

Bureau of Reclamation

WaterSMART Grants: Water and Energy Efficiency FY 2023

Project Name:

Cal Water's Lawn to Garden Turf Conversion Rebate Project

Project Locations:

Bakersfield, CA; Marysville, CA; Oroville, CA; Selma, CA; Visalia, CA

Applicant:

California Water Service



1720 North 1st St.
San Jose, CA 95112
Corporate Office

Project Manager:

Natalie Pavlovski
Interim Manager, Research, Analytics & Reporting
California Water Service
NPavloski@calwater.com
(310) 257-1462

Date:

July 26, 2022

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Technical Proposal

Executive Summary

Date: July 28, 2022

Applicant Name: California Water Service (Cal Water)

City, County, State: San Jose, Santa Clara County, California

- **Project Locations (by Cal Water District):**
 - o Bakersfield, Kern County, California
 - o Marysville, Yuba County, California
 - o Oroville, Butte County, California
 - o Selma, Fresno County, California
 - o Visalia, Tulare County, California

Project Summary:

California Water Service (Cal Water) proposes the implementation of the Lawn to Garden Turf Conversion Rebate Project. Over a two-year period, the Project will help facilitate transformative landscape improvements and heightened water conservation measures across eligible participating customers classified as single-family residential, multi-family residential, and commercial accounts in the Districts of Bakersfield, Marysville, Oroville, Selma, and Visalia. Cal Water currently offers a minimum rebate of \$3 per square foot of lawn removed and converted to landscaping utilizing California-friendly, drought-tolerant plant material.

This Project will promote water conservation through the transformation from high-water-use landscaping and irrigation to drought tolerant, permeable landscapes through an established rebate format and result in the conversion of up to 195,000 square feet of turfgrass to California friendly landscapes. These measures will result in reductions of potable water use, increased water usage efficiency, reductions of dry-weather and stormwater runoff and its associated non-point source pollution, reductions of landscape maintenance costs, and are expected to save more than 161.6 acre-feet (AF) of potable water over the life of the improvements (assuming a lifetime of 10 years). This Project will also result in an estimated energy savings of 7,465 kWh annually, and 74,650 kWh over the lifetime of the project. Additional project benefits include the reduction of carbon dioxide emissions and increase of carbon sequestration and biomass.

This Project will enable Cal Water to expand its existing Lawn to Garden rebate program funding, further facilitating customers being able to beautify their landscapes while simultaneously reducing water use and saving money, which reflect Cal Water's commitment to deliver quality, service, and value. Participants serve as examples for others to follow, thereby fostering a California Friendly landscape transformation and promoting water conservation and environmental stewardship and responsibility for landscape practices throughout California and

the five participating regions. California friendly landscaping will include native and habitat-friendly plants, permeable mulch and concrete, and drought tolerant structuring.

Program Term: The applicant proposes a two-year performance period, with an expected start date of July 2023 and completion date of June 2025.

Program Location: The program will be implemented within the California Water Service Districts of Bakersfield, Marysville, Oroville, Selma, and Visalia, on existing residential and commercial landscapes. The sites will not be located on federal facilities.

The estimated populations of each district are as follows (as of 2021):

- Bakersfield: 287,759
- Marysville: 12,272
- Oroville: 11,063
- Selma: 26,248
- Visalia: 148,276

TOTAL: 485,618

Background Data

Water Supply: California Water Service (Cal Water) is the largest regulated American water utility west of the Mississippi River and the third largest in the country. Formed in 1926, the San Jose-based company serves 489,600 customer connections through 28 Customer and Operations Centers throughout the state. Cal Water is the largest subsidiary of the California Water Service Group, which also includes Washington Water Service, New Mexico Water Service, Texas Water Service, and Hawaii Water Service. As a whole, the Group provides high-quality regulated and non-regulated utility services to approximately 2 million people in 100 communities. The five participating water districts are all located in areas that are impacted by the current extreme and exceptional drought conditions in 2021 and 2022. In response to these ongoing drought conditions, these districts are in Stage 2 of Cal Water’s Water Shortage Contingency Plan, in alignment with Governor Newsom’s March 28, 2022 Executive Order and the State Water Resources Control Board’s Emergency Water Conservation Regulation. Stage 2 includes additional outdoor watering limits and higher water waste penalties.

Using the California Department of Water Resources Water Use Efficiency Portal, the total gross water use in each participating district as of 2020 is as follows:

- Bakersfield: 59,418 AF
- Marysville: 2,012 AF
- Oroville: 2,753 AF
- Selma: 4,592 AF
- Visalia: 30,152 AF

Water Delivery System: Please see the chart below for District-specific delivery system information.

Overview of District Capacity and Connection				
	# of Single-Family Connections	# of Multi-family Connections	Miles of Distribution Piping	Groundwater Wells
Bakersfield	59,487	1,204	1,589	130
Marysville	3,054	134	53	8
Oroville	2,681	85	59	3
Selma	5,754	66	90	16
Visalia	41,792	955	598	59

In addition to this infrastructure, Cal Water also relies on imported and purchased water to meet the supply demands of the Bakersfield and Oroville Districts.

Applicant Capacity: Cal Water has sufficient financial resources and competencies to carry out the proposed Project, exceeding the requisite matching funds for the proposed Project. Through State Grant funding through the Department of Water Resources, in 2015 Cal Water successfully implemented a Turf Replacement Program in the Visalia District through the Proposition 84 Integrated Regional Water Management Drought Grant. Cal Water has executed similar rebate programs to great success across various water districts in California and established the necessary protocols and procedures to ensure that the funds are obligated by the conclusion of the grant performance period. Cal Water has been the recipient of other water conservation and drought relief grant funding from the California Department of Water Resources, and has successfully worked to implement all grants received in timely and fiscally responsible manner.

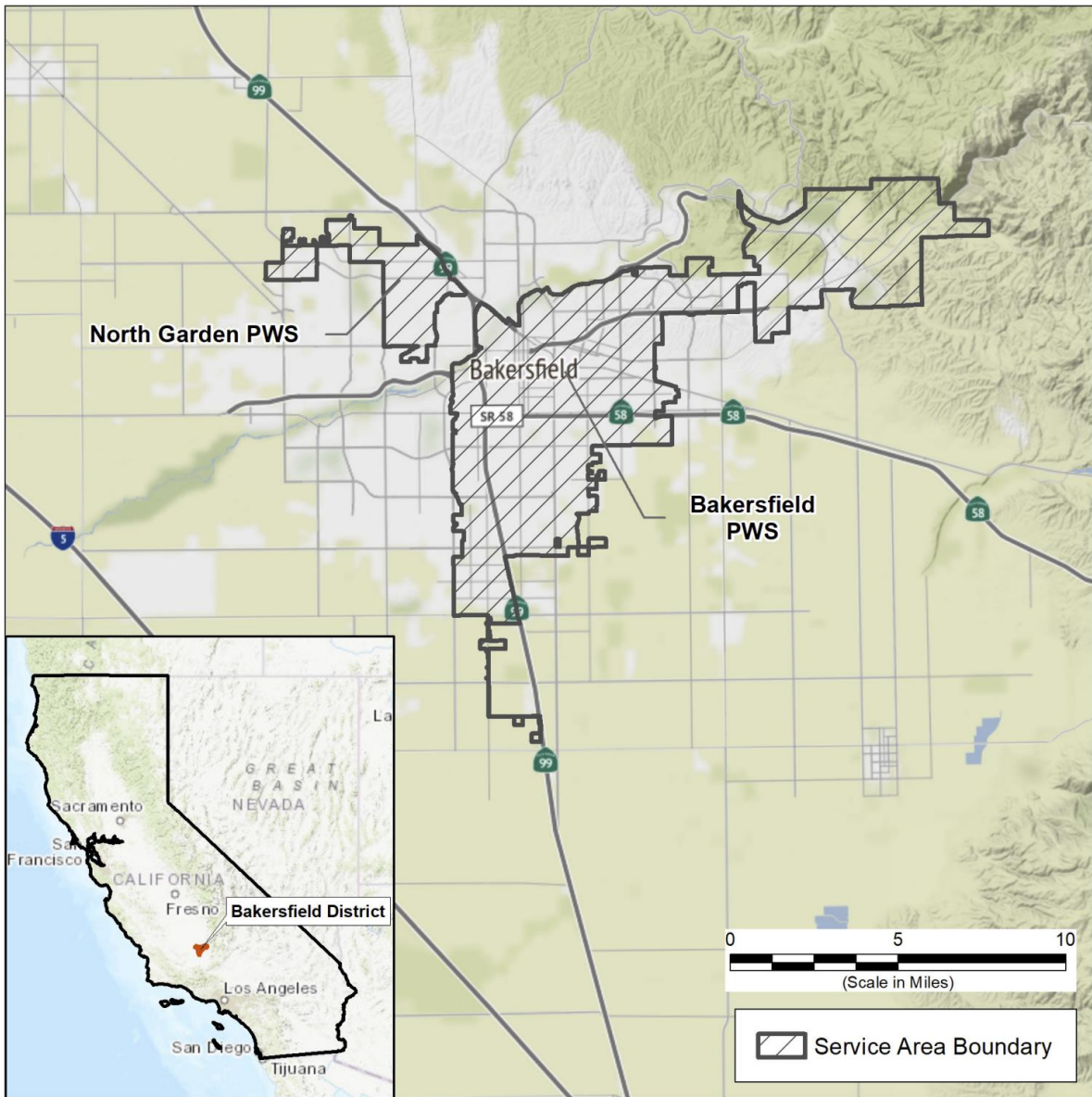
This Project will support Cal Water’s broader conservation and sustainability goals as a larger component of their overall conservation program. In addition to this proposed turf removal project, Cal Water also offers high-efficiency nozzle rebates and drip-irrigation conversion rebates, among numerous other programs, to customers throughout their districts in order to increase water conservation. While these other rebate programs are not a part of this WaterSMART grant application, they paint a broader picture of the conservation measures that will collaborate and work alongside the turf removal project to heighten sustainability, water conservation, and public outreach, as top priorities of the company.

