

# **APPENDIX F – WATER SUPPLY ASSESSMENT**

Prepared by

Karen E. Johnson, Water Resources Planning

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# **Water Supply Assessment**

## **Valley Clean Infrastructure Plan**

**Fresno County, California**

**Prepared for:**

**Westlands Water District**

**July 2025**



**Karen E. Johnson**  
**Water Resources Planning**

[kejwater@aol.com](mailto:kejwater@aol.com)

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## CHAPTER 1 – INTRODUCTION

### BACKGROUND AND PURPOSE

This Water Supply Assessment (WSA) was prepared for Westlands Water District (the District or WWD) regarding the proposed Valley Clean Infrastructure Plan (the VCIP or project), for which the District is preparing a Programmatic Environmental Impact Report (PEIR) as the lead agency under the California Environmental Quality Act (CEQA).

The primary purpose of the WSA is to determine if there is sufficient water supply to meet the projected demands of the project under normal, single dry, and multiple dry water years during a 20-year projection. The WSA will be included in the PEIR prepared for the VCIP. This forms the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code § 10910, *et seq.* The WSA was prepared in conformance with the requirements of Senate Bill 610 (Chapter 643, Statutes of 2001) (referred to here as SB 610). SB 610 was adopted, along with a companion measure SB 221 effective January 1, 2002, to improve the nexus between land use planning and water supply availability. Information regarding water supply availability is to be provided to local public agency decision makers prior to approval of projects that meet or exceed specific criteria.<sup>1</sup>

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- A proposed hotel or motel, or both, having more than 500 rooms.
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- A mixed-use project that includes one or more of the projects defined herein.
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(Wat. Code, § 10912; see Cal. Code Regs., tit. 14 (CEQA Guidelines), § 15155.)

To determine water demands for a 500 unit residential development, local data were used. Based on the City of Hanford’s water system master plan, medium density residential water demands are 2,450 gallons per day per acre (Hanford 2017a). The Hanford General Plan indicates an average of nine dwelling units per acre for the net medium density residential category (Hanford 2017b). The resulting average water demand by a 500 dwelling unit project in the vicinity of the project is 168 acre-feet per year (AFY).<sup>2</sup> As discussed in Chapter 2 of this WSA, the maximum water construction demand of 2,227 acre-feet (AF) will

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<sup>1</sup> While the District is not a city or county, this WSA has been prepared for informational purposes. (Wat. Code, § 10910 [“Any city or county . . . shall comply with this part.”].)

<sup>2</sup> With a 10 percent increase for net acres for the dwelling unit density in the General Plan to gross acres.

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be needed annually for four years for this project, declining through the remainder of the construction period with a maximum annual operational demand of 514 AF after all construction is completed around year 2039. As these demands would exceed the amount of water required by a 500 dwelling unit project, the VCIP meets the definition of a “project” for which a WSA is required.

The purpose of a water supply assessment is to address the reasonably foreseeable impacts of supplying water to a project, particularly those on an existing public water system. Under SB 610, a “public water system” is a system that provides potable piped water to the public for human consumption and has 3,000 or more service connections (Wat. Code, §§ 10912(c), 10910(b).) As part of this analysis, SB 610 asks whether there is a current Urban Water Management Plan (UWMP) that accounts for a project’s demand. A “urban water supplier” is a publicly or privately owned supplier that provides potable water for municipal purposes to more than 3,000 customers or supplies more than 3,000 AF annually. (Wat. Code, § 10617.) Every urban water supplier shall prepare and adopt an UWMP, which will be updated at least once every five years. (Wat. Code, §§ 10620, 10621.)

Regarding the VCIP, there is no public potable water system needed to serve the project.<sup>3</sup> The project site is located within the boundaries of the District, which provides irrigation water to users within its jurisdiction. The District also delivers non-potable, untreated surface water to municipal and industrial (M&I) users. The M&I purposes include but are not limited to single family dwellings, farm housing, commercial operations, industrial operations, military, and state institutions. As such, the District is not a “public water system” under SB 610 because it does not provide piped water to the public for human consumption. (Wat. Code, § 10912(c).) Water required during construction and operation of the project does not need to be treated for human consumption and will be obtained from groundwater wells and/or from District surface water supplies. There is no UWMP that accounts for the project’s water demands. Because the District does not provide potable municipal water to more than 3,000 customers or supply more than 3,000 AFY of treated piped water, it is not an urban water supplier and is not required to prepare an UWMP. (Wat. Code, §§ 10617, 10620.) While inapplicable to the VCIP, the closest jurisdictions with UWMPs include the cities of Hanford, Lemoore, and Coalinga. The District, however, prepares annual groundwater reports, pursuant to SGMA, and regular Water Management Plans (Surface water) to satisfy requirements of the Agricultural Water Management Planning Act.

## DESCRIPTION OF THE VCIP

The proposed VCIP provides an overall plan to guide and facilitate the beneficial repurposing of drainage-impaired and other private and District-owned lands with renewable energy generation and storage, and conveyance related facilities such as transmission facilities, generation interconnection tie-lines (gen-tie lines), substations, and related infrastructure to convey the clean energy.



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<sup>3</sup> During construction and decommissioning, drinking water for workers would be provided by bottled water delivered by truck. During project operations, potable water for domestic use would be stored in an on-site water tank which would be refilled as needed via truck delivery.

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## **Plan Area**

The Plan Area is presented on Figure 1, Project Setting. It encompasses the entire Fresno County portion, approximately 534,800 acres, of the District's 614,700-acre service area. Within the Plan Area, approximately 136,000 acres have been identified as "Development Focus Areas" (DFAs); see Figure 2, VCIP Concept Plan. These lands, which are suitable for clean energy development, include approximately 72,000 acres of District-owned land and approximately 64,000 acres of privately-owned lands for which the landowners have expressed interest in clean energy facilities. The 136,000 gross acres of repurposed farmland in the DFAs would accommodate the planned generation capacity of up to 21,000 mega-watts (MW) under the VCIP.

## **Energy Resource Plan**

In the VCIP, the Energy Resource Plan identifies specific areas within the Plan Area for potential renewable energy development, including solar photovoltaic (PV) facilities with integrated energy storage systems (ESS), along with typical supporting facilities such as Operations and Maintenance (O&M) facilities and project substations. Separate ESS facilities dedicated solely to energy storage are also included in the Energy Resource Plan.

The individual solar PV facilities would range in size from 100 MW (on approximately 640 acres) to about 1,150 MW (on approximately 7,500 acres), with the latter representing the approximate maximum generation that can be accommodated by a double-circuit 230-kV gen-tie line. It is assumed that a typical solar PV facility would have a generating capacity of 250 MW and would occupy about 1,600 acres. This project size represents the typical upper limit for a project size that is manageable for construction contractors and financing. It is assumed that each solar facility would include an on-site ESS integrated into the project design with a maximum storage capacity equivalent to the facility's generation capacity. A typical facility could include an on-site battery energy storage system (BESS) that would provide up to 250 MW of storage. As such, this analysis covers an overall BESS storage capacity within the VCIP of 21,000 MW. Currently, these BESS facilities would likely utilize lithium-ion batteries, but could include other technologies.

As an alternative co-locating and integrating the BESS facilities with the solar PV facilities, some BESS facilities could consist of stand-alone energy storage facilities which would operate independently of solar generation facilities. These facilities could provide temporary storage for solar power generated at off-site solar facilities, and would dispatch the stored power to the electrical grid when needed. Since the number of stand-alone BESS facilities that would be proposed within the VCIP, if any, cannot be predicted, it is assumed for purposes of this analysis that all BESS facilities would likely be located within the solar PV facilities and integrated with the solar PV facility sites. As noted above, this analysis covers an overall BESS storage capacity within VCIP of 21,000 MW, which would consist of some combination of stand-alone BESS facilities and BESS integrated into solar facilities.

## **Infrastructure Plan**

The Infrastructure Plan consists of transmission facilities and collection substations required for the collection of solar generation within the Plan Area, and for the delivery of renewable energy to electricity markets in California. The energy produced at the solar facilities would be transferred to gen-tie lines for

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conveyance to one of five new collection substations to be distributed throughout the Plan Area. The collection substations would provide for interconnection to the state and federal power systems for delivery of solar generation to areas outside the Plan Area.

**Collection Substations.** The Infrastructure Plan includes five collection substations which would be distributed from north to south along the backbone transmission corridor running through the eastern portion of the Plan Area. These 500/230-kV substations would serve as collection points for power generated in the surrounding DFAs as received from the gen-tie network and would provide interconnection to the state and federal power systems. It is expected that each collection substation would accommodate approximately 4,000 MW of solar power generated at solar facilities occupying an average of about 26,000 acres around each substation. Each collection substation is anticipated to have a footprint of about 60 acres, to be located within a larger site of about 160 acres which would provide sufficient buffer area to accommodate the convergence of incoming gen-tie lines from the nearby solar generation and energy storage facilities. The construction of each collection substation would take about 24 months. Therefore, a footprint of 60 acres was used here to determine construction water demands.

**Gen-Tie Lines.** Each solar PV generating facility and stand-alone energy storage facility would be served by a 230-kV gen-tie line which would convey the generated power to one of five 500/230-kV collection substations located along the backbone transmission line within the VCIP. The gen-tie lines would branch out from each collection substation to collect from the solar and energy storage facilities in the vicinity. It is estimated that approximately 260 miles of gen-tie line would be needed to serve the VCIP solar and energy storage facilities. Each of the 20 gen-tie lines required will have an average length of 13 miles. The average 13-mile gen-tie line segment is expected to be constructed over a four-month period. Assuming an approximate 10-year build-out period for the VCIP infrastructure, the gen-tie lines would be constructed at a pace of about 26 miles per year, on average. The precise alignments of the gen-tie lines would depend on the size, location, and timing of solar and energy storage projects as they are planned to come on-line which cannot be defined at a plan level under the VCIP. However, the general construction and operational nature of the gen-tie facilities can be characterized in sufficient detail to allow for the meaningful evaluation of construction water demands.

