

To achieve its objectives toward drought resiliency, PWD will drill and equip a new well and construct a pipeline to connect to its existing water distribution system. The Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and strengthening a secondary supply source in the event of State Water Project shortages or disruptions caused by prolonged droughts or catastrophic events. The Project will provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley.

If you have any questions, feel free to contact Charles Bostwick at (661) 726-3600 or e-mail him at cbostwick@bos.lacounty.gov.

Thank you for the work that you do on behalf of the residents of Los Angeles County.

Sincerely,

KATHRYN BARGER
Supervisor, Fifth District

KB:cb

PALMDALE

a place to call home

September 19, 2024

38300 Sierra Highway

Palmdale, CA 93550-4798

Tel: 661/267-5100

TDD: 661/267-5167

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

On behalf of the City of Palmdale, we support Palmdale Water District's (PWD or District) application for the WaterSMART Drought Response Program: Drought Resiliency Projects. The Project aims to provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley. To achieve these objectives, the proposed Project will drill and equip a new well and construct a pipeline to connect to PWD's existing water distribution system. At Project completion, PWD can convey groundwater supplies to the PWD distribution system.

The adjudication of the Antelope Valley Groundwater Basin (Basin) in 2015 allocated Production Rights to Parties (i.e., groundwater users) in the Basin. However, the District's capacity to extract the full groundwater Production Right in the Basin lacks the necessary redundancy to fulfill that right. As a result, PWD will rely on imported water from the State Water Project (SWP) to meet potable water demands. The proposed Project will improve groundwater supply recovery flexibility by allowing PWD to extract and convey groundwater to access groundwater to fully recover the District's Production Right each year. By doing so, the proposed Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and continue to provide a secondary supply source in the event of SWP water supply shortages or disruptions caused by prolonged droughts or catastrophic events.

This Project is expected to enhance drought resilience by diversifying the regional supply portfolio and providing greater flexibility in system operations. Therefore, we support PWD's application for funding through WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025.

If you have any questions about our support, please contact me at rperez@cityofpalmdale.org or 661-267-5115.

Respectfully,

Ronda Perez
City Manager

ANTELOPE VALLEY - EAST KERN WATER AGENCY
AVEK
ESTABLISHED 1959

A PUBLIC AGENCY

9/25/2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Re: Support for Palmdale Water District's Well 37 Water Supply Resiliency Project

Dear Ms. Looper,

I am writing on behalf of Antelope Valley-East Kern Water Agency (AVEK) to express support for the WaterSMART Drought Response Program Grant application being submitted by Palmdale Water District (PWD) for their Well 37 Water Supply Resiliency Project (Project). This Project will drill and equip a new well and construct a pipeline to connect PWD's existing water distribution system. At project completion, PWD will be able to convey groundwater supplies to its distribution system.

The Project will benefit the Antelope Valley region with improved drought resiliency and water supply reliability through the diversification of its water supply portfolio and increased operational flexibility of its water systems. PWD and AVEK have inter-ties that enable water supplies to be provided to each other and have successfully collaborated in the past to support the region during periods of drought.

For these reasons, AVEK supports the Well 37 Water Supply Resiliency Project.

Respectfully,

Matthew Knudson
General Manager

10/1/2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

The Antelope Valley Integrated Regional Water Management Group (AVIRWMG) supports Palmdale Water District's (PWD or District) application to the WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for the **Well 37 Water Supply Resiliency Project (Project)**.

The Well 37 Water Supply Resiliency Project will provide significant regional drought resiliency and water supply reliability benefits to multiple entities in the region, in both the District's service area as well as that of the Antelope Valley East Kern Water Authority (AVEK). To achieve these objectives, the proposed Project will drill and equip a new well and construct a pipeline to connect PWD's existing water distribution system, including an inter-tie with AVEK.

AVIRWMG is a group of agencies working cooperatively to manage local and imported water supplies to improve quality, quantity, and reliability. The District's project will increase community drought resilience and directly increase the beneficial use of the District's supply portfolio, which in turn will increase the long-term reliability of the region's water supply.