[Project Location](#)

A map showing the locations of each of the proposed districts throughout the state, as well as the boundaries of each district is provided in Figures 1-5, below. These projects will be located in the following California counties: Kern, Yuba, Butte, Fresno, and Tulare and serve approximately 485,618 people throughout the participating districts. Each of these districts has implemented successful turf removal and landscape conversion projects in the past. It is Cal Water’s hope that

by continuing to collaborate amongst the communities that are both in high need of increased water savings and have an established legacy of water conservation and turf removal, they can mobilize participants and maximize water savings amongst the communities that need it the most. Two of these communities are also considered small systems (less than 3,000 connections or a supply volume of less than 3,000 acre feet). Cal Water hopes to promote and expand water conservation in small districts and water systems that may have limited funding availability. This is to help ensure that such districts are also able to participate in water conservation and community outreach efforts like this Turf Removal project, and that Cal Water customers in these districts are also empowered to implement water savings measures. Additionally, these Districts are also the areas which would achieve the maximum water savings benefit per square foot of converted turf.

Figure 1. Location and Boundaries of Bakersfield District.



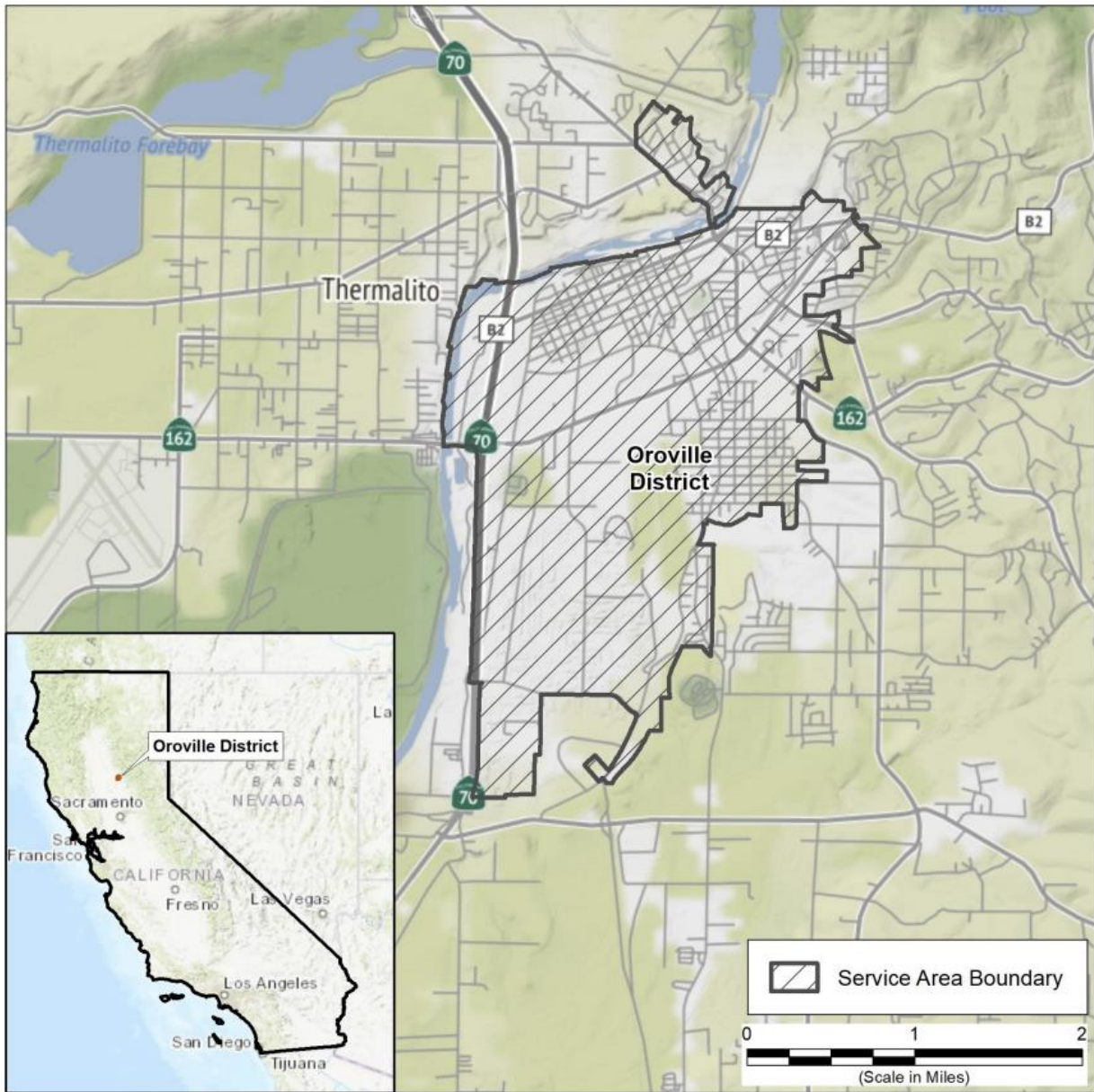
The Bakersfield District is located in Kern County and serves portions of the City of Bakersfield and segments of unincorporated Kern County lands adjacent to the City of Bakersfield. Bakersfield is the largest city in Kern County. Major transportation links in the District include the Golden State Highway (State Route 99), and Stockdale Highway (State Route 58). The Westside Freeway (Interstate 5) is approximately 15 miles to the southwest of the District at its closest point. The Southern Pacific Railroad and the Burlington Northern Santa Fe Railroad provide rail service to the region. The District is situated in the Tulare Lake Hydrologic Region, within the Kern Valley Floor Rivers sub-area. The service area is built upon the alluvium of the Kern River flood plain and covers approximately 51 square miles.

Figure 2. Location and Boundaries of Marysville District.



The Marysville District is located in Yuba County, approximately 40 miles north of the City of Sacramento. Major transportation corridors serving the area include State Highway 70 and State Route 20. Additionally, the Southern Pacific Railroad operates a line through the region. The District is situated in the Sacramento River hydrologic region, part of the North Yuba Subbasin. The service area is built at the confluence of the Feather and Yuba Rivers. The District operates within the levee system that protects the City of Marysville.

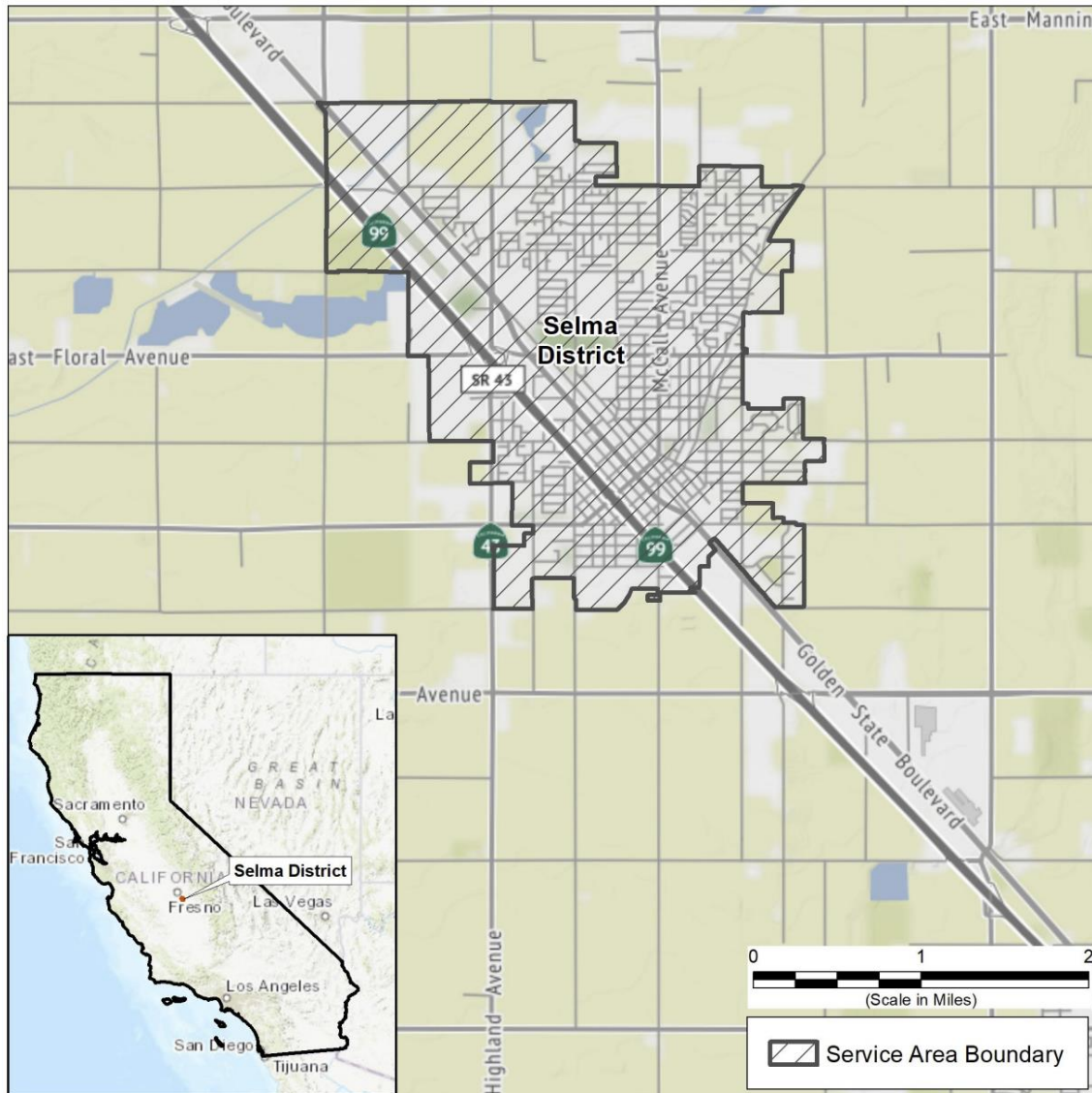
Figure 3. Location and Boundaries of Oroville District.