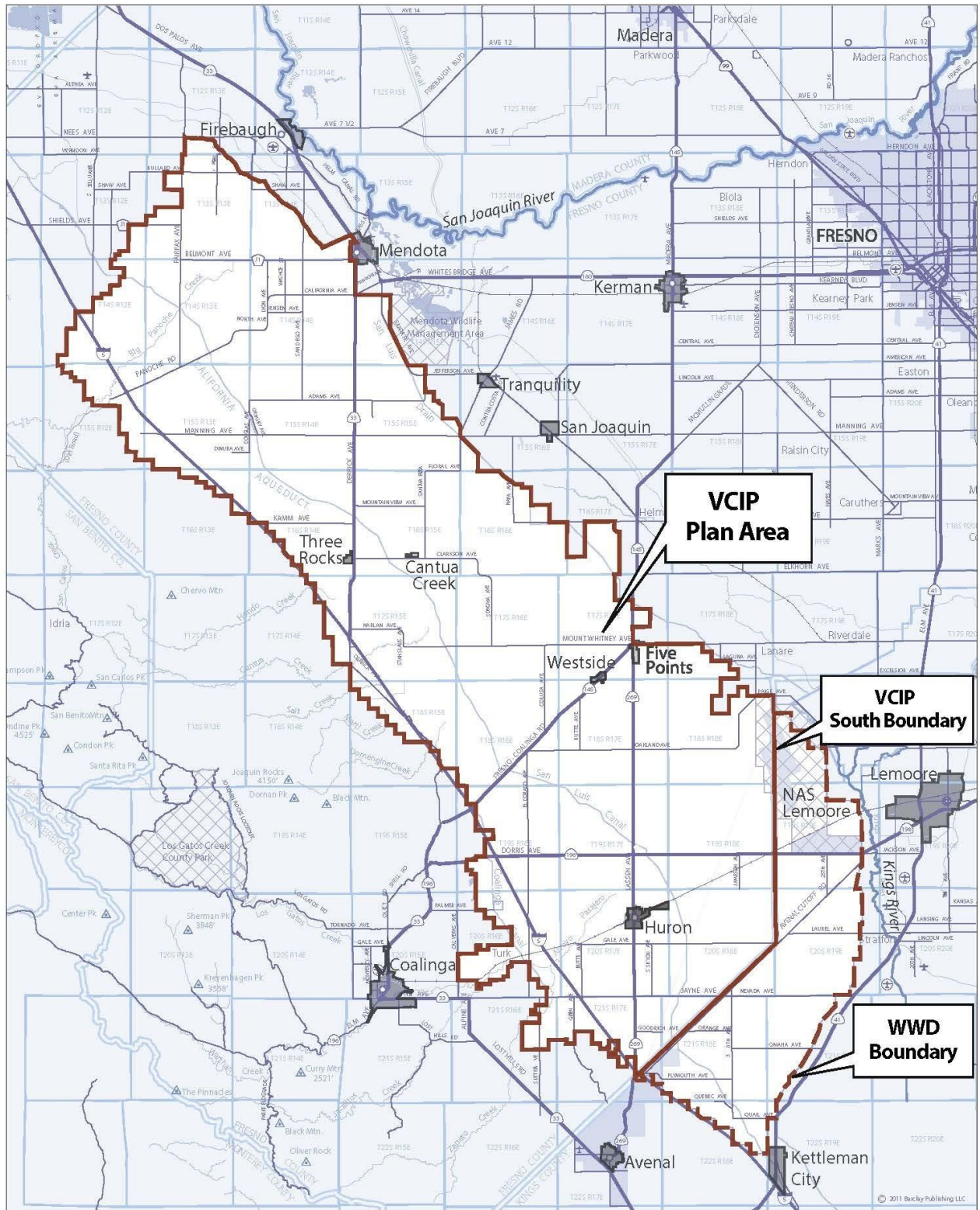
**Connector Transmission Lines within the VCIP.** As shown on Figure 2, VCIP Concept Plan, the five collection substations within the VCIP would be connected by a backbone transmission corridor running through the eastern portion of the Plan Area in a northwest-southeast direction. This corridor would have a total length of approximately 138 line miles and would collect the VCIP-generated power and provide interconnection to the state and federal power systems. It is anticipated that the VCIP connector transmission corridors would include up to two parallel 500-kV transmission lines within 1,000-foot-wide corridors. The two parallel lines would require a combined right-of-way of approximately 450 feet, with the additional width included to provide equipment maneuvering space during construction as well as design flexibility at the engineering stage.

In addition, a central transmission corridor is planned to run east-west through the Plan Area to provide connection between the VCIP backbone corridor at Substation No. 3 and a new Manning Substation planned for the vicinity of W. Manning Avenue and Interstate 5. This connecting transmission corridor would be approximately 20 miles long and would provide an alternative path for energy exported from the VCIP to connect to the larger grid. It would also provide redundancy and resilience to the system. The

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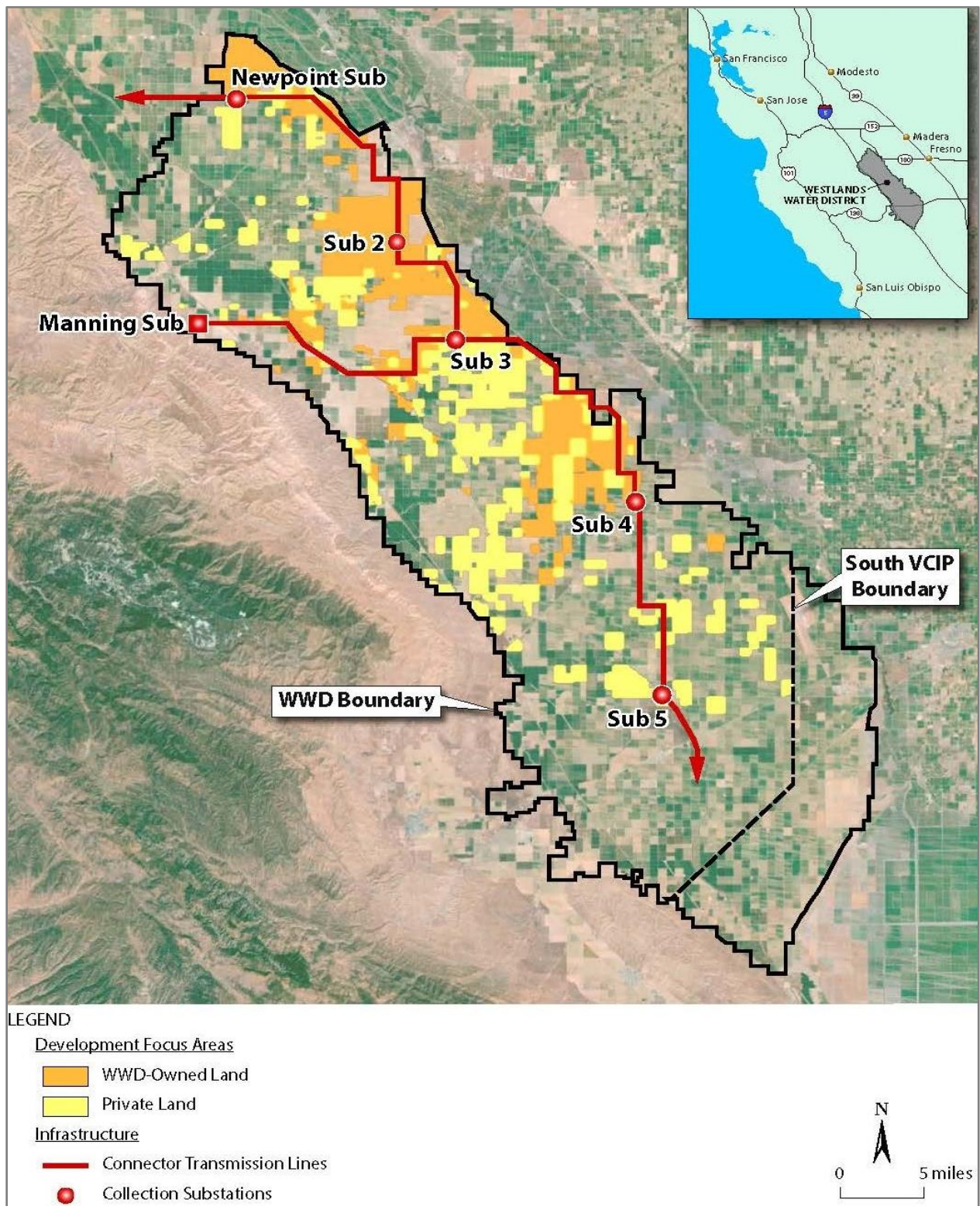
Manning Substation is not part of the VCIP, however the 20-mile connecting transmission line connecting the VCIP to the Manning Substation is part of the VCIP.

Chapter 2 of this WSA provides a discussion of future project water demands and historical site demands. Water supply information, the comparison of demands with supplies, and the reliability of supplies is provided in Chapter 3, followed by sufficiency findings in Chapter 4.



Source: Westlands Water District  
 Map Source: Bert Verrips, AICP, Environmental Consulting, 2024

**Project Setting**  
**Figure 1**



Source: Google Earth  
 Map Source: Bert Verrips, AICP, Environmental Consulting, 2024

**VCIP Concept Plan  
 Figure 2**

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## CHAPTER 2 – WATER DEMANDS

Regional climatic characteristics are summarized here along with projected project construction and operational water demands. Water is needed during construction of the solar generation and storage facilities, substations, and transmission lines. Operational water is needed for panel washing, vegetation management, and operational management activities. Historical water production/use data within the Plan Area are provided.

### CLIMATIC CONDITIONS

The Plan Area is in the semi-arid San Joaquin Valley. Temperatures during the summer are hot, frequently exceeding 100 degrees Fahrenheit. Cool winters occasionally fall below freezing. Average maximum and minimum temperatures are presented in Table 1 for a weather monitoring station central to the District. The growing season is long with most rainfall occurring between October and March. As presented in Table 1, the average annual precipitation in this region is 7.45 inches. With climate change, the California Department of Water Resources (DWR) expects a reduced snowpack in the Sierra Nevada, spring runoff shifting to earlier in the year, more frequent and extreme dry periods, and shorter winters (DWR, 2025a).

**Table 1. Climate Data**

Month	Average Maximum Temperature (F)	Average Minimum Temperature (F)	Average Precipitation (inches)
January	59	38	1.61
February	64	38	1.37
March	69	42	1.44
April	75	46	0.82
May	83	52	0.39
June	91	58	0.13
July	96	63	0.03
August	95	61	0.10
September	90	57	0.23
October	79	48	0.79
November	67	40	0.55
December	57	36	1.12
Annual	77	48	8.58

Source: Temperature and precipitation from WWD Central Zone (WWD, 2023a)

### CONSTRUCTION WATER DEMAND

Projected water demands associated with the VCIP include temporary water demands for the construction of solar generation facilities and storage, and infrastructure to convey the energy generated.

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## **Solar PV Generating Facility and Energy Storage Construction**

Each typical 250-MW solar project would include a central staging area for construction management and support. The VCIP contemplates both stand-alone ESS facilities to operate independently of the solar facilities and energy storage systems co-located and integrated within the solar PV facilities. However, the locations of the potential stand-alone energy storage facilities are unknown and cannot be forecasted. Therefore, for purposes of the PEIR and this WSA, it is assumed that the VCIP will include 21,000 MW of BESSs, all of which will be integrated with the solar facilities.

The highest water demands would be associated with construction in preparing the sites for the solar arrays and trenching for conduit. During this earthwork phase of construction, non-potable water would be used for dust control and soil conditioning. Based on experience with similar projects located on sites with similar physical conditions,<sup>4</sup> the water demand for preparation and construction of a typical 1,600-acre solar facility project site would average 0.15 acre-feet per acre (AF/acre), resulting in a total consumption of 240 AF of water during a 12-month construction period. This is presented in Table 2. Bottled water would be provided to the construction workers for consumption. Water is not needed for sanitary needs during construction; portable chemical toilets would be provided and serviced as needed by a private contractor. It is anticipated that eighty-five (85) 1,600-acre sites would be developed in the Plan Area with a total water demand of 20,400 AF over the approximately ten-year construction period for the VCIP.

### **Collection Substation Construction**

During construction of the collection substations, water is required for dust suppression and soil conditioning. At a demand rate of 0.15 AF/acre, the typical 60-acre collection substation site would require 9.0 AF of water. The five substations together require a total water demand of 45 AF. Each of the five collection substations would be constructed over a 24-month period.