The adjudication of the Antelope Valley Groundwater Basin (Basin) in 2015 allocated Production Rights to Parties (i.e., groundwater users) in the Basin. However, the District's capacity to extract the full groundwater Production Right in the Basin lacks the necessary redundancy to fulfill that right. As a result, PWD will rely on imported water from the State Water Project (SWP) to meet potable water demands. The proposed Project will improve groundwater supply recovery flexibility by allowing PWD to extract and convey groundwater to access groundwater to fully recover the District's Production Right each year. By doing so, the proposed Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water supplies and continue to provide a secondary supply source in the event of SWP water supply shortages or disruptions caused by prolonged droughts or catastrophic events.

For these reasons, AVIRWMG enthusiastically supports the District's project.

Very truly yours,

Brent Byrne
General Manager, Quartz Hill Water District

On the behalf of Antelope Valley Integrated Water Management Group:
City of Palmdale, Quartz Hill Water District, Los Angeles County Sanitation District Nos. 14 and 20, Palmdale Water District, Antelope Valley East Kern Water Agency, Little Rock Creek Irrigation District, City of Lancaster, and Rosamond Community Services District

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

Robert C. Ferrante
Chief Engineer and General Manager

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
(562) 699-7411 • www.lacsd.org

September 25, 2024

Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Sheri Looper:

Letter of Support for Palmdale Water District's Well 37 Water Supply Resiliency Project Application – WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025

Los Angeles County Sanitation District No. 20 (Sanitation District) is pleased to support Palmdale Water District's (PWD) application to the US Bureau of Reclamation's WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for PWD's Well 37 Water Supply Resiliency Project (Project).

The Sanitation District owns and operates the Palmdale Water Reclamation Plant (WRP), which produces approximately 9,000 acre-feet per year of disinfected tertiary recycled water in the City of Palmdale, located in the Antelope Valley Region of California. The Sanitation District has a recycled water purchase agreement with PWD to allocate a portion of Palmdale WRP recycled water for beneficial reuse. PWD's Pure Water Antelope Valley Project aims to mitigate the effects of drought by building a new advanced water purification facility that will further treat recycled water provided by the Sanitation District and use it to replenish the local groundwater basin via subsurface injection. Water stored in the groundwater basin will be extracted as a reliable and sustainable source of potable water supply for the communities served by PWD, creating a new, drought-resilient water supply. Using recycled water to augment a potable water supply is its most effective and beneficial use.

The Well 37 Project aims to mitigate the effects of drought by building a new water supply well and constructing a pipeline to connect to PWD's existing water distribution system. Upon Project completion, PWD can convey additional groundwater supplies to its distribution system. Water stored in the groundwater basin will be extracted as a reliable source of potable water supply for the communities that PWD serves.

In 2015, adjudication of the Antelope Valley Groundwater Basin (Basin) allocated production rights to groundwater users in the Basin. However, PWD's capacity to extract its full groundwater production right in the Basin lacks the necessary redundancy to fulfill that right. As a result, PWD relies on imported water from the California State Water Project (SWP) to meet potable water demands. The Project will improve groundwater supply recovery and allow PWD to access and fully recover its production right in the Basin each year. After implementation of the Pure Water Antelope Valley Project, the Well 37 Project will provide access to a drought-resistant local supply, effectively reducing regional reliance on imported water while providing a secondary supply source in the event of a SWP water supply shortage or disruptions caused by prolonged droughts or catastrophic events.

PWD is a local leader in addressing climate change by seeking scalable drought mitigation and greenhouse gas (GHG) reduction solutions that will directly benefit some of the region's most climate-vulnerable communities. There are 115,147 people in PWD's service area that depend upon the potable resources made available through PWD. The White House Climate and Economic Justice Screening Tool categorizes 70 percent of those customers as disadvantaged. As such, much of the population in PWD's service area is considered highly vulnerable to the impacts of climate change, particularly the day-to-day effects of drought—an ongoing hazard in

this region. This Project will diversify the regional supply portfolio and provide greater flexibility in system operations.

For these reasons, the Sanitation District supports PWD's application for funding through WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 for the Well 37 Water Supply Resiliency Project and encourages the US Bureau of Reclamation to award funding to this vital effort.

Very truly yours,

Robert C. Ferrante

Robert C. Ferrante

cc: Dennis LaMoreaux – Palmdale Water District

29 August 2024

Ms. Sheri Looper
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Dear Ms. Looper:

On behalf of the Antelope Valley Economic Development & Growth Enterprise (AV EDGE), we would like to express our support for the Palmdale Water District's (PWD or District) Well 37 Water Supply Resiliency Project (Project).