The Oroville District is located in Butte County. It is situated in the Sacramento River Hydrologic Region, part of the Central Basin East sub-area. The District is approximately 60 miles north of the City of Sacramento. Major transportation links to the District include the Golden State Highway (State Route 99), State Highway 70 and State Route 162; the Union Pacific Railroad provides rail service to the region. The system serves a major portion of the City of Oroville and unincorporated areas within Butte County. The service area is built upon the alluvium of the Feather River flood plain. The Feather River flows through the City of Oroville providing an outlet

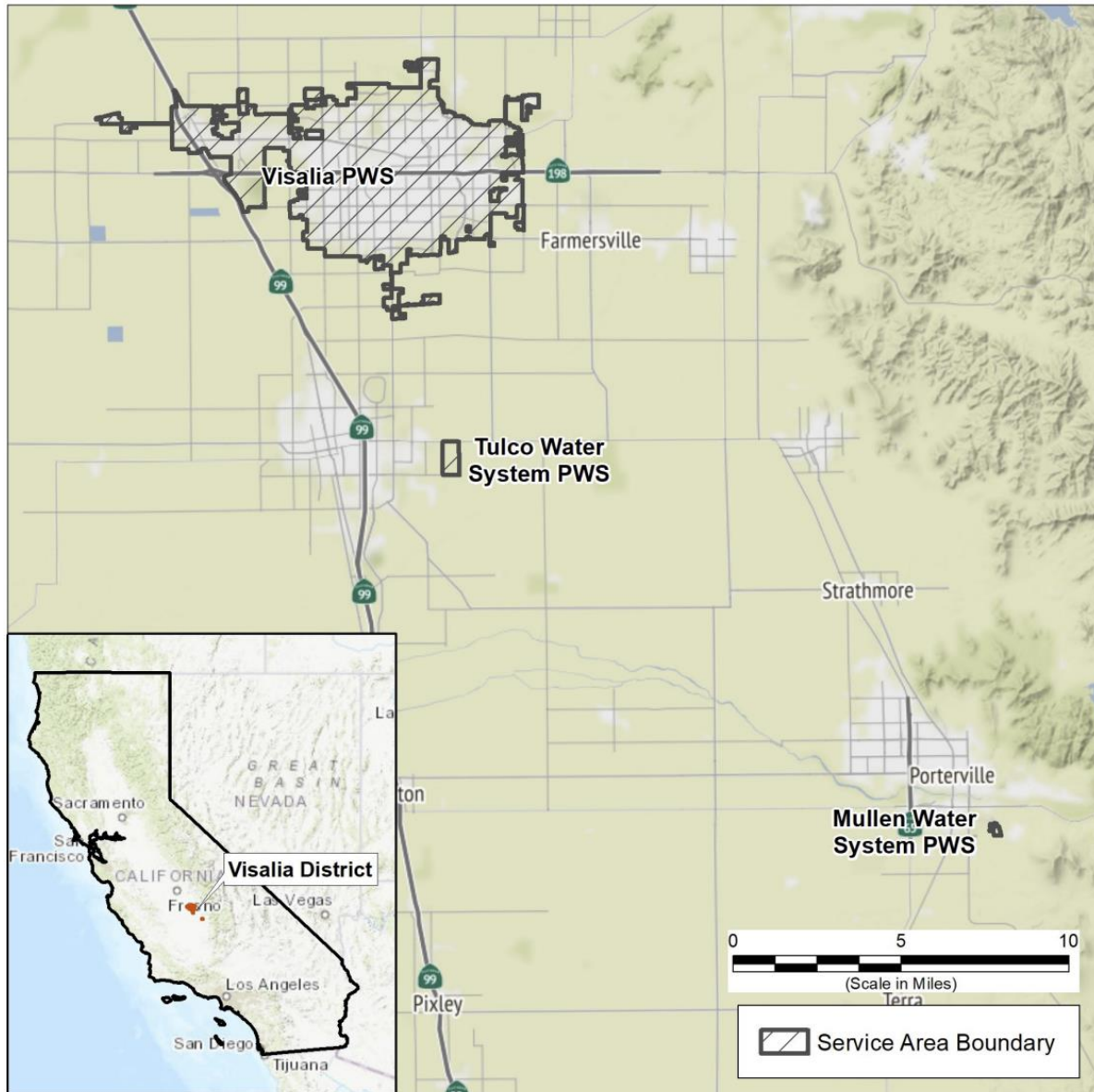
for a major drainage basin in the northern Sierra Nevada Mountains. Lake Oroville is located on the Feather River about three miles upstream of the city.

Figure 4. Location and Boundaries of Selma District.



The Selma District is in Fresno County, approximately 20 miles southeast of the City of Fresno and 90 miles north of the City of Bakersfield. Major transportation links in the District include the Golden State Highway (State Route 99) and State Route 43. The Southern Pacific Railroad, which runs parallel to State Route 99, provides rail service to the region. The District is situated in the Tulare Lake Hydrologic Region, part of the Kings River fan within the King-Kaweah-Tule Rivers sub-area. The Kings River lies approximately six miles to the southeast of the District.

Figure 5. Location and Boundaries of Visalia District.



The Visalia District is in Tulare County and serves the City of Visalia and segments of unincorporated Tulare County including the communities of Goshen, Mullen, and Tulco. Visalia is the largest city in Tulare County. The District lies approximately 42 miles southeast of the City of Fresno and 75 miles north of the City of Bakersfield. Major transportation links in the District include the Golden State Highway (State Route 99), State Route 63 and State Route 198.

Technical Project Description

The objective of the Project is to save water and energy, while also transforming the way people understand beautiful landscaping.

This Project will emphasize Cal Water's comprehensive suite of rebate programs and promote a Lawn to Garden Project that utilizes the existing and previous rebate program tools that promote community transformation and water conservation. This Project will foster a resilient and comprehensive landscape transformation and water conservation program that will be designed to further the paradigm shift from turf intensive landscapes, which utilize potable water supplies and inefficient equipment, to Drought-tolerant, resilient, California-friendly landscaping, incorporating Native and friendly local plant species and natural resources.

The current scope of this Project incorporates a \$3.00 rebate per square foot of living lawn removed and replaced with low water use plants. For single-family residential customers, the maximum rebate is \$4,500 for removing 1,500 square feet of lawn and for multi-family residential and non-residential customers, the maximum rebate will be \$30,000 for removing 10,000 square feet of lawn.

The expected total water savings for this Project is 16.2 acre-feet per year (AF) and 161.6 acre-feet over the lifetime of the projects. In order to achieve this, the project will encourage the conversion of approximately 195,000 square feet of turfgrass.

The turf removal and implementation of California-friendly landscapes will result in water and energy savings, in addition to reduced dry-weather and stormwater runoff, prevention of pollution, stormwater management, reduced maintenance costs, and reduced CO2 emissions.

Sites converted from turfgrass to drought-tolerant landscapes will better utilize and retain rainfall on site as a natural resource and to encourage healthy, living soils. Increasing stormwater retention and infiltration will reduce runoff and its associated non-point source pollution in local fresh and marine environments, increase urban groundwater recharge, and reduce local flooding risks.

Turfgrass which, on average, requires more than four feet of supplementary irrigation water each year, will be removed and replaced by low-water landscaping alternatives and plants, which require less than half the water needed by turfgrass.¹ Additional water wise improvements can include, but are not limited to, infiltration strips, bio swales, rain gardens, and rain barrels.