### **Gen-tie Line Construction**

The gen-tie lines would require water during construction at the same water demand of 0.15 AF/acre. A total of 260 miles of gen-tie lines would be needed to service the VCIP solar and energy storage facilities for an average length of 13 miles for each of the approximately 20 gen-tie lines required. The total disturbed land area for the 260 miles of gen-tie lines would be 1,544 acres, which would require water for dust suppression and soil conditioning for clearing the right-of-way and staging areas for tower installation, pulling/tensioning sites, and staging/material storage sites. This equates to 5.94 acres per gen-tie line mile; with 77.2 acres per 13-mile segment, the water demand factor would be 11.58 AF per segment. Construction is estimated to result in two segments per year or about 26 miles of gen-tie lines built annually over 10 years, which would result in a total demand of approximately 231.6 AF with 23.2 AFY required during each year of the 10-year construction period.

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<sup>4</sup> Based on actual water volume used during construction of three nearby utility-scale solar projects located in the Westlands Solar Park in Kings County with a combined generating capacity of 650 MW. Average construction water required for the three projects was 0.09 AF/acre. The demand factor applied in this WSA is based on the highest demand of 0.15 AF/acre for the Aquamarine Solar Facility during 2021 (a very dry year) (Biller 2024/2025).

## Connector Transmission Line Construction

The collection substations within the VCIP would be connected by a northwest-southeast backbone transmission corridor approximately 59 miles long with two transmission lines in the corridor, and a 20-mile-long east-west single-line segment connecting this backbone corridor to the planned Manning Substation (not part of the VCIP), for a total of 138 line miles. These internal connector lines would be constructed similar to the gen-tie lines described above but in 15-mile segments. The total disturbed land area for the 138 miles of connecting lines would be 1,076 acres, which would require water for dust suppression and soil conditioning for clearing the right-of-way and staging areas for tower installation, pulling/tensioning sites, and staging/material storage sites. This equates to 7.8 acres per connector line mile; with 117 acres per 15-mile segment, the water demand factor is 17.55 AF per segment. At a demand rate of 0.15 AF per acre, the 1,076 acres of disturbed area would result in a total demand of 161.4 AF, with 32.3 AF required during each year of the five-year construction period.

## Total Construction Water Demand

As presented in Table 2, each of the anticipated VCIP construction activities requiring dust suppression and soil conditioning have been broken down into construction projects or segments of the overall VCIP. Water requirements were identified for each individual project based on the acreage anticipated to be disturbed. For example, there are 85 solar PV 250-MW production facility projects with each site having 1,600 acres of disturbed land. The construction water demand of 240 AF per 1,600-acre project is presented along with the approximate total acreage disturbed and the total water demand.

**Table 2. Construction Water Demand**

Activity	Facility Project	Demand per Project (AF)	Number of Projects	Total Acreage Disturbed	Total Water Demand (AF)
<b>Solar Production and Energy Storage Facilities<sup>1</sup></b>	1,600 acre site	240	85	136,000	20,400
<b>Collection Substations<sup>2</sup></b>	60 acre site	9	5	300	45
<b>Gen-tie Lines<sup>3</sup></b>	13 miles	11.58	20	1,544	232
<b>Connector Line<sup>4</sup></b>	15 miles	17.55	9.2	1,076	161
<b>Total Construction Water Demand</b>					<b>20,838</b>

Note: Dust control and soil conditioning water demand is 0.15 AF/acre of disturbed area.

<sup>1</sup>Based on 1,600 acres disturbed for each of the 85 solar facility and storage sites.

<sup>2</sup>Based on 60 acres disturbed for each of the 5 collection substation sites.

<sup>3</sup>Based on 260 miles of gen-tie lines at 5.94 acres per mile equals 1,544 acres disturbed.

<sup>4</sup>Based on 138 miles of connector lines at 7.8 acres per mile for the two lines equals 1,076 acres disturbed.

Data source: Bert Verrips, AICP, Environmental Consulting, 2024.

Annual construction water demands were determined for each of the projects and combined. Table 3 presents the phasing of the construction demands over time based on the project phasing plan with

construction starting on the first substation in the first year of 2028. These numbers are not exact due to staging of projects, but provide a general estimate of annual construction demand over time. The total annual construction demand is used in the analysis of supply reliability in Chapter 3. It is anticipated that most construction water would be obtained from existing agricultural wells in the Plan Area, while surface water may be available from the District in some years.

**Table 3. VCIP Phasing of Construction Demands (AF)**

Year	Solar & Storage Facilities <sup>1</sup>	Substations <sup>2</sup>	Gen-tie Lines <sup>3</sup>	Internal Connector Lines <sup>4</sup>	Total Annual Demand	Disturbed Land (acres)
<b>Project Demand Factor (AF)</b>	240	9	11.58	17.55		
<b>2028</b>	0	4.5	0	0	5	30
<b>2029</b>	2,160	9.0	23	35	2,227	14,771
<b>2030</b>	2,160	9.0	23	35	2,227	14,771
<b>2031</b>	2,160	9.0	23	35	2,227	14,771
<b>2032</b>	2,160	9.0	23	35	2,227	14,771
<b>2033</b>	2,160	4.5	23	21	2,213	14,647
<b>2034</b>	2,160	0	23	0	2,183	14,477
<b>2035</b>	2,160	0	23	0	2,183	14,477
<b>2036</b>	2,160	0	23	0	2,183	14,477
<b>2037</b>	2,160	0	23	0	2,183	14,477
<b>2038</b>	960	0	23	0	983	6,477

Note: Demand factors and projects per year from Table 2. Numbers may not add due to rounding

<sup>1</sup> Assumed 9 projects constructed per year through 2037; 4 during 2038.

<sup>2</sup> Assumed 2 years required for each substation starting in 2028.

<sup>3</sup> Assumed 26 line miles per year.

<sup>4</sup> Assumed 30 line miles per year through 2032; 18 line miles in 2033.

Data source: Bert Verrips, AICP, Environmental Consulting, 2024.

## OPERATIONAL WATER DEMAND

In addition to construction related water demands, solar generation and storage facilities will have ongoing operational water demands. Water would not be required for the maintenance of substations or the transmission related infrastructure facilities such as gen-tie lines and connecting lines. Water demands associated with solar and storage facilities would include water needed for panel washing, vegetation management (i.e., sheep watering), and centralized operational activities. Water demands associated with project decommissioning and restoration of lands to a condition suitable for agricultural uses are also discussed.

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## Panel Washing

Maintenance would primarily consist of washing the PV modules (panels) up to two times each year to remove accumulated dust from panel surfaces to maintain efficiency.<sup>5</sup> The cleaning interval would be determined by the rate at which electrical output degrades between cleanings. Periodic panel washing would occur during late spring and late summer months while rainfall would provide cleaning in the winter. Light duty trucks with tow-behind water trailers would transport the water, which workers would spray to wet the panel surfaces before squeegeeing them dry. No chemical cleaners would be used for module washing. Based on the most recent experience with the 250-MW Aquamarine Solar Facility in 2022, 2023, and 2024, for a single 250-MW project, the water demand for one complete cycle of panel washing is approximately 2.5 AF. Panel washing with two cycles each year would therefore require 5.0 AFY for each PV solar project. The VCIP includes the equivalent of 85 typical 250-MW solar PV projects, which would result in a total demand of approximately 425 AFY.

## Vegetation Management

Under the VCIP, each project operator would decide whether to utilize sheep grazing to manage on-site vegetation. For the purposes of the PEIR and this analysis, it is assumed that the typical solar project would employ sheep grazing in addition to mechanical means of vegetation control. Sheep would graze each 1,600-acre typical site for approximately five months during the first half of the year to control on-site vegetation. Sheep grazing within each project site would have a density of 0.5 sheep per acre, on approximately 1,400 acres to remain in vegetative cover, for a total of approximately 700 sheep. During a five-month grazing period per year (151 days January through May), at three gallons per day per sheep, 453 gallons per sheep per year is required for each 250-MW project (NRCS 2002). The total water required for sheep watering for each 250-MW project would be 317,100 gallons per year or 0.97 AFY. While the actual extent of sheep grazing would be determined at the project level and cannot be accurately predicted, sheep grazing on each potential project would result in a total VCIP demand of approximately 82.45 AFY.

## Operational Management Activities

General operational management activities, such as washing or rinsing equipment and other non-potable water uses for each 250-MW project are estimated to require 2,000 gallons per month, based on the Aquamarine Solar Facility operations. For the VCIP, the total estimated annual water usage for operations would be 24,000 gallons or 0.07 AF of non-potable water for each project.

Potable water for domestic uses would be delivered to the facility by a water delivery service. The typical 250 MW solar plus energy storage facility would include a water storage tank for potable water, which would provide for drinking, hand washing, and toilet flushing at the O&M building. The water tank would be refilled regularly at a rate of approximately 5,000 gallons per month (i.e., the capacity of a standard water tanker truck), for a total of approximately 16 AFY for full VCIP implementation. The potable water would be provided by a commercial supplier who would purchase it from a municipal water source outside the Subbasin. (Therefore, potable water is not included in the water demand totals in this WSA.) The

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<sup>5</sup> Panel cleaning at the nearby Aquamarine Solar Facility was conducted twice in 2022, and only one time each year in 2023 and 2024. It is anticipated that only one panel washing cycle per year would be needed for VCIP solar facilities, except in very dry years, like 2022, when up to two panel cleaning cycles may be needed (Biller 2025).

potable water would be delivered to the O&M building through water pipes connecting the tank to the building. Given the small quantities of potable water that would be required (i.e., approximately three percent of total operational water demands), and given the multiple water delivery services within the vicinity of the Plan Area, there are sufficient supplies to meet all potable water demands.

### Total Operational Water Demand

As presented in Table 4, the combined operational water demand for a typical 250-MW facility would total approximately 6.05 AF of water annually over each 1,600-acre project site. Operational demands include panel washing (5.0 AFY), sheep watering (0.97 AFY), and general operational uses (0.07 AFY). This rounded 6.05 AFY demand is equivalent to 0.004 AF/acre, or 0.6 AF per quarter-section (160 acres) per year. Overall, annual VCIP water demands are not anticipated to vary based on climatic conditions.

**Table 4. Operational Water Demand per Typical 250-MW Solar Facility**

<b>Activity</b>	<b>Water Demand (gallons)</b>	<b>Water Demand (AFY)</b>
<b>Project Water Demands</b>		
Panel Washing	1,629,255	5.0
Sheep Watering	317,100	0.97
General Operations	24,000	0.07
<b>Total Operational Water Demand</b>	<b>1,970,355</b>	<b>6.046</b>

Note: Based on a single 250-MW project on 1,600 acres at buildout. The 85 projects at 6.046 AFY totals 514 AFY.  
Source: Bert Verrips, AICP, Environmental Consulting, 2024.

Annual operational water demands were determined based on the construction phasing schedule of the 85 planned 250-MW solar facilities. As presented in Table 5, VCIP Phasing of Operational Demands, after the first full year of construction, the first solar facility project will come on-line in 2030. The annual operational water demand presented here is important in this assessment in determining the availability of adequate water supplies. It is anticipated that operational water would be obtained from a combination of existing agricultural wells in the Plan Area, surface water provided by the District for projects on District-owned and private land, and supplemental surface supplies procured by the District and private landowners.