The Project will provide significant regional drought resiliency and water supply reliability benefits to the Antelope Valley. These benefits align with AV EDGE's vision for a redefined Antelope Valley economy that facilitates sustainability and adaptability.

To achieve these objectives toward drought resiliency, the proposed Project will drill and equip a new well and construct a pipeline to connect to PWD's existing water distribution system. At Project completion, PWD can convey groundwater supplies to the PWD distribution system.

We are proud to be partners with PWD and are confident that this Project will enhance drought resilience by diversifying the regional supply portfolio and providing greater flexibility in system operations.

Recognizing the need and value for this Project and the benefits it will provide; we strongly support the Project and PWD's application for funding through WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025. If you have any questions about our support for the Project, please contact me at drew@advedgeca.org or 661-441-2957.

Respectfully,

Drew Mercy
Executive Director

Attachment E

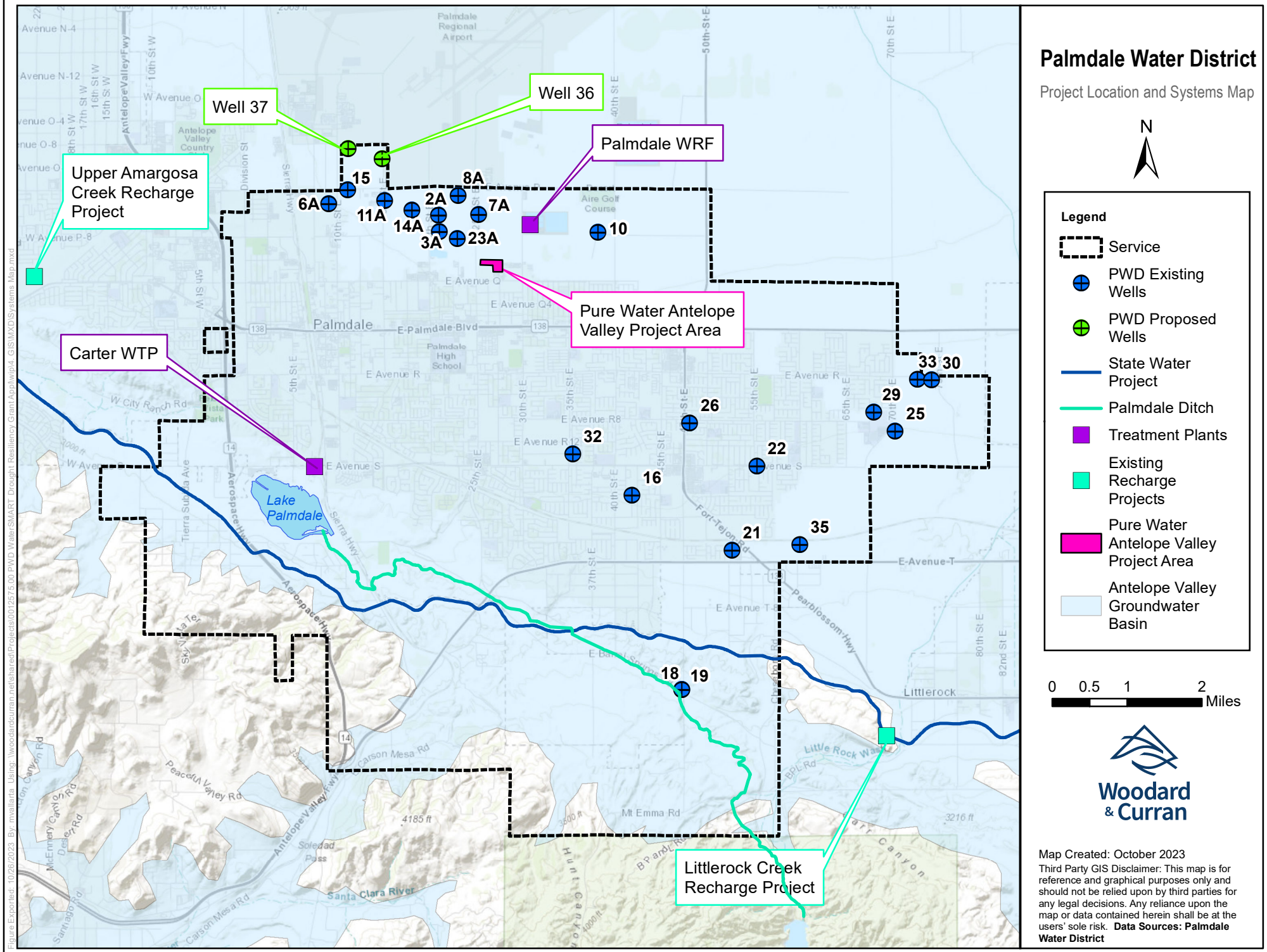
Estimated Construction Costs for Well 37 Water Supply Resiliency Project