In order to promote the integration of water-wise landscaping and drought-friendly greenery, the Project includes a requirement that a minimum of 50% of the project area must be transformed into a water-wise landscape, and a minimum of 250 square feet of living lawn must be removed over the 90-day rebate period. Artificial turf is not allowed as part of the converted

¹ According to a study conducted by the University of California Cooperative Extension in May 2015. <https://ucanr.edu/sites/UrbanHort/files/216568.pdf>

landscape, and greenery must be included in Cal Water's list of qualified plants or the California Native Plant Society's plant database, to ensure that it is water-wise, drought tolerant, and California-friendly. Any mulched areas must not be dyed, painted, or composed of rubber, and they must be permeable to allow water to pass through, and the new landscape is required to have a 2" layer of organic or inorganic mulch type to cover exposed soil in order to prevent runoff and hold moisture in the soil. Any concrete incorporated in the landscaping must be porous to be eligible for the rebate. Once the participant has submitted sufficient evidence of landscape transformation, in accordance with the terms and conditions, Cal Water will mail rebate checks within 8 weeks of project approval. These landscape transformations will serve as examples for the community to follow, thereby fostering additional landscape transformation and promoting water conservation and environmental stewardship and efficient landscape practices throughout the neighborhoods that surround the participating districts.

As part of the holistic, water-transformation nature of the Project, Cal Water provides participants with additional resources to promote optimal water savings. These example resources include but are not limited:

- Databases and Guidelines for Native Plant Resources
- Instructions for accessing both the already existing Cal Water Drip Irrigation rebate program and High-efficiency nozzle rebate program (not included in this scope of work, but serve as an additional resource and supplemental rebate for participants.)
- Email Notifications regarding project updates and application status
- While Cal Water does not endorse any products, suppliers, designers, or contractors, they do offer links to participants to web resources like the California State Contractor's License Board, to locate and identify licensed contractors.

Eligible participants in this rebate program include single-family homeowners, multi-family residential unit owners, and commercial property owners. To begin the process, participants submit the online application detailing their project, submitting a simple site plan, and providing square footage, materials, and site photos as applicable. Cal Water may perform select or random onsite installation confirmation inspections if they so choose to ensure that the landscaping complies with the rebate program's current terms and conditions.

Participants will include the following in their application and post-renovation reports, in accordance with Cal Water's current established terms and conditions.

- Application:
 - At minimum, 1 picture of each proposed lawn area to be converted
 - At minimum, 1 picture of the current irrigation system in each area to be converted
 - At minimum, 1 picture showing the house number or address along with a view of the surrounding landscape. Google street view pictures are not acceptable

- Pictures must include all lawn areas as identified in the project plans. Sites that are not pictured with lawn prior to receiving the “Notice to Proceed” email from Cal Water will be disqualified from participating
- Upon Project Completion:
 - At minimum, 1 picture of each converted landscape area
 - Pictures should show drought tolerant or water-wise plant selections represented on the Planted Plant List or [WUCOLS](#) resource page.
 - Completed project pictures must show at least a 2” layer of inorganic or organic mulch covering exposed soil

The Project will include six tasks, as described below:

1) Rebate Program Administration

Program Administration, Task 1, is the total staff hours needed for the day to day operation of the Rebate Program and constitutes the salaries/wages and fringe benefits associated with the comprehensive Program administration. Cal Water will supply a data table with staff hours and related salary and fringe benefit rates for personnel as part of the requisite grantee administration requirements.

2) Marketing and Promotion

Cal Water’s marketing and promotional material will encourage property owners to participate in the Program and direct them to use the Program’s web portal. The Program webpages contain information regarding Program current terms and conditions, a frequently asked question (FAQ) document, access to the Program application, information about rebate funding levels, and resources to assist customers with their water conservation projects.

Marketing material includes, but is not limited to, bill inserts, social media campaigns, water bill messages, newsletter articles, and posts on water agency websites. Over the 10+ years Cal Water has marketed water efficiency rebate programs, and has seen widespread success with social media outreach, online posts and newsletter outreach. For example, the 2015 grant-funded Turf Removal Rebate Program exceeded original estimates by 70,000 square feet. Cal Water intends to utilize and expand upon the strategies that marked the success of the original grant funded projects, with additional online outreach given the ever-increasing need for a robust online platform in order to reach their customer base. Cal Water is also intending to involve and include stakeholders in education and promotion of the program. This includes City Council presentations to impacted municipalities, monthly Landscape contractor meetings, and Homeowners’ Association feedback.

3) Site Inspections

California Water Service will conduct random, select site inspections utilizing aerial imaging technology to confirm pre-approval and post-implementation requirements have been met. Customers are also required to submit photos during the application process that allow Cal Water's staff to visually inspect the sites. Large-scale in-person site visits are infeasible due to Cal Water's large service territory, limited staffing, and its regionally administered Conservation Programs. Cal Water reserves the right to conduct an onsite inspection in cases where verification is not possible through other means.

4) Rebate Incentive

Over the 24-month grant performance period, Cal Water anticipates the conversion of approximately 195,000 square feet of turf removal and landscape transformation. These conversions could result in over 100 projects, ranging from small, single-family homes converting 1,500 square feet to 20 large commercial properties converting 10,000 square feet each.

Cal Water proposes providing incentives through an established, user-friendly online rebate portal to residential property owners, commercial property owners, and landscape managers for qualifying conversions. The current rebate amount (\$3.00 per square foot) will be available for each participant site; these rebate levels may be updated, based on Cal Water's ongoing assessment of the program.

Rebate incentives shall be based on the square footage. To receive rebate funds, the Participant's completed site conversion and irrigation system are required to be consistent with the intent of the Cal Water's Project and ensure efficient landscape water use by implementing water-wise landscaping measures. Additionally, the project must remain rebate program-compliant for at least 5-years from the date of project approval to ensure long-term water and energy savings benefits.

5) Project Reporting

Following the reporting schedule set forth in the WaterSMART grant agreement, Cal Water will submit all required Interim Performance Reports, Financial Reports, and Final Performance Reports laid out in the WaterSMART Water and Energy Efficiency Grant Program guidelines. This will include updates on schedule, costs, and reporting milestones, all required SF forms, discussion of project benefit and any additional reporting requirements.

6) Project Evaluation & Performance Measures

To assess project benefits, Cal Water plans to analyze landscape conversions using aerial imagery to conduct post-inspections. In-house 3-inch resolution images allow staff to confirm project installation, plant establishment, and measure total Project areas. Additional assessment of project benefits including analysis of tree canopy growth and shade coverage can also be evaluated through this method.

Cal Water estimates that direct measurement of water savings resulting from this turf Project via statistical regression would not be economically feasible. Statistically valid estimates of savings would have required a cost-prohibitive statistical analysis of water use at project sites pre-and post-turf replacement as well as at matched control sites that did not participate in the turf replacement project. To calculate and measure estimated quantifiable water savings (described in Evaluation Criteria A), Cal Water has instead opted to use the EPA's Water Sense calculation tools.

Energy savings will be measured using US Department of Energy Statistics. A written report describing the evaluation will be submitted as the final report for the request project, and will be shared with Reclamation, Metropolitan, and other Project Stakeholders. Cal Water staff will analyze the project's benefits and completion goals, process rebate savings data, and develop the draft and final report.

The performance measure for water savings will be calculated using the total square footage converted (verified using arial footage and/or site visits), and then quantified using EPA's water conservation coefficients/data evaluation strategies and historical water usage data.

Cal Water has seen broad success in prior rebate programs conducted in several of the proposed districts under similar turf removal rebate scopes. In 2016, Cal Water conducted a turf removal rebate program in the Visalia District, facilitating the removal of 199,158 square feet of turfgrass and replacement of these landscapes with water-wise landscaping. Cal Water's overall rebate program, which includes, but is not limited to landscape upgrades such as drip irrigation and high-efficiency nozzle rebates, saved an estimated 47.8 million gallons annually in 2021 across 24 districts.

This Project will also increase affordability and access to water savings measures across each district, by allowing residents to make informed, proactive water savings measures more affordably. Grant funding will also allow Cal Water to reach smaller districts with limited financial resources and implement programs that could otherwise place economic strain on the district and its customers. The rebate application format of a landscape conversion and turf removal program eliminates cost barriers that may otherwise be prohibitive to allow low-income residents to conserve water. These heightened water savings will contribute to affordability and lower the cost-of-living for Cal Water customers in the participating Districts. Cal Water has a Customer Assistance Program (CAP) that also contributes to water service affordability for qualifying low-income households that will contribute to amplifying the affordability benefits

afforded by the proposed Project. The CAP program in 2021 provided \$12,730,506 in discounts to 111,287 qualifying customers and demonstrates Cal Water's commitment to affordability, water access, and customer quality-of-life. Cal Water will continue to assess the best way to service its customers in the proposed Districts and throughout the state, and, based on ongoing program assessment may make modifications to the program rules to continue to maximize water savings benefits and landscape beautification. This may include adjusting the proposed \$3.00 per square foot rebate or revising the program's terms based on ongoing assessment.

Evaluation Criteria

Evaluation Criteria A: Quantifiable Water Savings

The following provides the methodology and technical justification associated with the 161.6 acre feet estimated lifetime savings for this project proposal.