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**Table 5. VCIP Phasing of Operational Demands<sup>1</sup>**

<b>Year</b>	<b>Cumulative Built PV Projects</b>	<b>Cumulative Operational Demands (AF)</b>
<b>2028</b>	0	0
<b>2029</b>	0	0
<b>2030</b>	9	54
<b>2031</b>	18	109
<b>2032</b>	27	163
<b>2033</b>	36	218
<b>2034</b>	45	272
<b>2035</b>	54	326
<b>2036</b>	63	381
<b>2037</b>	72	435
<b>2038</b>	81	490
<b>2039+</b>	85	514

<sup>1</sup> Based on VCIP phasing plan and 6.046 AF per PV project.

### **Decommissioning and Site Reclamation**

At the end of its useful life after approximately 35 years of operation, the typical solar facility would be decommissioned and the site would be restored to a condition suitable for agricultural uses in accordance with the project’s decommissioning plan. Water for dust suppression would be required, with water usage expected to be similar to that used during construction. However, the timeframe for decommissioning activities is likely to be less than the duration of project construction for each of the facilities. Therefore, while the VCIP’s maximum annual construction demands for all VCIP facilities would be 2,227 AF, it is anticipated that water requirements for dust suppression during decommissioning will be less on a per acre basis. Because decommissioning and site reclamation water requirements are for a time beyond the time frame of a Water Supply Assessment, the need for decommissioning and site reclamation water in 35 years is noted here but not included in the 20-year demand analyses.<sup>6</sup>

### **HISTORICAL WATER PRODUCTION**

In the recent past, the 136,000 acres of VCIP DFA lands have been used for cultivating cotton, tomatoes, winter wheat, almonds, and other crops, with varying portions of the Plan Area left fallow in any given year depending on availability of imported surface water supplies for irrigation. The District provides agricultural water for irrigation using its Central Valley Project (CVP) repayment and assignment contract water and other sources (either CVP or non-CVP water sources). Landowners on privately owned lands augment reduced CVP contract water supplies with either pumped groundwater from on-site wells or non CVP contract surface water supplies, as needed.

As discussed in more detail in Chapter 3, annual water production varies substantially depending on the availability of the District’s CVP contract water. The average rate of applied water for crop irrigation can range from 2.4 to 2.6 AFY from all sources (CVP water, supplemental surface water, and groundwater).

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<sup>6</sup> For informational purposes, it is expected that water demands for decommissioning would be no greater than maximum construction water demands of 2,227 AFY.

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The groundwater is relatively high in salinity so the amount of groundwater that can be blended with the higher quality imported surface water is limited by the salinity tolerance of crops.

Based on these factors, it is estimated that the annual volume of irrigation water (groundwater and surface water) historically applied in the 136,000-acre DFAs ranged up to 353,600 AFY. However, under recent historical conditions, total water use within the DFAs is substantially lower. As provided in further detail below, the 72,000 acres of District-owned lands are no longer irrigated. In 2024, the majority of the DFA lands were fallow, with 53,044 acres actively farmed. For context, at a rate of 2.6 AFY per acre, these 53,044 acres would require approximately 137,914 AFY. As noted, irrigation water for the privately-owned DFA lands would have been provided by a combination of CVP contract water, supplemental water, and groundwater. The surface and groundwater supplies are non-potable water for crop irrigation; there are no sources of potable domestic water available for the VCIP from municipal water systems, except supplies purchased from outside the Plan Area and trucked to solar facilities within the DFAs.

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## CHAPTER 3 – WATER SUPPLIES

The District provides water services to agricultural, municipal, and industrial users. The District delivers CVP contract water, allocated by the U.S. Bureau of Reclamation (USBR), and other surface water supplies acquired by the District and water users. To provide timely, reliable, and affordable water services and to facilitate the Sustainable Groundwater Management Act of 2014 (SGMA) implementation, the District provides funding for education and technology, enabling growers to effectively and efficiently use and conserve CVP contract water and groundwater. The District surveys the static water levels in the wells and monitors the quality and quantity of pumped groundwater as part of its Water Management Plan. A key component of the District's Water Management Plan is water conservation. The conservation program consists of the following elements.

- ◆ Irrigation Guide for water requirements per crop
- ◆ Water Conservation and Management Handbook
- ◆ Workshops and meeting on water management information
- ◆ Technical assistance and conservation computer programs
- ◆ Meter repair and updated program
- ◆ Groundwater monitoring
- ◆ Pump efficiency tests
- ◆ Conjunctive use of supplies
- ◆ Irrigation System Improvement Program
- ◆ Satellite imagery purchased about once every two weeks

Water for VCIP construction needs would be provided by the existing on-site agricultural wells, other agricultural wells in the vicinity of the Plan Area, or with District surface water supplies, if available. Upon completion of the various components of the project, water for ongoing operational water supplies would be obtained from on-site agricultural wells and/or surface water provided by the District through its conveyance system. This section discusses surface water and groundwater available to meet the demands associated with the project, District's supply conditions, and availability of supplies sufficient to serve the project's total projected needs, in addition to existing and planned future uses, during normal, single dry, and multiple dry years during a 20-year projection.

### **SURFACE WATER SUPPLIES**

The VCIP Plan Area, shown on Figure 2, lies entirely within the boundaries of the District's Fresno County portion. The District was formed in 1952 to serve agricultural water users on the west side of the San Joaquin Valley and has a service area of 614,700 acres, of which approximately 72,000 acres are lands owned by the District for which the permanent right to surface water and groundwater allocation has been removed from the land. The total acquired lands reached approximately 86,000 acres, but the District has reconveyed approximately 14,000 acres, primarily for solar development. District owned lands are generally only dry land farmed through the District's land lease program. Some lands have recorded non-irrigation covenants, but essentially all District owned land is fallowed or dry land farmed.

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## CVP Contract Water Supplies

Although the District's service area is 614,700 acres, the irrigable land is approximately 568,000 acres. Due to a series of settlements and land acquisition programs that reduced private land ownership in the District, there are now about 470,000 privately owned irrigable acres that have a right to apply for a per acre entitlement of CVP water. If the average applied surface water rate on privately owned irrigable lands is 2.6 AF/acre, then the total volume of water required for the entire privately owned irrigable area of 470,000 acres within the District is about 1.22 million AF. USBR delivers the District's CVP contract water supply via the San Luis Canal / California Aqueduct. Under its current repayment contract and several assignment contracts with USBR, the District is entitled to receive 1.195 million acre-feet (MAF) of CVP contract water in years when 100 percent of this CVP water is allocated. The District conveys its allocated CVP contract water to water users pursuant to its rules and regulations through a series of lateral pipes extending from the San Luis Canal to metered valves located throughout the District.

In recent years, actual deliveries of CVP contract water to the District have been dramatically curtailed. Also, passage of the Central Valley Project Improvement Act and adoption of other regulations dedicated more water to fish and wildlife, placing the District at a very low priority for water deliveries during times of shortage. As presented in Table 6, during the 10 years of 2015 and 2024, the District received an average of 36 percent of its CVP contract water<sup>7</sup>. In 2014, 2015, 2021, and 2022, the District received "zero" allocation of CVP contract water (see Table 6) (WWD 2025) and in 2016 received five percent of its CVP contract water (see Table 6). However, even when the District receives a "zero" allocation of CVP contract water, it would be able to supply VCIP operational demands through its CVP M&I allocation or the health and safety allocation from USBR (DWR 2014; WWD 2023c), or supplemental surface water supplies. During the 2015 and 2024 period, the District received its full 100 percent contract entitlement only twice: in 2017 and 2023. In five of those 10 years, the District received water allocations that were less than 50 percent of its contract entitlement.

The District augments CVP contract water with other supplies such as flood flows from the San Joaquin and Kings rivers when available; these seasonal supplies are made available to the District as they flow into the Mendota Pool. Water transfers (private and District managed Supplemental Water Program) have become an important component in the District supply portfolio. Under the Supplemental Water Program, the District pursues additional water supply each year on behalf of its farmers from surplus supplies that may be available from other districts that are contractors of the CVP or the State Water Project. District farmers may also pursue water transfers from sources within or outside the District, or may use water brokers to do so. Supplemental water is delivered to District farmers through the District's water distribution pipeline system. Transfers and other purchases are included in Table 6 as "Additional District Supply." The District has continued to improve the availability and reliability of imported surface water. For example, in 2021, despite no initial allocation from the CVP, the District and its water users secured 173,000 AF of surface water from the CVP and an additional 44,000 AF of surface water from other non-CVP contract sources for irrigation during the 2021 contract water year.

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<sup>7</sup> Average CVP deliveries 2015 through 2024 = 423,638 AF / 1,195,000 AF total CVP entitlement = 35.5 percent.

**Table 6. Westlands Water District Water Supplies**

Water Year	CVP Allocation %	Net CVP (AF)	Ground-water (AF)	Water User Acquired (AF)	Additional District Supply (AF)	Total Supply (AF)	Fallowed Acres
1988	100%	1,150,000	160,000	7,657	97,712	1,415,369	45,632
1989	100%	1,035,369	175,000	20,530	99,549	1,330,448	64,579
1990	50%	625,196	300,000	18,502	-2,223	941,475	52,544
1991	27%	229,666	600,000	22,943	77,399	930,008	125,082
1992	27%	208,668	600,000	42,623	100,861	952,152	112,718
1993	54%	682,833	225,000	152,520	82,511	1,142,864	90,413
1994	43%	458,281	325,000	56,541	108,083	947,905	75,732
1995	100%	1,021,719	150,000	57,840	121,747	1,351,306	43,528
1996	95%	994,935	50,000	92,953	172,609	1,310,497	26,754
1997	90%	968,408	30,000	94,908	261,085	1,354,401	35,554
1998	100%	945,115	15,000	54,205	162,684	1,177,004	33,481
1999	70%	806,040	60,000	178,632	111,144	1,155,816	37,206
2000	65%	695,693	225,000	198,294	133,314	1,252,301	46,748
2001	49%	611,267	215,000	75,592	135,039	1,036,898	73,802
2002	70%	776,526	205,000	106,043	64,040	1,151,609	94,557
2003	75%	863,150	160,000	107,958	32,518	1,163,626	76,654
2004	70%	800,704	210,000	96,872	44,407	1,151,983	70,367
2005	85%	996,147	75,000	20,776	98,347	1,190,270	66,804
2006	100%	1,076,461	25,000	45,936	38,079	1,185,476	54,944
2007	50%	647,864	310,000	87,554	61,466	1,106,884	96,409
2008	40%	347,222	460,000	85,421	102,862	995,505	99,663
2009	10%	202,991	480,000	68,070	70,149	821,210	156,239
2010	45%	590,059	140,000	71,296	79,242	880,597	131,339
2011	80%	876,910	45,000	60,380	191,686	1,173,976	59,514
2012	40%	405,451	355,000	111,154	123,636	995,241	112,755
2013	20%	188,448	638,000	101,413	143,962	1,071,823	131,848
2014	0%	98,573	655,000	59,714	26,382	839,669	220,053
2015	0%	82,429	660,000	51,134	34,600	828,163	218,112
2016	5%	9,204	612,000	72,154	174,374	867,732	179,784
2017	100%	911,307	54,000	-50,009	174,490	1,089,788	146,275
2018	50%	580,050	328,000	42,338	55,872	1,006,260	148,320
2019	75%	827,317	89,000	37,985	53,433	1,007,735	158,103
2020	20%	259,540	493,000	66,436	78,780	897,756	190,972
2021	0%	99,928	636,000	63,822	20,595	820,345	211,920
2022	0%	3,822	603,000	37,546	104,866	749,234	227,563
2023	100%	871,194	10,000	13,515	231,606	1,126,315	211,678
2024	50%	591,588	97,000	44,582	89,944	823,114	212,973

**Definitions:**

Water Year – March 1 to February 28 (29 Leap Year)

CVP Allocation – Final CVP water supply allocation (100% = 1,150,000 AF)+(Reassignment = 45,383 AF)

Net CVP – CVP Allocation adjusted for carry over and rescheduled losses

Groundwater – Total groundwater pumped

Water User Acquired – Private landowner water transfers

Additional District Supply – Surplus water, supplemental supplies, and other adjustments

Fallowed Acres – Agricultural land out of production

Source: WWD 2025a, accessed June 2025.