Palmdale Water District

ATTACHMENT E: ESTIMATED CONSTRUCTION COSTS FOR WELL 37 WATER SUPPLY RESILIENCY PROJECT (DRILLING AND EQUIPPING)

Item Description	Quantity	Unit	Well 37 Unit Price	Total Price Well 37 (2022)	ENR 18% (2022 2024)	Final Cost Estimate (Escalation to 2026 Dollars)
Mobilization, demobilization, site clean-up, and site restoration.	1	LS	$250,000	$250,000	**$347,181**	**$382,767**
Construct approx. 375,000-gallon percolation basin measuring approx. 180 feet x 80 feet x 4 feet.	1	LS	$48,500	$48,500	**$67,353**	**$74,257**
Provide noise mitigation.	1	LS	$1,000	$1,000	**$1,389**	**$1,531**
Testing and disposal of cuttings from borehole cleaning and enlargement.	1	LS	$50,830	$50,830	**$70,589**	**$77,824**
Drill 48-inch diameter conductor borehole, install 36-inch OD conductor casing, cement into place (+0.5 to 50 feet).	50.5	Feet	$1,010	$51,005	**$70,832**	**$78,092**
Drill 17.5-inch diameter borehole (50 to 1,030 feet).	980	Feet	$150	$147,000	**$204,142**	**$225,067**
Conduct borehole geophysical surveys, as specified.	1	LS	$14,350	$14,350	**$19,928**	**$21,971**
Install isolated aquifer zone tool, upper and lower seals, and gravel envelope. Provide initial development and demonstrate seal integrity.	4	Each	$21,470	$85,880	**$119,263**	**$131,488**
Pump isolated aquifer zones (estimate 18 hours per zone).	72	Hours	$580	$41,760	**$57,993**	**$63,937**
Provide laboratory analyses for isolated aquifer zone testing.	4	Each	$3,690	$14,760	**$20,498**	**$22,599**
Ream 17.5-inch borehole to 34-inch diameter (50 to 700 feet).	650	Feet	$165	$107,250	**$148,940**	**$164,207**
Ream 17.5-inch borehole to 30-inch diameter (700 to 1,030 feet).	330	Feet	$160	$52,800	**$73,325**	**$80,840**
Provide caliper survey of reamed borehole	1	LS	$7,720	$7,720	**$10,721**	**$11,820**
Furnish and install 20-inch ID x 3/8-inch wall ASTM A778 304L stainless steel blank well casing (+2 to 620 feet).	622	Feet	$810	$503,820	**$699,666**	**$771,382**
Furnish and install 20-inch ID x 5/16-inch wall ASTM A778 304L stainless steel blank well casing (620 to 700 feet).	80	Feet	$675	$54,000	**$74,991**	**$82,678**
Furnish and install 20-inch ID x 5/16-inch wall A778 304L stainless steel Ful Flo louvered well screen with 0.080-inch slot (700 to 1,000 feet).	300	Feet	$800	$240,000	**$333,293**	**$367,456**
Furnish and install 20-inch ID x 5/16-inch wall ASTM A778 304L stainless steel blank well casing with end plate (1,000 to 1,010 feet).	10	Feet	$845	$8,450	**$11,735**	**$12,938**
Furnish and install 2-inch Sch. 40 304L stainless steel sounding tube and 2-foot connection box (+1 to 698 feet).	699	Feet	$50	$34,950	**$48,536**	**$53,511**
Furnish and install two (2) 3-inch Sch. 40 304L stainless steel gravel fill pipes (+1 to 610 feet).	1222	Feet	$90	$109,980	**$152,732**	**$168,387**
Furnish and install specified gravel envelope material and transition sand.	430	Feet	$145	$62,350	**$86,587**	**$95,462**
Furnish and install annular cement seal.	600	Feet	$140	$84,000	**$116,653**	**$128,610**
Provide initial well development by focused intake pumping and swabbing.	144	Hours	$800	$115,200	**$159,981**	**$176,379**
Provide, install, and remove development test pump and motor.	1	LS	$52,910	$52,910	**$73,477**	**$81,009**
Provide final well development by pumping and surging.	60	Hours	$370	$22,200	**$30,830**	**$33,990**
Provide aquifer pumping tests (8-hour step, 24-hour constant rate, 4-hour recovery).	36	LS	$370	$13,320	**$18,498**	**$20,394**
Provide flowmeter spinner survey.	1	LS	$9,610	$9,610	**$13,346**	**$14,714**