Turf Removal

Water savings were calculated using a landscape water requirements model developed by USEPA's WaterSense Program. Landscape water requirements and allowances are determined by assumed irrigation efficiency, evapotranspiration, landscape coefficient, landscape area, and effective rainfall in each district.

Turf conversions are assumed to reduce the landscape coefficient and reduce demand by converting turf to landscaping that requires less water. In the selected Districts, effective rainfall is assumed to equal 0, with landscape coefficients for turf and drought tolerant as 0.8 and 0.2, respectively.

Local reference evapotranspiration values are included in the table below. These values are derived from EPA Water Data Budget Finder (found here: <https://www.epa.gov/watersense/water-budget-data-finder>). Unit savings are estimated with the EPA WaterSense New Home Specification Water Budget Tool (version 1.02) and assume that turf is replaced with drought tolerant landscaping.

The EPA Water Budget tool calculates the landscape water use requirement for turf as 8 gallons per square foot and low water use plants as 2 gallons per square foot – indicating an estimated 6 gallons volume difference per month across landscaping types. Cal Water's unit water savings was derived by multiplying this volume difference of six gallons per sq. ft. by a six month annual peak irrigation period, amounting to a unit savings of 36 gallons of water per square foot. The Water Budget Tool is available as an excel tool (xlsx)(Version 1.04 released June, 2020), found here: <https://www.epa.gov/watersense/water-budget-tool>. A screenshot of Cal Water's input for the budget tool can be seen below:

This worksheet determines the monthly landscape water requirement (LWR) for a site based on its peak watering month.

The monthly LWR is the water requirement specific to the designed landscape. The sum of the LWRs for each hydrozone equals the site LWR. The following formula is used to calculate the LWR for each hydrozone:

$$LWR_H = \frac{1}{DU_{LQ}} \times [(ET_o \times K_L) - R_a] \times A \times C_u$$

Where:
 LWR_H = Landscape water requirement for the hydrozone (gallons/month)
 DU_{LQ} = Lower quarter distribution uniformity
 ET_o = Local reference evapotranspiration (inches/month)
 K_L = Landscape coefficient for the type of plant in that hydrozone (dimensionless)
 R_a = Allowable rainfall, designated by WaterSense as 25% of average peak monthly rainfall (F)
 A = Area of the hydrozone (square feet)
 C_u = Conversion factor (0.6233 for results in gallons/month)

To calculate the LWR for the site, enter the information requested below for the site's peak watering month. (Enter data in white cells only.)

STEP 2A - ENTER THE AVERAGE MONTHLY RAINFALL (R) AT THE SITE FOR THE PEAK WATERING MONTH IDENTIFIED IN PART 1

Average monthly rainfall (inches/month) for the site's peak watering month

Obtain from Water Budget Data Finder www.epa.gov/watersense/nhspecs/wb_data_finder.html

STEP 2B - COMPLETE TABLE 1 BELOW (enter data in white cells only)

Enter the area of the hydrozone (square feet). The total area must equal the landscaped area entered in Step 1A.

Choose the plant type from the dropdown list (source data is displayed in Table 2).

Choose the irrigation type from the dropdown list (source data is displayed in Table 3; guidance is displayed in Table 4 and Table 5).

Table 1. Landscape Water Requirement

Zone	Feature Area (sq. ft.)	Plant Type or Landscape Feature	Coefficient (K _L)	Irrigation Type	Uniformity (DU _{LQ})	(gall/month)
1	1	Turfgrass - High water requirement	0.8	Fixed Spray	65%	8
2	1	Groundcover - Low water requirement	0.2	Drip - Standard	70%	2
3						-
4						-
5						-
6						-
7						-
8						-
9						-
10						-
11						-
12						-
13						-
14						-
15						-
Total Area	2	Landscape Water Requirement for the Site (gall/month)				10

Table 2. Plant Type or Landscape Feature and Associated Landscape Coefficient

Plant Type or Landscape Feature	K _L		
	Low	Medium	High
Trees	0.2	0.5	0.9
Shrubs	0.2	0.5	0.7
Groundcover	0.2	0.5	0.7
Turfgrass	0.6	0.7	0.8
Pool, Spa, or Water Feature	0.8		
Permeable Hardscape	0		
Nonvegetated Softscape	0		

Source: Based on LEED for Homes Rating System 2008.

Table 3. Distribution Uniformity

Irrigation Type	DU _{LQ} or EU*
Drip - Standard	70%
Drip - Press Comp.	90%
Fixed Spray	65%
Micro Spray	70%
Potor	70%
No Irrigation	NA

*Lower quarter distribution uniformity (DU_{LQ}) applies to sprinkler zones and emission uniformity (EU) applies to drip/microirrigation zones.
 Source: (The Irrigation Association, October 2001) in Landscape Irrigation Scheduling and Water Management, IA, 2005.

Table 4. Appropriate Irrigation Types - Landscaped Areas with Irrigation Systems

IF THE PLANT TYPE IS:	THEN THE IRRIGATION TYPE CAN BE:			
	Drip - Standard	Drip - Press	Fixed Spray	Micro Spray*
Trees	x	x		x
Shrubs	x	x		x
Groundcover	x	x		x
Turfgrass	x	x	x	x

*Micro spray may only be used on vegetation other than turfgrass if it meets the definition of microirrigation system, which according to the *WaterSense New Home Specification* is: "The frequent application of small quantities of water on or below the soil surface as drops, tiny streams or miniature spray through emitters or applicators placed along a water delivery line. Microirrigation encompasses a number of methods or concepts, such as bubbler, drip, trickle, mist or spray, and subsurface irrigation. For the purposes of this specification, microirrigation includes emission devices that have flow rates less than 30 gallons per hour."

Table 5. Appropriate Irrigation Types - Landscaped Areas without Irrigation Systems

IF THE PLANT TYPE OR LANDSCAPE FEATURE IS:	THEN THE IRRIGATION TYPE SHALL BE:		
	Drip - Standard	Fixed Spray	No Irrigation
Trees, Shrubs, or Groundcover with Low Water Requirements (K _L = 0.2)	x		
Trees, Shrubs, or Groundcover with Medium or High Water Requirements (K _L > 0.2)		x	
Turfgrass with Low, Medium, or High Water Requirements (K _L > 0.2)		x	
Pool, Spa, or Water Feature		x	
Permeable Hardscape			x
Nonvegetated Softscape			x

*Please see additional information in the *WaterSense Water Budget Approach* for landscapes installed without irrigation systems.

OUTPUT - WATER REQUIREMENT FOR THE SITE

Monthly landscape water requirement (gallons/month) based on the site's peak watering month

Next Step: Click on the next tab labeled *Part 3 - Results* to view the results.

With a projected quantity of 195,000 square feet to be converted under the Project scope, expected lifetime savings amount to 16.2 AF per year, with an expected lifetime of 10 years, amounting to 161.6 over the lifetime.

From data previously collected from Cal Water Turf Removal projects from 2015-2022 in the Bakersfield, Marysville, Oroville, Selma and Visalia districts, the total quantity of square feet removed was 212,215 square feet, inclusive of both residential and commercial sectors.

The historical sum of lifetime savings from turf removal rebates (in Million Gallons) conducted over the course of a year (2016) by District was as follows:

- Bakersfield: 7.92 MG
- Marysville: 0.39 MG
- Oroville: 0.78 MG
- Selma: 3.19 MG
- Visalia: 32.19 MG

Pre-application and post-conversion reporting requirements from participants, and aerial view monitoring, will help ensure that there is currently turf on the proposed site and that the proposed square footage of eligible turf to be removed matches the final completed project outcome.

Overall, turf conversions will reduce demand. Quality control measures are in place to ensure participants correctly convert their landscape or irrigation according to the terms and conditions of the Project. This will work collaboratively with Cal Water's other water conservation measures and rebate programs, to achieve complementary and maximized water conservation results.

The Project will help to provide reliable water supply, reduce dependency on imported water and groundwater, meet water demands during all hydrologic conditions (drought resiliency), and maximize water use efficiency. As a result, less water will be pumped from the groundwater basin and less imported water will be used. These water conservation efforts will preserve local flexibility and implement water use management improvements at local and regional levels to maximize beneficial use of existing water supplies.

Current Losses

The water losses in each District, as of 2020, were determined via the American Water Works Association Free Water Audit Software, in accordance with the California Code of Regulations, and were as follows, in acre-feet per year:

- Bakersfield: 5,001 AFY
- Marysville: 53 AFY
- Oroville: 145 AFY
- Selma: 411 AFY
- Visalia: 329 AFY

There are currently no known benefits associated with these current losses – there are no wetlands or habitats that benefit from this seepage. These losses in each district are caused by

metering inaccuracies, data handling errors, leakages on transmission, distribution mains, service connections, or storage tanks.

By district, this is the destination of the current losses.

- Bakersfield: Kern Subbasin
- Marysville: North Yuba Subbasin
- Oroville: East Butte Subbasin
- Selma: Kings Subbasin
- Visalia: Tulare Subbasin

Water losses caused by run-off or excess irrigation end up in adjacent streams and river systems like the Feather River and the Kaweah River. Water losses due to leakage in system connections or other distribution infrastructure re-enter groundwater tables, delivering possible contaminants.