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The amount of groundwater pumped from the basin in any given year is typically inversely proportional to the availability of surface water supplies. This is evident for dry water years 2013 through 2016, 2021, and 2022, and the wet water years of 2017 and 2023, for example, as shown in Table 6.

### **Surface Water Imports Program**

The primary focus of the District's Surface Water Imports program is to increase surface water availability and reliability and to reduce the corresponding landowner reliance on groundwater within the Subbasin by fulfilling most of the agricultural, municipal, and industrial water demands within the Subbasin. Surface water deliveries will be obtained through existing CVP contracts and through water transfer and exchange projects. Increasing the supply of surface water will allow surface water to be used in lieu of groundwater, leading to increased groundwater storage and levels. The increased delivery of surface water can further conjunctive use strategies (WWD 2022a).

### **REGIONAL GROUNDWATER SUPPLY**

Growers within the District's service area augment District deliveries with pumped groundwater, as needed. The Plan Area and the 136,000 acres of DFAs are located within the Fresno County portion of the Westside Subbasin (5-22.09) (Subbasin) of the San Joaquin Valley Basin within the Tulare Lake Hydrologic Region. The District is the Groundwater Sustainability Agency (GSA) for the Subbasin, for which the District's Board of Directors adopted a Groundwater Sustainability Plan (GSP). The District collects metered pumping data as the GSA. With the development of the groundwater sustainability plan discussed below, additional data are being developed annually. Sufficient data is available to make quantitative estimates of water availability and reliability, combined with reasonable assumptions based on available information and data.

### **Subbasin Characteristics**

The Tulare Lake Hydrologic Region covers approximately 17,000 square miles including all of Kings and Tulare counties, and most of Fresno and Kern counties. Significant geographic features include the Temblor Range to the west, the Tehachapi Mountains to the south and the southern Sierra Nevada to the east. The Kings, Kaweah, Tule, and Kern Rivers drain into the southern portion of the valley internally towards the Tulare drainage basin.

The Subbasin is primarily located in Fresno County, with a relatively small portion (approximately 79,900 acres) located in Kings County. The Subbasin encompasses a surface area of approximately 622,215 acres (972 square miles) within the western portion of the larger San Joaquin Groundwater Basin. The Subbasin is located between the Coast Range foothills on the west and the San Joaquin River drainage and Fresno Slough to the east. To the southwest is the Pleasant Valley Subbasin, and to the west are Tertiary marine sediments of the Coast Ranges. To the north and east is the Delta-Mendota Subbasin, to the east is the Kings Subbasin, and to the south is the Tulare Lake Subbasin (WWD, 2024b).

The aquifer system comprising the Subbasin consists of unconsolidated continental deposits of Tertiary and Quaternary age. These deposits form an unconfined to semi-confined Upper Aquifer and a confined Lower Aquifer. These aquifers are separated by an aquitard named the Corcoran Clay member of the Tulare Formation. The Corcoran clay creates a significant hydraulic separation between the semi-confined Upper Aquifer and confined Lower Aquifer. Where this layer is present, it impedes vertical flow of water

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except where there is leakage through intra-borehole flow through composite wells. The shallow zone is a portion within the Upper Aquifer which has been defined as the uppermost 100 feet. Groundwater encountered in the upper 100 feet is not hydrologically connected to the rest of the Upper Aquifer showing no seasonal or long-term variation and is likely supported by recharge from irrigation. Groundwater extraction is not known to occur in the shallow zone due to poor water quality and limited production capacity. It is not defined as one of the primary aquifer units in the Subbasin; groundwater production occurs in wells in the deeper portions of the Upper Aquifer (as well as the Lower Aquifer) (WWD, 2024b).

The unconfined to semi-confined aquifer (Upper Aquifer) above the Corcoran Clay includes younger alluvium, older alluvium, and part of the Tulare Formation. These deposits consist of highly lenticular, poorly sorted clay, silt, and sand intercalated with occasional beds of well-sorted fine to medium grained sand. This clay layer ranges in thickness from 20 to 200 feet, underlies most of the District, and has extensive wells penetrating the clay which allows partial interaction between the zones (DWR, 2006). The depth to the top of the Corcoran Clay varies from approximately 400 feet in the east to 800 feet or more at the western margins of the Subbasin (WWD, 2024b). The confined aquifer (Lower Aquifer) consists of the lower part of the Tulare Formation and possibly the uppermost part of the San Joaquin Formation. This unit is composed of lenticular beds of silty clay, clay, silt, and sand interbedded with occasional strata of well-sorted sand.

Water quality in the Lower Aquifer typically varies with depth with poorer quality existing at the upper and lower limits of the Lower Aquifer and the optimum quality somewhere between. The upper limit of the Lower Aquifer is the base of the Corcoran Clay with the USGS identifying the lower limit as the base of the fresh groundwater. In the northern Subbasin the base of fresh water is at elevations of -1,000 feet to less than -400 feet mean sea level. The southern Subbasin freshwater extends to -2,000 feet, up to 1,600 feet lower than the elevation at which it occurs in the Subbasin's north (WWD, 2024b).

The groundwater quality in the Upper Aquifer and Lower Aquifer between 2016 and 2023 ranges throughout the Subbasin with wells mostly containing TDS concentrations above 1,000 milligrams per liter (mg/L) to above 2,000 mg/L. In addition to high TDS, the Subbasin can also contain naturally occurring selenium and boron that may affect usability as irrigation water. In general, groundwater quality in the Lower Aquifer is considered better than the Upper Aquifer (WWD, 2024b)

### **Groundwater Level Trends**

In the Upper Aquifer, groundwater level data for 2014 to 2024 indicate various degrees of groundwater elevation declines. During drought conditions from 2012 through 2016, there were significant declines followed by recovered levels after 2017. Groundwater level declines again followed dry conditions from 2020 through 2022 with significant increases occurring after the wet conditions in 2023 (WWD, 2024b).

As shown in Table 7, Lower Aquifer groundwater levels were generally at their lowest levels during the 1950s through late 1960s prior to the delivery of CVP contract water to the District, which began in 1967-68. Groundwater levels gradually increased to a maximum in about 1987-88, falling briefly during the 1976-77 drought and again during the 1987-92 drought. In 1998, Lower Aquifer groundwater levels

**Table 7. Groundwater Use and Elevation Change in Westlands Water District**

Crop <sup>1</sup> Year	Pumped AF	Elevation FT	Elevation Change FT	Crop Year	Pumped AF	Elevation FT	Elevation Change FT
1956	964,000	-65	-13	1986	145,000	71	8
1957	928,000	-56	9	1987	159,000	89	18
1958	884,000	-29	27	1988	160,000	64	-25
1959	912,000	-77	-48	1989	175,000	63	-1
1960	872,000	-81	-4	1990	300,000	9	-54
1961	824,000	-96	-15	1991	600,000	-32	-41
1962	920,000			1992	600,000	-62	-30
1963	883,000			1993	225,000	1	63
1964	913,000			1994	325,000	-51	-52
1965	822,000			1995	150,000	27	78
1966	924,000	-134		1996	50,000	49	22
1967	875,000	-156	-22	1997	30,000	63	14
1968	596,000	-135	21	1998	15,000	63	0
1969	592,000	-120	15	1999	20,000	65	2
1970	460,000	-100	20	2000	225,000	43	-22
1971	377,000	-93	7	2001	215,000	25	-18
1972		-54	39	2002	205,000	22	-3
1973		-37	17	2003	160,000	30	8
1974	96,000	-22	15	2004	210,000	24	-6
1975	111,000	-11	11	2005	75,000	56	32
1976	97,000	-2	9	2006	15,000	77	21
1977	472,000	-99	-97	2007	310,000	35	-42
1978	159,000	-4	95	2008	460,000	-11	-46
1979	140,000	-13	-9	2009	480,000	-31	-20
1980	106,000	4	17	2010	140,000	9	40
1981	99,000	11	7	2011	45,000	49	40
1982	105,000	32	21	2012 <sup>2</sup>	355,000	1	-48
1983	31,000	56	24	2013	638,000	-58	-59
1984	73,000	61	5	2014	655,000	-76	-18
1985	228,000	63	2	2015	660,000	-120	-44

Source: WWD, 2016a.

<sup>1</sup> Crop year is from October 1 of previous year to September 30 of current year.

<sup>2</sup> Starting with 2012, groundwater pumped is for Water Year (March 1 through February 28)

recovered nearly to the 1987-88 levels after a series of wet years. In this Lower Aquifer, groundwater levels declined considerably since 2010. For some wells, levels declined by as much as 200 feet between 2010 and 2015. Groundwater levels have since recovered from these near historic lows around 2015. Groundwater levels continue to vary with climatic conditions (WWD, 2024b).

Dry conditions and the resulting reduction in imported surface water use has historically resulted in increased rates of subsidence within most of the Subbasin. With reduced pumping and injection in aquifer storage and recovery wells, land surface elevation has increased by up to 0.5 feet in in the central and southeastern portion of the Subbasin and more modest rates on the western side. A significant increase in land surface elevation between Checks 15 and 19 during 2023 suggests the subsidence during the preceding drought was elastic with less pronounced increases in water levels during 2023 in the Lower

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Aquifer. On the eastern side of the Subbasin, subsidence in adjacent basins appears to affect rates of subsidence within the Subbasin (WWD, 2024b).

Recharge is primarily from seepage of Coast Range streams along the west side of the Subbasin and deep percolation of surface irrigation. Secondary recharge to the Upper Aquifer and Lower Aquifer occurs from areas to the east and northeast as subsurface flows. Groundwater flow direction changes with extended dry periods due to an increase in groundwater pumping (DWR, 2006; WWD, 2016; DWR, 2020; WWD, 2024b).

### **Groundwater Sustainability Plan**

The SGMA required a designated GSA to prepare a GSP for each high- or medium-priority basin (or subbasin), with adoption deadlines of 2020 or 2022 depending on the basin’s priority. DWR designated the Subbasin as critically overdrafted, which required the District to prepare a GSP by January 31, 2020 (DWR, 2015).

As the primary water purveyor in the Subbasin, the District is the designated GSA for the Subbasin and developed the GSP. Fresno County serves as the GSA for the portions of the Subbasin that are within the County’s jurisdictional boundaries, including the areas within the City of Huron’s jurisdictional boundaries, but outside the boundaries of the District. The District, in cooperation with Fresno County, prepared the “Westside Subbasin Groundwater Sustainability Plan,” which the County and the District adopted on January 7 and January 8, 2020, respectively. The District resubmitted the GSP to DWR on July 18, 2022. DWR approved the GSP on August 4, 2023. DWR included a list of recommended corrective actions to improve the GSP. Based on the list of corrective actions, the District identified a need for an amendment to the GSP, which was adopted in December 2024 and January 2025 by the District and Fresno County, respectively (2025 GSP Amendment).