Provide Title 22 laboratory analyses.	1	LS	$6,680	$6,680	**$9,277**	**$10,228**
Provide dual-cam downhole video survey.	1	LS	$2,450	$2,450	**$3,402**	**$3,751**
Provide plumbness and alignment surveys.	1	LS	$10,100	$10,100	**$14,026**	**$15,464**
Provide well disinfection.	1	LS	$8,325	$8,325	**$11,561**	**$12,746**
Complete wellhead as designed.	**1**	LS	$6,100	$6,100	**$8,471**	**$9,340**
Waste Water Discharge- Compliance with discharge requirements, including temporary conveyance approximately 2,200 feet west, energy dissipation, and damming of natural drainage channel	1	LS	$42,350	$42,350	**$58,812**	**$64,841**
Mobilization, demobilization, insurance and bonds	1	Allowance	$302,500	$302,500		**$333,506**
Permit Fees Allowance	1	LS	$2,200	$2,200		**$2,426**
Trench and Excavation Safety Measures	1	LS	$30,500	$30,500		**$33,626**
Site Work. Provide and install all site improvements including clearing and grading, sub-grade preparation, base material, asphalt paving, chain-link fence and gates, contrete equipement pads, SCADA tower installation, miscellaneous structures, and all other work required that is not specifically listed in other bid items	1	LS	$355,000	$355,000		**$391,388**
Well Building. Provide materials and construct the well building including building foundation, rolling section track, structure, access doors and interior doors, drain piping, water service piping, housekeeping pads, lighting, fire extinguishers, signs, cabinets, and all other required appurtenances	1	LS	$1,100,000	$1,100,000		**$1,212,750**
Well Pump and Appurtenances. Provide and install 600HP oil-lubricated lineshaft pump and motor, including column pipe, discharge head, oil lubrication system, air line, and all appurtenances for a complete well pump system	1	LS	$870,000	$870,000		**$959,175**
Piping and Valves. Provide and install all piping, fitting, couplings, valves, control valves, and appurtenances required for the well pump discharge system, water supply system, and drainage system.	1	LS	$310,000	$310,000		**$341,775**
Electrical and Instrumentation. Provide and install all electrical and instrumentation including MCC, PLC, control panel, conduit & wiring, meters, transmitters and all related appurtenances.	1	LS	$1,250,000	$1,250,000		**$1,378,125**
Heating, Ventilating, and Air Conditioning (HVAC). Provide and install a complete HVAC system including package heat pump system, air distribution system, thermostat and controls, exhaust fans and louvers for a complete building HVAC system	1	LS	$120,000	$120,000		**$132,300**
Startup Testing and Training. Provide equipment, materials, and labor necessary for startup, testing, and training for the well pump, electrical equipment, telemetry equipment, control valves, HVAC equipment, and all other equipment that requires testing and training.	1	LS	$25,000	$25,000		**$27,563**
Preparation of Operations and Maintenance Manuals	1	LS	$7,500	$7,500		**$8,269**
Construct Approx. 1400 feet of 12" DI Pipeline	1400	LF	$190	$266,000		**$293,265**
Well 37 Total Cost				$6,898,350		**$8,573,841**


Well 37
Well 36
Palmdale WRF
Upper Amargosa Creek Recharge Project
Pure Water Antelope Valley Project Area
Carter WTP
Littlerock Creek Recharge Project
Lake Palmdale
Palmdale
Littlerock
15
6A
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Palmdale Water District
Project Location and Systems Map
N
Legend
Service
PWD Existing Wells
PWD Proposed Wells
State Water Project
Palmdale Ditch
Treatment Plants
Existing Recharge Projects
Pure Water Antelope Valley Project Area
Antelope Valley Groundwater Basin
0 0.5 1 2
Miles
Woodard & Curran
Map Created: October 2023
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