Additional Water Savings Justification

The 16.2 acre feet of annual projected water savings means that 161.6 acre feet of lifetime water savings will off-set local groundwater sources and other sources of supply. Due to the severe drought conditions in these regions and hot summers in California, the greatest savings will be achieved in the summer months through irrigation efficiency. Additionally, the proposed project promotes and encourages collaboration among other community stakeholders and municipalities to promote other water conservation and savings measures. Additionally, in developing Urban Water Management Plans for each participating district in 2020, key stakeholders were engaged and highlighted the need for increased water savings and efficiency as part of mitigating climate impact consequences. These stakeholders referenced through plan development included representatives from the participating and surrounding counties, tribes, the Northern Sacramento Valley Integrated Regional Water Management Board (Oroville), Upper Kings Water Forum (Selma), the Cities of Bakersfield, Selma, Oroville, Marysville, Visalia, the Yuba County Water Agency, relevant GSA's and the public in plan development. The goals identified in these plans correlate with the need for increased efficiency and conservation measures. This program will significantly increase the awareness of water conservation statewide, and will be promoted through online media channels, water bill messages, bill inserts, newsletters, and website announcements.

The Project will serve as an example of efficiency that can be replicated, not only from user to user, but also by water agency to water agency, thereby increasing the capability of future water conservation and efficiency efforts beyond their districts. A significant portion of customers who participate in Cal Water's water savings rebate programs will participate in other in the programs in the future. Metropolitan Water District of Southern California has demonstrated that turf conversions sites induce a multiplier effect, meaning people not participating in the rebate program will convert their lawns themselves, enhancing the opportunities for future water efficiency and conservation. The measures converted in this Program create long term water

efficient practices, which will save water during and between times of drought, and also provide infrastructure for residents to further conserve water during times of drought. The Program also provides specific avenues to help inform the public how to reduce their water use, eliminate runoff, and utilize stormwater.

Evaluation Criteria B: Renewable Energy

With an expected water savings of approximately 16.2 AF per year (AFY), this project has an associated total estimated energy savings of approximately 7,465 kilowatt-hours (kWh) per year, due to reduced pumping/treatment energy needs for lost water.

The total estimated energy savings for this project were calculated using district-level energy intensity values from Cal Water's 2021 GHG emissions calculator as follows:

- Bakersfield: 557 kWh/AF
- Marysville: 393 kWh/AF
- Oroville: 326 kWh/AF
- Selma: 508 kWh/AF
- Visalia: 520 kWh/AF
- **Average energy intensity across districts: 460.8 kWh/AF**

The individual district energy intensity data was derived from a Cal Water proprietary model that utilizes direct consumption data from our electricity utilities to determine the kilowatt hours of electricity use per acre foot of water produced by district. The average estimated kilowatt-hours per acre foot across all districts in the project scope was multiplied by the estimated total water savings for the project (16.2 AFY) to derive the total estimated kilowatt-hour savings per year for the project, assuming the turf conversions (and therefore, associated water savings) are well-distributed across the districts.

The resulting total estimated energy savings is:

$$460.8 \text{ kWh/AF} * 16.2 \text{ AFY} = \mathbf{7,464.96 \text{ kilowatt-hours/year}}$$

This reduction in energy consumption in water distribution (through water savings) contributes to reduced indirect GHG emissions associated with electricity generation.

Evaluation Criteria C: Sustainability Elements

Enhanced Drought Resiliency

The proposed project are located Cal Water districts (Bakersfield, Visalia, Marysville) impacted by the ongoing drought. The surface water and groundwater supplies in these districts are becoming less reliable and require higher efficiency and conservation measures to ensure that customers in the District continue to have safe and reliable access to water. The water savings measures in this program will help lessen the strain on these water systems through increased conservation. Additionally, by requiring projects to include California Friendly and water wise

landscaping, residents become more educated on the value of native/friendly species and habitats in landscaping, the drawbacks of turf, and the need for water conservation measures, which will continue to inform their decisions as property owners and as residents.

The water saved through the turf removal project will not remain in the system for periods of time, it will be continuously distributed throughout the District to continue to fulfill customer demand.

This program looks to increase watershed health through reductions in runoff and non-point source pollution, benefiting both terrestrial and aquatic threatened and/or endangered species and habitat.

Beyond its water-saving benefits, the project will result in more efficient management of the water supply through the long-term landscaping improvements that will better manage run-off and stormwater capture.

The proposed regions have several bodies of water that fall or potentially fall under CWA jurisdiction, such as the Feather River and Lake Oroville. This Program will have no negative impacts on these water bodies. The Program will have a positive impact by reducing urban runoff, specifically increasing onsite stormwater retention, while reducing stormwater runoff and non-point source pollution.

Increased water savings will provide particular water sustainability elements to several districts with constrained or otherwise impacted environmental concerns. This includes:

Bakersfield

Roughly 84% of Kern County, including the service area of Bakersfield, is in severe drought. Yet, as the number one county in California for job growth and one of the fastest-growing metropolitan areas in the country, the demand for reliable, long-term water resources is only increasing. This need is amplified even further given that agriculture, one of the Kern County's key industries, employs almost a quarter of the county's workforce. Reliable access to water, especially given the demographic and economic challenges facing the region, is an urgent challenge facing the Wofford Heights area. Additionally, the exceptional drought conditions in the county exacerbate the fire risk of the entire region, with the French Fire in August of 2021 burning over 26,000 acres throughout the county. 2021 was the driest year on record for the Kern River, which feeds the Lake Isabella Reservoir, the key reservoir the Bakersfield District and Bakersfield metropolitan area.

Oroville

Oroville, a town located in Butte County with a population of about 20,000, is under severe threat due to ongoing exceptional drought conditions. The shockingly low water levels of Lake Oroville, the second-largest reservoir in the state, have forced the closure of the Hyatt hydroelectric power plant. Additionally, the region is at severe risk of wildfire, with the infamous 2018 Camp Fire,

causing an estimated 20% population increase in Oroville, as residents from the nearby town of Paradise relocated into Oroville in the wake of the fire's devastation. Additionally, the Dixie Fire in 2021 stands second only to the Camp Fire in Butte County and burning over 960k acres over five counties. In addition to the increased wildfire risk and lowered water levels due to drought conditions, the surface water supply of Lake Oroville is decreasing in water quality as the water runs across fire scar areas. This has caused Cal Water to lean more heavily on their existing wells and groundwater supply in Oroville, which also have water quality concerns.

Selma

As of June 2022, the Selma district is in Stage 2 of Cal Water's Water Shortage Contingency Plan given the current extreme drought conditions (as of July 19, 2022). Stage 2 restrictions include additional outdoor watering limits and increased water waste penalties that limit outdoor landscape irrigation. For the approximately 23,319 residents of Selma, drought can jeopardize both the environment, but also their way of life as the "Raisin Capital of the World" with an economy reliant on agriculture – with 90% of US raisins produced within 8 miles of the City. Maximizing water efficiency and conservation is integral, particularly given the extreme climate shifts and drought conditions, particularly for low-income areas like Selma that rely on clean, reliable water for both their quality of life and economic well-being.

Visalia

10% of the population of Tulare county – where the Visalia District is located -- are designated as "water insecure" and 100% of the county is under severe drought conditions. Many are Latinos, who make up two-thirds of the county's population. Entire communities have no connection to water systems, wells are old and failing and many water sources are contaminated by fertilizers and pesticides. During the last statewide drought, more than 2,600 dry wells were self-reported by residents in California; about 50% of them were in Tulare County. Some estimates state that as high as 20% of the region's farmland is being fallowed due to the lack of water. Ensuring that water systems which are dependent on ground water for supply have sufficient emergency above ground storage and pumping capacity to maintain operations and fire flow (even despite the drought) is an urgent concern, with the Windy Fire having burned over 97,000 acres in the Eastern part of the county. It is critical that the Visalia District can ensure that water systems have sufficient fire flow for the safety of residents.

This project will help residents, particularly those who may not otherwise have the income for landscape conversion, to adapt their homes to meet the shifting climate and drought conditions. These increased water savings will directly impact the aforementioned sustainability concerns in these districts, through the reduction of water use beyond outdoor watering limits. It will allow for a more robust supply of water in times of climate catastrophe, like wildfires of exceptional drought.