The purpose of the GSP is to characterize groundwater conditions in the subbasin, to evaluate and report on conditions of overdraft, to establish sustainability goals and sustainability management criteria, and to describe projects and management actions the GSA intends to implement to achieve sustainability by 2040 (DWR, 2020; WWD 2022a). The plans and progress toward meeting the sustainability goal - that the Subbasin will be operated within its sustainable yield by 2040 and maintain sustainability through the entire planning and implementation horizon through 2070 - will be evaluated every five years.

A GSP five-year update, also known as a periodic evaluation, is an evaluation of the implementation of an approved GSP performed by the GSA. The evaluation is described in a written assessment submitted to DWR and represents a progress report for each evaluation cycle – at least every five years after initial GSP submission. The evaluation summarizes the basin’s conditions in relation to the sustainable management criteria established in the GSP, the implementation of projects and management actions, and other information as specified in SGMA and the GSP Regulations. The purpose of the five-year updates is to determine whether GSP implementation is meeting interim milestones and is on track to meeting the sustainability goal for the basin (WWD, 2022b). The District submitted its five-year update, 2025 Periodic Evaluation, to DWR in January 2025. The Periodic Evaluation indicates that current groundwater level conditions generally reflect progress toward groundwater sustainability. (WWD, 2025; DWR, 2025b.)

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Projects and management actions developed for the GSP are aimed at preventing and managing chronic lowering of groundwater levels, and significant and unreasonable reduction of groundwater storage, land subsidence, and degradation of groundwater quality. Proposed projects and management actions identified in the 2022 GSP were grouped into the following project categories and are described below (WWD, 2022a).

1. Surface water imports (described under Surface Water Supplies)
2. Initial allocation of groundwater extraction
3. Aquifer storage and recovery
4. Targeted pumping reductions (to reduce pumping near Check 16, 17, and 20)
5. Percolation basins

**Initial Allocation of Groundwater Extraction.** The GSA has prepared a groundwater allocation framework to manage demand by equally distributing the total annual pumping from the subbasin based on gross land acreage overlying the subbasin. The groundwater allocation program includes a “transition period” from 2022 to 2030, in which a uniform annual allocation was initially established at 1.3 AF/acre and then subsequently reduced each year by 0.1 AF/acre until 2030 when the allocation would reach 0.6 AF/acre. The groundwater will be distributed based on per-acre land ownership for all qualifying lands. Under the GSP, landowners overlying the Subbasin with the ability to make reasonable and beneficial use of groundwater on their lands will be entitled to apply for a groundwater allocation based solely on overlying (developed or undeveloped) acreage and irrespective of prior use of groundwater utilization. Landowners with groundwater allocations may pump their allocation, bank any unused allocation (credits), or transfer unused allocations and groundwater credits to another landowner with the District’s permission. The District has also developed regulations requiring metering of all extraction wells, and fines for excess extraction. The District also adopted land-based fees and extraction facility fees to support its implementation of the GSP.

**Aquifer Storage and Recovery.** An aquifer storage and recovery program (ASR) involving the direct injection and subsurface storage of groundwater using agricultural wells has been proposed by the GSA to improve water supply reliability within the Subbasin. Landowners will voluntarily participate in the program to have recharged water augment a landowner’s groundwater allocation and increase their supply. (See Article 1.) As of the end of the 2023 water year, the District approved 72 water user ASR projects. ASR projects that directly inject water into the confined aquifer system provided 5,600 AF of additional recharge in the Subbasin during the 2023 water year.

**Targeted Pumping Reductions.** It is possible that the combination of other measures will not be sufficient individually or collectively to avoid significant and unreasonable land subsidence in certain regions of the Subbasin. When combined with cumulative Subbasin pumping, groundwater withdrawals near Checks 16, 17, and 20 of the San Luis Canal/California Aqueduct, may require focused management efforts. Consequently, the GSP proposes to offer or, if necessary to avoid significant and unreasonable land subsidence, to require surface water substitution to reduce groundwater pumping near the canal. In exchange for the reduction in pumping, the GSA may provide incentives to landowners included in this program. Participating landowners may be required to bear material unmitigated impacts in accepting the substitute surface water. Because the project water requirements are significantly lower than that required for irrigated agriculture, implementation of the VCIP may provide similar benefits.

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**Percolation Basins.** The District proposes engaging in managed aquifer recharge through percolation basins in selected areas of the Subbasin to increase groundwater in storage. These basins would be constructed on District-owned or privately held land where the Corcoran Clay is not present. In 2023, the District and water users recharged approximately 385,000 AF.

The District has pursued District-operated recharge enhancement projects as a conjunctive use strategy to promote groundwater sustainability in the Subbasin. District recharge projects are intended to store surplus surface water (when available) in the aquifer to increase groundwater storage. These strategies are intended to mitigate impacts of groundwater extraction during droughts to improve water supply resiliency and avoid undesirable results. Feasibility studies and construction of District owned recharge facilities began in 2019 with the first projects beginning operation during the 2020 water year.

The District is proposing to construct and operate percolation basins on District-owned lands located along the western margin of the Subbasin where the Corcoran clay is not present. Additionally, the District recently acquired land that could be favorable for Upper Aquifer percolation basin recharge. Percolation basins are a conjunctive use strategy where surface water is retained and infiltrated through permeable surficial deposits to recharge the Upper Aquifer and Lower Aquifer. The District would utilize these basins to store and recharge supplemental surface water in the aquifer to enhance groundwater conditions within the Subbasin. The District conducted basin style recharge at four locations in 2023.

The District has conducted studies to facilitate implementation of landowner recharge projects described below.

- **ASR Pilot Study:** As described in the PEIR, the District contracted with Brown & Caldwell to conduct a pilot ASR study to demonstrate ASR feasibility. This 2018 study was followed up by a 2019 Report of Waste Discharge and Technical Report submitted to the Central Valley Regional Water Quality Control Board used to secure programmatic regulatory compliance for up to 400 ASR wells and provide landowners with technical information for implementing ASR projects.
- **Recharge Feasibility Study:** The District contracted with Universal Engineering Sciences to conduct a geological investigation on groundwater recharge potential largely in the southwestern portion of the Subbasin. The study, which was published in 2024, relied on 123 Cone Penetration Tests and 10 hollow stem auger borings to identify areas with favorable recharge conditions.
- **Towed Electromagnetic Resistivity (tTEM) Survey:** The District contracted with Luhdorff and Scalmanini and Geophysical Imaging Partners to conduct a desktop study followed by a tTEM survey to identify recharge potential in drainage impaired lands in the eastern portion of the Subbasin near Naval Air Station Lemoore in 2024 (in progress at the time of this writing). The goal of this study is to help identify if there is any localized potential for modified surface-based recharge in drainage impaired portions of the Subbasin.

As a result of the aforementioned studies, the District collected additional subsurface information regarding soil types in the Subbasin and updated the District Groundwater Sustainability Guidance For Processing Groundwater Recharge Project Application document to ensure that Groundwater Users are recharging in areas that optimize groundwater conditions.

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The District has encouraged, incentivized, and provided support to landowner-operated groundwater recharge enhancement projects in the Subbasin. Like District-operated projects, landowner recharge projects are intended to store surplus surface water in the aquifer system, when available, to increase groundwater storage in the Subbasin. These strategies are intended to mitigate impacts of groundwater extraction during droughts to improve water supply resiliency and avoid undesirable results.

The District has encouraged and incentivized landowners within the Subbasin to establish groundwater recharge projects including percolation basins, flood managed aquifer recharge (Flood MAR or flood irrigation), sublateral recharge, and ASR. Landowner projects serve as a groundwater replenishment strategy to enhance groundwater storage within the Subbasin when surface water supply is available. The District has funded multiple investigations to determine recharge feasibility, completed studies to ensure environmental compliance, and developed programs to incentivize landowner participation in Subbasin recharge enhancement.

As described in the District’s 2025 Periodic Evaluation, substantial progress towards the implementation of Project Management Actions described in the 2022 GSP was made during the first five years of GSP implementation. Over this period, the District prioritized sustainable groundwater management by (1) expanding existing Project Management Actions and (2) developing two new Project Management Actions: Agricultural Land Repurposing, and Desalination and On-Farm Recycling. Agricultural Land Repurposing includes converting agricultural lands to less water-intensive beneficial uses to reduce groundwater demand. This includes clean energy development. The Desalination and On-Farm Recycling Project focuses on developing infrastructure to treat salty Upper Aquifer groundwater during wet years, and using the permeate for crop irrigation and applying the resulting concentrate on salt tolerant crops to manage treatment byproduct. The initial phase of the Desalination Project involves a 2-year pilot project, focused on operating a small reverse osmosis (RO) facility and monitoring the transport and fate of concentrate in the crop-based byproduct water management system. (WWD, 2025.)

The 2025 Amendment to the GSP builds upon the 2022 GSP and describes projects and management actions the GSA intends to implement to achieve groundwater sustainability by 2024. Specifically, the 2025 GSP Amendment identifies the following projects and management actions:

1. Surface water deliveries
2. Groundwater allocation program
3. Westlands Water District groundwater recharge enhancement
4. Water user groundwater recharge projects
5. Targeted groundwater pumping reduction program
6. Agricultural land repurposing
7. Desalination and on-farm recycling

The first five projects are substantially similar to those described above in the 2022 GSP and are therefore not repeated here.

**Agricultural Land Repurposing.** The District is pursuing strategic long-term land repurposing projects that aim to both reduce agricultural water demand and promote community development, environmental stewardship, clean energy, and economic sustainability. These initiatives include the District’s Strategic Plan and the proposed VCIP. The District’s Strategic Plan outlines key strategies to ensure the District

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achieves long-term groundwater sustainability, preserves economic opportunities for growers and the communities, and protects against undesirable results, such as subsidence. As more particularly described in the PEIR, the VCIP is an initiative that focuses on expanding clean and renewable energy infrastructure within California's Central Valley. It aims to support the region's transition to more sustainable energy sources while addressing environmental and economic challenges. The Subbasin has long been a hub for agricultural activity, which traditionally relied on significant groundwater extraction and fossil fuel energy sources. The VCIP seeks to align energy development with goals of sustainability and resilience, including the reduction of carbon emissions and groundwater sustainability.

**Desalination and On-Farm Recycling.** Under the broader Storage, Treatment and Aquifer Recharge (STAR) Project, the District is developing a Desalination and On-Farm Recycling Project (Desalination Project) to extract and treat groundwater from portions of the underlying aquifer system where water quality has previously prevented the use of water for irrigation and other beneficial uses. Use of groundwater extracted from these areas could provide a reliable source of additional supply, increasing the sustainable yield of the Subbasin and provide a new source of reliable water to disadvantaged communities during shortages. The first phase of the Desalination Project is a pilot study that will be used to demonstrate feasibility and develop the full-scale project which is anticipated to pump and treat up to 20,000 acre-feet of water per year. The Desalination Pilot will use the brine water produced from RO to irrigate halophytic (salt-tolerant) crops without degrading soil or shallow aquifer water quality. The Desalination Pilot seeks to maximize uptake of ions in the brine water via halophytic crops and phytoremediation plant species. If successful, the District will consider expanding the pilot project to an appropriate scale to contribute to sustainability objectives.

### **Aquifer's Ability to Recover**

Most of the information provided in the following subsections on District groundwater conditions was obtained from the District's 2015 Deep Groundwater Conditions Report (WWD, 2016), 2012 and 2017 Water Management Plans (WWD, 2013; WWD, 2017a), 2020 Westside Subbasin GSP; 2021 Westside Subbasin Annual Report (WWD, 2022b), 2023 Water Management Plan (2023a); and the 2025 Westside Subbasin Periodic Evaluation (WWD, 2025).

As presented in Table 7, prior to the delivery of CVP water into the District, annual groundwater pumping ranged from 822,000 to 964,000 AF during the period from 1953 to 1968. The majority of this pumping was from the Lower Aquifer below the Corcoran Clay, causing the sub-Corcoran piezometric groundwater surface (i.e., the top of the subsurface groundwater body or the water table) to reach the lowest recorded average elevation of 156 feet below mean sea level in 1967. The U.S. Geological Survey concluded that extraction of large quantities of groundwater prior to CVP deliveries resulted in compaction of water bearing sediments and caused land subsidence ranging from 1 to 24 feet between 1926 and 1972.

After CVP water deliveries began in 1968, the groundwater surface rose steadily until reaching 89 feet above mean sea level in 1987, the highest average elevation on record dating back to the early 1940s. The only exception during this period was in 1977 when a drought and drastic reduction of CVP deliveries resulted in groundwater pumping of approximately 472,000 AF and an accompanying drop in the groundwater surface elevation of approximately 97 feet.

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During the early 1990s, groundwater pumping increased due to reduced CVP water supplies due to drought and regulatory actions. Groundwater pumping reached an estimated 600,000 AF annually during 1991 and 1992 when the District received 25 percent of its contractual entitlement of CVP water. This increased pumping caused the groundwater surface to decline to 62 feet below mean sea level, the lowest elevation since 1977. DWR estimated the amount of subsidence since 1983 to be almost two feet in some areas of the District, with most of that subsidence occurring since 1989.

Based on data presented in Table 6 and Table 7, during 2015 to 2024, CVP allocations averaged 423,638 AF (36 percent of CVP contract volume), total groundwater pumped was 3,582,000 AF, and in 2015 the groundwater surface elevation decreased 129 feet. The CVP allocations for 2014, 2015, 2021, and 2022 water years were “zero” with the accompanying increase in groundwater pumped ranging from 603,000 AF to 660,000 AF during those four years. To address subsidence from increased groundwater extractions, the state adopted SGMA and required that overdrafted basins, such as the Subbasin, be managed by a GSA via a GSP to aid in aquifer recovery and to obtain sustainability.

### **Sustainable Yield and Groundwater Allocation Program**

SGMA defines sustainable yield is defined as “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.” (Wat. Code, § 10721(w).) The GSP determined that the estimated sustainable yield for the historical period (1989-2015) across the Subbasin is 305,000 AFY and that the estimated sustainable yield for the projected period (2020-2070) ranges from 270,000 to 294,000 AFY, depending on the future climate scenario (WWD, 2022a).

Pursuant to SGMA, the District developed, adopted, and revised Article 1. Regulations for the Groundwater Allocation Program and Use of Groundwater within the Westside Subbasin. Article 1 establishes the sustainable yield of the Subbasin and outlines the provisions governing the allocation of groundwater, including the definition of the implementation period and requirements for registration, well metering, and transfer of groundwater credits.

A component of the District’s allocation program is the installation of District-owned meters at all well locations where agricultural water extraction will occur. As of March 2023, all current agricultural wells have been furnished with a District-owned groundwater flow meter. Groundwater pumping data is obtained remotely through the Automatic Metering Infrastructure (AMI). The District also monitors all meter and extraction information from privately owned water meters within the Subbasin on a quarterly basis. As new production wells are constructed within the Subbasin, the GSA will furnish the new well(s) with a District-owned groundwater flow meter. The District conducts a monthly assessment of groundwater extraction and recharge for each landowner to track groundwater allocations, carryover, and recharge credits. The District also releases and processes annual applications to register for the Groundwater Allocation Program for the coming water contract year.

To manage groundwater supplies during the initial years of GSP implementation, the GSA established an interim allocation of groundwater extraction intended to manage demand by equally distributing total annual pumping from the Subbasin based on overlying land acreage. Under the GSP, approximately 525,000 gross acres (as opposed to irrigable acres for surface water) within the Subbasin are eligible to

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receive a groundwater allocation, which limits the volume of annual groundwater pumping. The groundwater allocation framework established under the GSP includes a “transition period” from 2022 to 2030, in which a uniform annual allocation cap is initially established at 1.3 AF/acre and then subsequently reduced each year starting in 2024 by 0.1 AF/acre until 2030 when the allocation reaches 0.6 AF/acre (WWD 2024a).

Under Article 1 (WWD, 2024), no groundwater is allocated annually to District-owned lands. (Article 1, 1.9(A).) However, any groundwater user that receives a groundwater allocation “may use it on any Eligible Land within the Westside Subbasin.” (Article 1, 1.3(C).) In addition, any groundwater user may “bank any unused quantity as carryover and/or Transfer any unused portion of the Groundwater Allocation.” (Article 1, 1.9(c).) Landowners may carry over unused groundwater allocation from one year to the next and earn groundwater credits by implementing recharge projects. Potential VCIP developers may negotiate with landowners to procure groundwater credits for solar/BESS project construction and operations.

Landowners that receive an allocation may also transfer groundwater credits to a “Gross Acre” which is defined as “an acre within the Westside Subbasin assessed by Fresno or Kings County, that has been irrigated prior to December 31, 2015, or is suitable for reasonable and beneficial use of groundwater. Land that does not meet this definition may be deemed to meet the definition pursuant to an approved request for variance.” Pursuant to Article 1, projects on District-owned land may purchase unused groundwater credits from private landowners and extract that water from wells located on District-owned land or transfer the groundwater via a pipeline to a project located on District-owned land.

While groundwater extraction is typically low during years with a high CVP allocation, the Groundwater Allocation Program has added additional incentives to utilize surface water in lieu of groundwater extraction. This resulted in the recovery of groundwater levels and a rebound in ground elevation (“reverse subsidence”) observed during the 2023 contract water year. It is anticipated that the transition to the final landowner specific annual rate-based allocation in 2030 will continue to reduce localized high rates of groundwater extraction during years where a low surface water allocation has historically led to substantial local declines in groundwater levels and land subsidence.

As the construction of potential VCIP projects would occur from 2029 through 2038, the long-term allocation of 0.6 AF/acre was used in this analysis as available supply for the reasonable and beneficial uses associated with VCIP implementation.

## **VCIP SUPPLY AVAILABILITY**

### **District Owned Lands**

For potential VCIP projects on existing District-owned lands, the District would likely either sell or lease these lands to the project proponent. The District will reserve overlying groundwater rights when it sells the land and execute a M&I water agreement with the lessee or project proponent. The District has indicated that land owned by the District but sold or leased for solar development through VCIP is eligible to receive M&I surface water deliveries through its existing system of lateral pipelines for conveyance of imported surface water to meet operational demands. This is because these lands are eligible for allocation or delivery of water under Reclamation law and any applicable District Regulation as described in *Article 2, Regulations for the Allocation and Use of Agricultural Water within Westlands Water District*,

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as revised September 2023, and *Article 19, Regulations Regarding the Application for and Use of Municipal and Industrial Water within Westlands Water District*. (WWD, 2023c, 2023d). During years of extreme shortage of surface water supplies, the District would continue to provide M&I supplies to solar and energy storage facilities on District-owned lands through its health and safety allocation from USBR. Further, project proponents may also purchase groundwater credits from other landowners for use on District-owned lands.

### **Privately Owned Lands**

For solar and energy storage facilities located on privately-owned lands, operational water supplies would be provided by the underlying landowner from its surface and/or groundwater allocations. If the District cannot provide the surface water supply from its CVP contract, operational water would be obtained from existing on-site agricultural wells or from surface water transferred into the District.

### **Supply Availability**

Based on the long-term groundwater pumping limit of 0.6 AF/acre per year (AFY/acre) established under the GSP, the overall pumping limit on 64,000 acres of solar facilities on private lands would be 38,400 AFY, which would be more than sufficient to provide for the maximum operational water demands of 260 AFY from projects on those lands at buildout (i.e., 64,000 ac x 0.004 AFY/acre).

Construction water demands will be greater than annual operational water demands but still significantly less than that allowed under the 0.6 AFY/acre GSP allocation. Annual construction demands within the 10 year construction period were calculated to reflect the VCIP phasing plan and peak between years 2029 through 2032 at 2,227 AFY. See Table 3 for more information on construction demands.

As noted previously, since CVP contract water generally may not be used for construction, construction water would generally come from groundwater within the District or water procured from other CVP or State Water Project contractors. At this program level of review, the amount of VCIP facilities to be constructed on District-owned lands or private lands in any given year is not known. While construction water for projects on private lands would likely come from groundwater wells on the project sites or its larger farm holding, construction water for projects on District lands would likely be purchased (via a District-approved groundwater transfer) from agricultural lands in the vicinity which are eligible for groundwater allocation, or from surplus District surface supplies (if available), or purchased from other sources. Given the broad distribution of District-owned lands throughout the Plan Area, this groundwater supply could come from anywhere in the District, but most likely would come from lands adjacent to or near the District-owned lands in northern and eastern portions of the Plan Area. Since it cannot be predicted where groundwater from off-site sources would be obtained, it is assumed that the development of VCIP projects on District-owned and private lands would obtain groundwater from an area of land equivalent to the lands subject to disturbance during a given year of VCIP development. For example, 14,771 acres of disturbed lands under construction in 2030 would obtain groundwater from an equivalent area of lands in the Plan Area. The annual groundwater allocation for 14,771 acres (at 0.6 AFY/ac) would be 8,863 AFY which is much greater than the project construction demand of 2,227 AFY.

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## WATER SUPPLY RELIABILITY

SB 610 requires the consideration of supply availability during normal, single dry, and multiple dry water years. Reasonable assumptions can be made regarding availability and reliability under normal year and dry year scenarios based on available data and information for the project.

The temporary groundwater supply required for construction of the VCIP will be provided from existing on-site agricultural wells, other wells located in the vicinity, or available surface water. The GSP determined that the allocation of groundwater of 0.6 AF/acre/year was to be used as the available supply for the analysis of supplies and demands. With a total of 64,000 acres of land within the Subbasin that is eligible for a groundwater allocation within VCIP, groundwater availability for VCIP is up to 38,400 AFY for construction and operational demands. Unused groundwater allocations (or carryover credits) from these lands may be transferred to land not eligible for an annual groundwater allocation. Transferred groundwater credits may be extracted from District-owned land, including from abandoned wells, or transferred to District-owned lands from private wells.

For the construction of solar energy generation and infrastructure projects, groundwater in the Subbasin is considered available and reliable under normal water years, a single dry water year, and multiple dry years, as shown in Table 8. Based on the temporary construction demands presented in Table 3, peak year 2030 demands of 2,227 AF are compared with an estimated 9,897 AF of historical water production for the same year based on recent historical annual average (2015 to 2024) groundwater production of 0.67 AFY/acre for agricultural irrigation.<sup>8</sup> The projected temporary application of water presented in Table 3 for dust control represents a far less intensive use of water supplies compared to pre-development conditions.