The aforementioned water savings will increase resilience to climate change. Likewise, by mandating California-friendly landscaping as a component of the rebate program, the converted

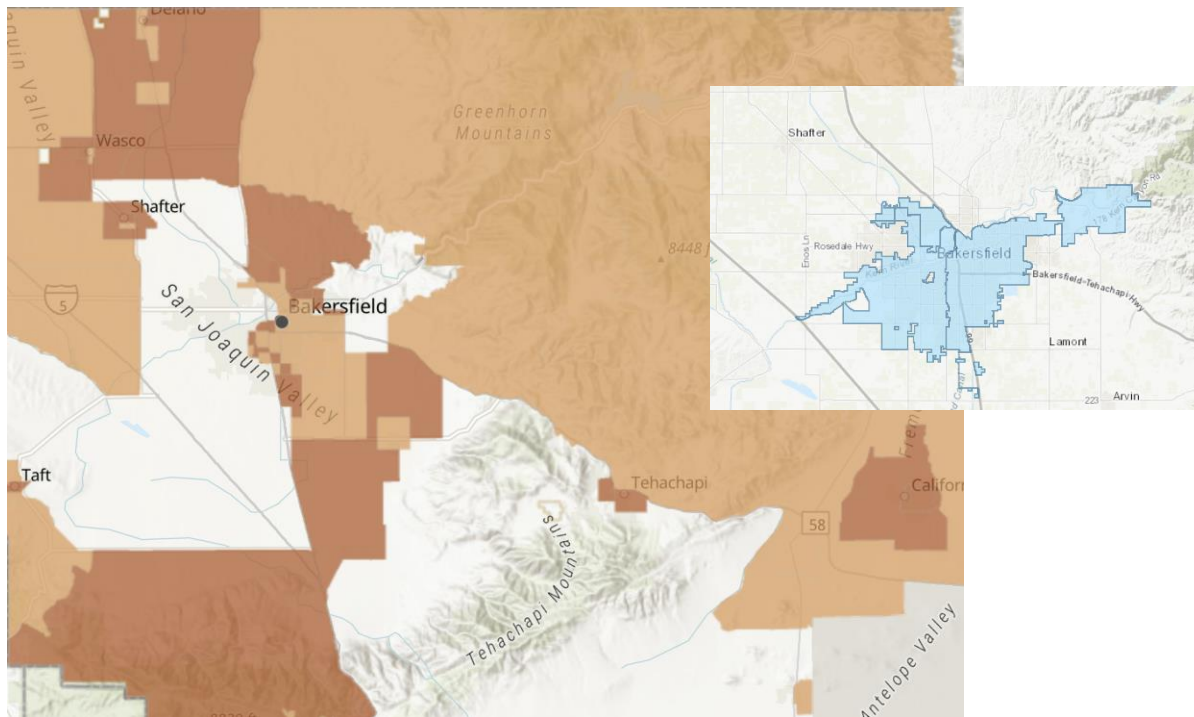
areas will offer healthy, drought-tolerant habitats that benefit the local ecosystem in addition to water conservation. In turn, by reducing demand for water in the district, less energy will be required to deliver and process water, lowering the District’s overall greenhouse gas emissions.

Disadvantaged or Underserved Communities

The project will service the following disadvantaged communities, as determined by the [State of California’s Department of Water Resources Disadvantaged Community Mapping Tool](#). All Disadvantaged Communities are highlighted in varying shades of orange, with the darker orange areas being considered “more disadvantaged” due to income level and quality of life access metrics. The adjacent map (blue) depicts the boundaries of each California Water Service District, to portray the overlap between the Disadvantaged Communities and District boundaries.

Bakersfield District

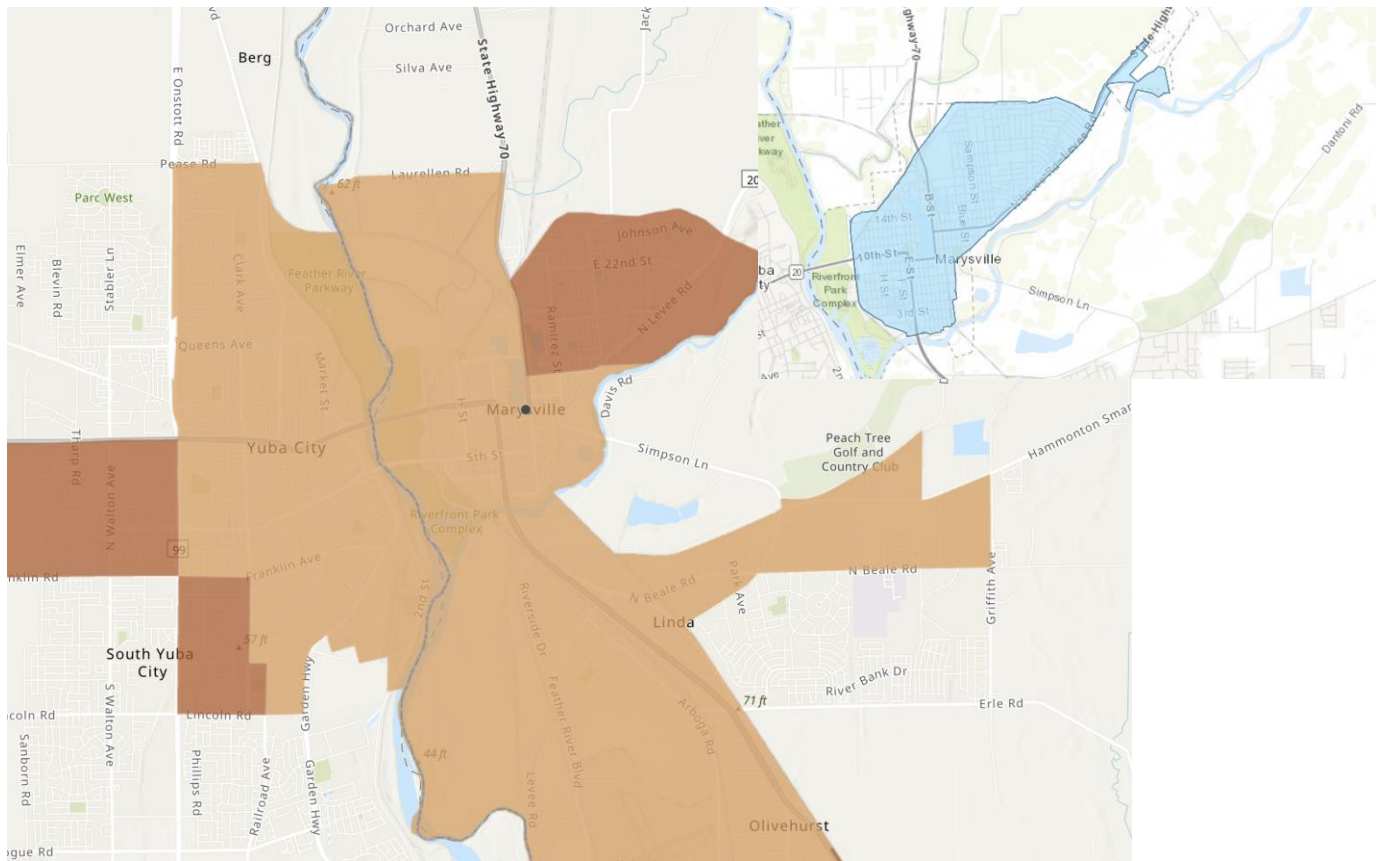
Figure 7. Map of State-designated Disadvantaged Communities transposed next to boundaries lines of Cal Water Bakersfield District. According to the US-census Bureau, the median household income of Bakersfield, in 2020 in dollars, is \$30,144, less than 50% of the California State median household income of \$78,672. The City is the fifth-largest majority Latino City in the United States, with 53% of its population being Latino in 2020.



Marysville District

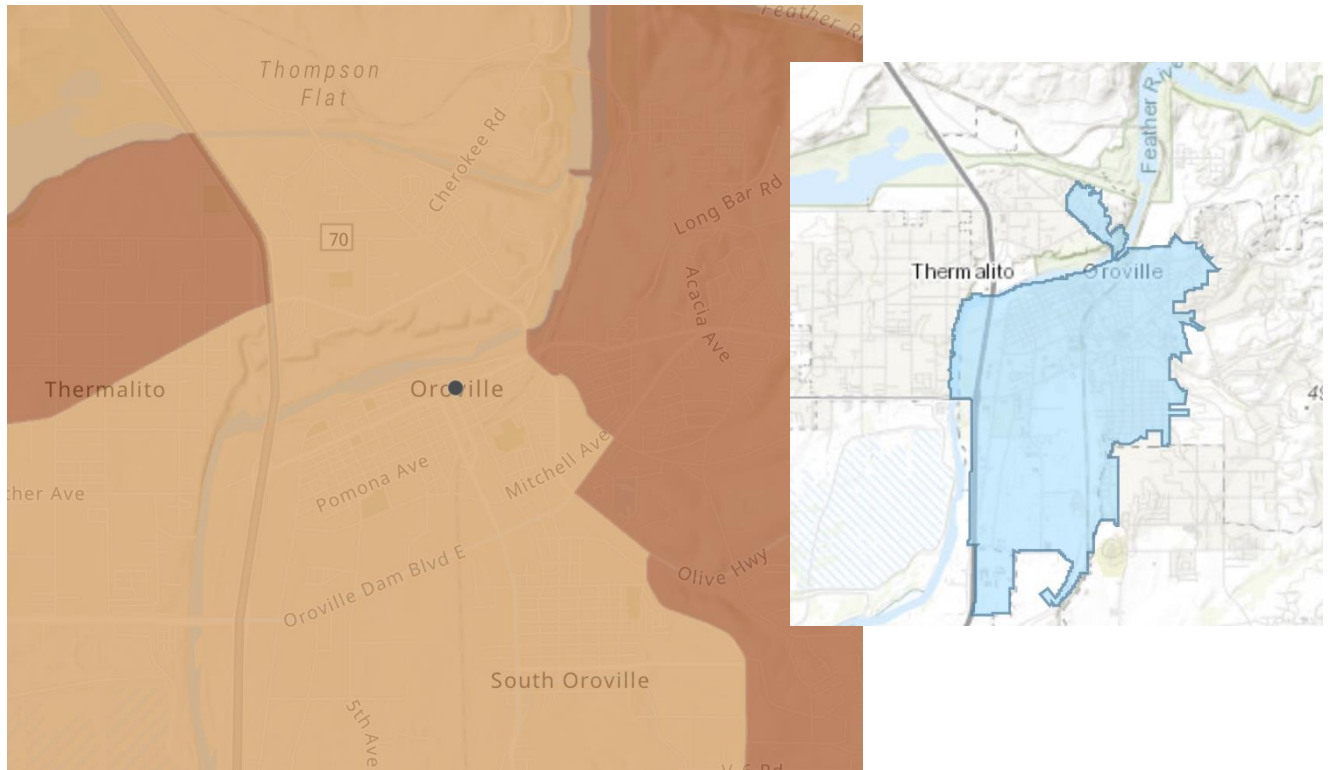
Figure 8. Map of State-designated Disadvantaged Communities transposed next to boundaries lines of Cal Water Marysville District. According to the US-census Bureau, the median household