In addition, based on the information provided in this WSA and presented in Table 5, the operational water demand at full build-out in year 2039 is 514 AF. This is significantly less than the available annual groundwater allocation of 38,400 AF (using 0.6 AFY/acre) for 64,000 acres of eligible DFA lands and the historic production requirements for eligible DFA lands of 42,880 AFY (using the recent historical average of 0.67 AFY/acre for groundwater).

The peak combined operations and construction demand is in year 2037; total demands for year 2037 are 2,673 AF. The projected demand for all years of analysis is not expected to result in adverse water supply reliability impacts.

The amount of CVP contract water received by the District during any given year varies depending on climatic and hydrologic conditions, Delta constraints, and other factors. The District augments the contract water with transfers and other purchased supplies, and growers augment surface supplies through groundwater pumping and market-based groundwater credit transfers, participating in the District's Supplemental Water program, acquiring their own transfers, or hiring a water broker to acquire water on their behalf. However, given the extreme variability in availability of supplemental water from year to year, supplemental water sources are not considered reliable for purposes of water supply planning and are not required to meet VCIP's projected water demand.

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<sup>8</sup> Based on average annual groundwater pumping from 2015 to 2024 of 357,500 AFY / 525,000 acres eligible for groundwater allocation.

**Table 8. VCIP Supplies and Demand (AFY)<sup>1</sup>**

	2025	2030	2035	2040	2045	2050
<b>Normal Year Construction</b>						
Groundwater Supply <sup>2</sup>	0	8,863	8,682	0	0	0
WWD Supply <sup>3</sup>	0	0	0	0	0	0
<i>Construction Demand</i> <sup>4</sup>	0	2,227	2,183	0	0	0
<b>Normal Year Operations</b>						
Groundwater Supply <sup>2</sup>	0	0	0	42,880	42,880	42,880
WWD Supply <sup>5</sup>	0	450	2,250	2,250	2,250	2,250
<i>Operations Demand</i> <sup>6</sup>	0	54	326	514	514	514
<b>Single Dry Year Construction</b>						
Groundwater Supply <sup>2</sup>	0	8,863	8,682	0	0	0
WWD Supply <sup>3</sup>	0	0	0	0	0	0
<i>Construction Demand</i> <sup>4</sup>	0	2,227	2,183	0	0	0
<b>Single Dry Year Operations</b>						
Groundwater Supply <sup>2</sup>	0	0	0	42,880	42,880	42,880
WWD Supply <sup>5</sup>	0	450	2,250	2,250	2,250	2,250
<i>Operations Demand</i> <sup>6</sup>	0	54	326	514	514	514
<b>Multiple Dry Year Construction (Year 1, 2, 3)</b>						
Groundwater Supply <sup>2</sup>	0	8,863	8,682	0	0	0
WWD Supply <sup>3</sup>	0	0	0	0	0	0
<i>Construction Demand</i> <sup>4</sup>	0	2,227	2,183	0	0	0
<b>Multiple Dry Year Operations (Year 1, 2, 3)</b>						
Groundwater Supply <sup>2</sup>	0	0	0	42,880	42,880	42,880
WWD Supply <sup>5</sup>	0	450	2,250	2,250	2,250	2,250
<i>Operations Demand</i> <sup>6</sup>	0	54	326	514	514	514

<sup>1</sup> Table reflects phasing order which places priority on developing District-owned lands first. Thus, the 72,000 acres of District-owned lands are assumed to be developed between 2029 and 2034. Development on the 64,000 acres of private lands begins in 2035, and the first year of operations on private lands is 2036.

<sup>2</sup> The GSP sustainable yield of up to 0.6 AFY/acre of groundwater is assumed available for the 72,000 acres of District-owned VCIP lands to meet temporary construction water demands; however, groundwater would be pumped from adjacent or nearby lands since no groundwater pumping is allowed on District-owned lands. This unit factor was applied to the acreage under construction or projects developed. Supply is available from local agricultural wells.

<sup>3</sup> WWD supply is not available for construction, except in years when surplus water is available; therefore, WWD supply is not relied upon for construction, and groundwater is considered the source for all construction water.

<sup>4</sup> From Table 3. Demands reflect acreage under construction.

<sup>5</sup> The VCIP solar projects on District-owned land are eligible to receive up to 5 AFY per 160 acres for operations under Article 2 of WWD's Rules and Regulations.

<sup>6</sup> From Table 5. Demand reflects the cumulative number of PV projects constructed.

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During operation of the project, the long-term water demand of 54 AFY in 2030 would increase to 514 AFY by 2039 for operational uses such as panel cleaning, sheep watering, and ongoing operations. This demand would be met using groundwater or M&I (surface) water provided by the District. The District manages its supplies for long term supply reliability. It augments CVP contract water with acquired surface water, which is supplemented by groundwater pumped by growers, as presented in Table 6. If for some reason District surface water supplies are not available to meet VCIP operational demands, groundwater would be pumped from existing on-site agricultural wells or from other agricultural wells in the vicinity and trucked to the site for panel washing.

Based on the information provided in this WSA, sufficient water supplies (surface and/or groundwater) are considered available and reliable to meet the VCIP maximum operational demand of 514 AFY and groundwater supplies to meet the maximum construction demand of 2,227 AFY, under normal, dry, and multiple dry year climatic conditions, as shown in Table 8. As presented in this WSA, the project water demand will result in significantly less groundwater pumping of the Subbasin during construction than that currently being pumped, and minimal groundwater pumping during solar facility operations after full buildout.

### **OTHER PLANNED PROJECTS**

Other planned uses in the Subbasin consist almost entirely of other solar PV generation and energy storage facilities in Kings and Fresno counties. As of July 2025, a total of 51 other solar and energy storage projects have been approved or are pending approval in the Subbasin portions of the two counties. Of these, 39 solar and energy storage projects have been completed, another 10 projects have been approved, and two projects are pending approval by the two counties.<sup>9</sup> It is estimated that the 12 unconstructed projects would consume a total of approximately 2,156 AF of water during construction. For five of these projects, this estimate is based on information available from public documents; for the remaining seven projects where no public documents contain water demand estimates, construction water demands were estimated based on a factor of 0.15 AFY/ac.

Based on review of available environmental documents for foreseeable solar and energy storage projects in the Subbasin, construction water for the solar and energy storage projects would be obtained from local groundwater sources within the Subbasin, but surface water will be available in some years. Use of construction water at a rate of 0.15 AFY/acre would be consistent with the Subbasin's long-term sustainable yield of 0.6 AFY/acre. For comparison, upon completion, operational water demands for VCIP solar and energy storage facilities would be approximately 0.004 AFY/acre (i.e., 1,600 acres per project x 85 projects/514 AFY). As discussed, it is assumed that operational water for the other solar and energy storage projects on District-owned land would mostly be obtained from surface water resources, while operational water for VCIP projects on privately-owned lands would be obtained from a combination of groundwater and surface water sources, with the ratio of surface versus groundwater supply depending on negotiations with the underlying landowner in each project case. Since this ratio cannot be predicted, it is conservatively assumed that all operational water supplies for energy projects on private lands would be obtained from groundwater, except for potable water delivered by truck as described above. These

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<sup>9</sup> This total does not include four solar/BESS projects (2 approved + 2 pending) located within the VCIP DFAs, since the water demands for those projects have been accounted for in the water supply analysis for the VCIP.

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operational water demands would be well below the long-term 0.6 AFY per acre SGMA allocation and therefore would be consistent with the Subbasin's sustainable yield.

In addition to solar and energy storage projects, six other projects are pending approval in the Subbasin. These include three pistachio processing plants, two highway commercial developments, and one utility substation (Manning Substation). One pistachio plant would, if approved, utilize only surface water provided by the District. The other two plants would utilize groundwater pursuant to agreements with the District, which would ensure groundwater pumping complies with the allocations established in the GSP. The two highway commercial projects would receive M&I water from the District's surface water deliveries. The Manning Substation would require no water supply for operations.

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## CHAPTER 4 – CONCLUSIONS

### SUFFICIENCY FINDINGS

An analysis of the ability of the groundwater basin (based on District Subbasin data) to meet projected construction water demands of the VCIP was based on several factors. The primary consideration is that solar projects have rights to extract a reasonable quantity of groundwater from the groundwater basin they overlie via an annual allocation or a purchase of groundwater credits from other landowners via a District-approved transfer. In addition, the maximum project construction demands of 2,227 AFY for the four years beginning in 2029 and long-term operational demand of 514 AFY are substantially less than the sustainable groundwater yield of the Subbasin on a per acre basis for the District per the GSP.

As discussed above, there are differences in water supply conditions depending on whether a VCIP project is to be located on District-owned land or privately-owned land. As discussed, construction water for all VCIP projects would be obtained from groundwater sources, although some surface water for construction may be available from the District in some years, although this is not relied upon here.

Operational water for VCIP projects on District-owned land would come from CVP contract water or supplemental surface water supplies provided by the District. It is anticipated that the District's allocations of CVP contract water will continue to resemble the most recent 10-year period of 2015 to 2024, where the District received an average of 36 percent of its CVP contract water with "zero" allocations in multiple years. However, even if the District receives no CVP allocation ("zero") in any given year, it would still be able to meet the operational demands of solar projects entitled to receive an M&I allocation pursuant to Article 19 of the District's Rules and Regulations or the health and safety allocation from USBR. As illustrated in Table 6, the District and users within its service area have augmented available CVP supplies with other surface water sources during each year since 1988, particularly during dry years. Due to the established market for these purchases and their longstanding availability during all water year types, it is anticipated that these additional sources will continue to be available, which bolsters water supply reliability. Therefore, no deficiencies in operational supplies are expected for solar and energy storage projects on District-owned land.

Groundwater supplies would be used for construction of all VCIP projects, and for some portion of operational water on privately-owned lands. The projected groundwater demands of the VCIP, in addition to those of completed and planned projects, are substantially lower than the GSP's long-term groundwater allocation of 0.6 AFY/acre long-term, which is consistent with the Subbasin's sustainable yield through 2070. (It is noted that VCIP's water demands would also be substantially lower than baseline demands from irrigation and M&I uses, both in terms of pumping rates, which average 0.67 AFY per acre of irrigable land District-wide, and in terms of absolute volumes of annual pumping within the DFAs eligible for groundwater allocation.) Therefore, a sufficient groundwater supply exists to serve all projected water demands associated with the VCIP, in addition to the completed and planned projects, on lands eligible to receive a groundwater allocation from the GSP (i.e., non-District-owned lands).

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With consideration of these variables and conditions, it is concluded that groundwater supplies from the Subbasin will meet construction demands for VCIP during the approximately 10-year construction period, in addition to the demand of existing and other planned future solar projects in the subbasin. District water supplies, augmented by groundwater supplies if needed, will meet the projected 514 AFY for VCIP operational water demands over a 20-year planning horizon, in addition to the demand of existing and other planned future uses.<sup>10</sup> No supply deficiencies are expected in normal, dry, and multiple dry years for the proposed project. This WSA was prepared in compliance with the California Water Code, as amended by SB 610.

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<sup>10</sup> Regarding decommissioning, it is noted that WSA's are required to cover a 20-year period, although decommissioning of VCIP projects is not expected to occur until at least 40 years in the future. -For informational purposes, it is expected that water demands for decommissioning would be no greater than maximum construction water demands of 2,227 AFY. At a demand rate of 0.15 AFY/ac for groundwater (no surface water would be used for decommissioning), the overall demand would be substantially below the 0.6 AFY/ac groundwater allocation under the GSP. Therefore, no supply deficiencies are anticipated for decommissioning.

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