income of Bakersfield, in 2020 in dollars, is \$44,839, less than 60% of the California State median household income of \$78,672.



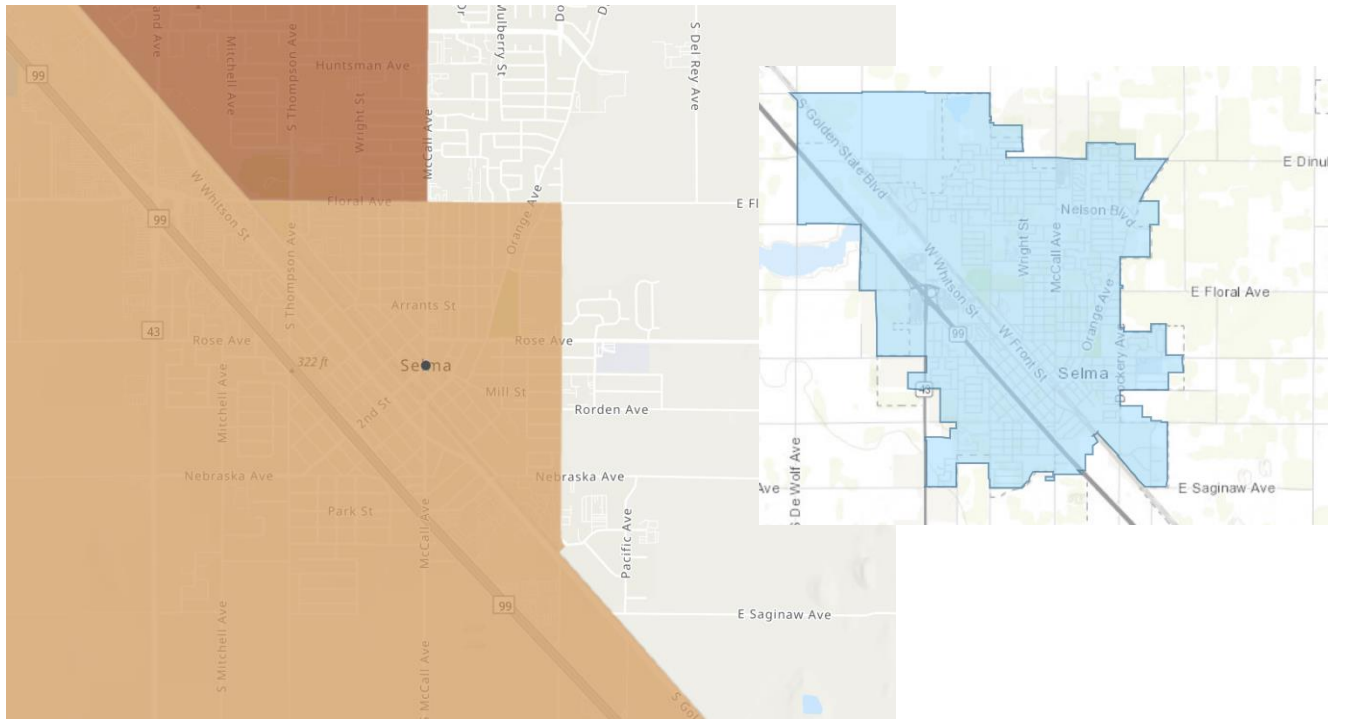
Oroville District

Figure 9. Map of State-designated Disadvantaged Communities transposed next to boundaries lines of Cal Water Oroville District. According to the US-census Bureau, the median household income of Oroville, in 2020 in dollars, is \$34,371, less than 50% of the California State median household income of \$78,672.



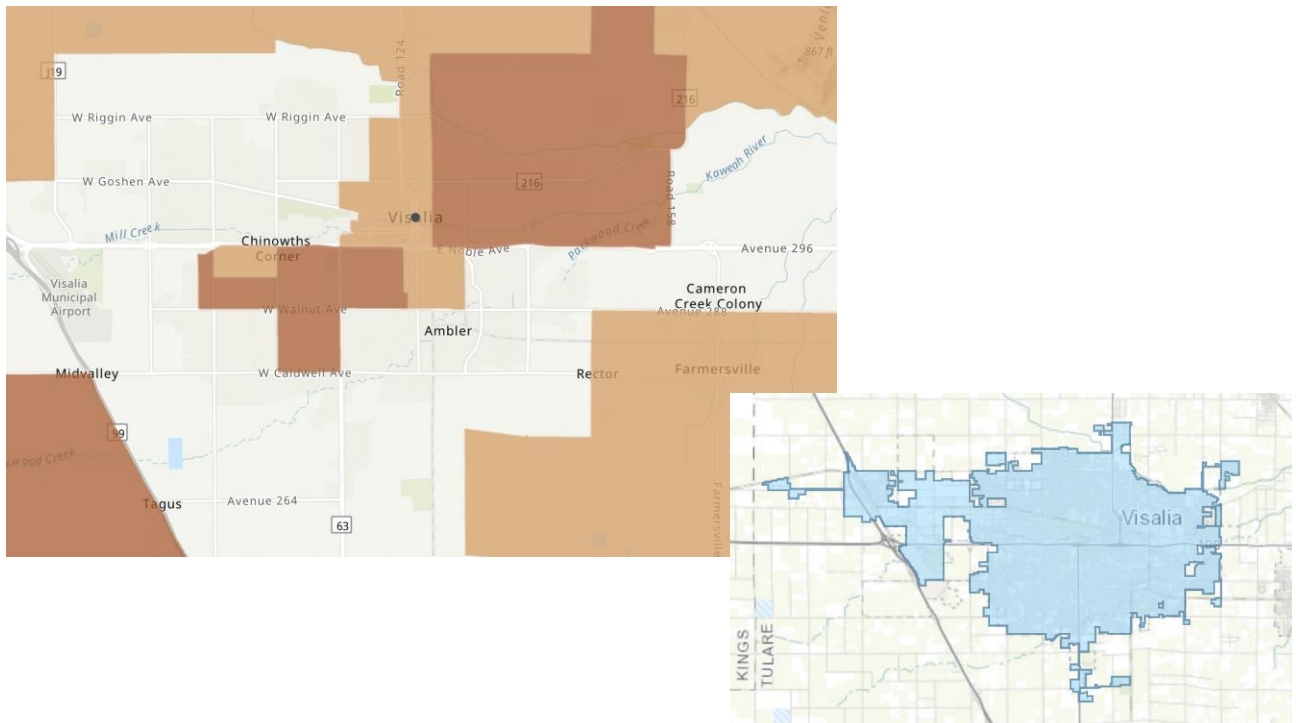
Selma District

Figure 10. Map of State-designated Disadvantaged Communities transposed next to boundaries lines of Cal Water Selma District. According to the US-census Bureau, the median household income of Bakersfield, in 2020 in dollars, is \$42,059, less than 60% of the California State median household income of \$78,672.



Visalia District

Figure 11. Map of State-designated Disadvantaged Communities transposed next to boundaries lines of Cal Water Visalia District. According to the US-census Bureau, the median household income of Bakersfield, in 2020 in dollars, is \$66,668, less than the California State median household income of \$78,672.



Tribal Benefits: There are no federally-designated tribal lands impacted by this project.

Other Benefit: This project will have both commercial and residential benefits due to the nature of the rebate program, which will in turn help economic vitality in the affected communities.

Evaluation Criteria D: Complementing On-Farm Irrigation Improvements

This criteria is not applicable to the scope of the application.

Evaluation Criteria E: Planning and Implementation

Project Planning

Every district has a designated Urban Water Management Plan (2020) in support of this project. The plans can be found here, and were developed through community and stakeholder outreach. They include turf conversion as a critical conservation program in each district:

- [Bakersfield](#)
- [Marysville](#)
- [Oroville](#)
- [Selma](#)
- [Visalia](#)

Cal Water has implemented their Water Shortage Contingency Plans in each district. The water conserved by the turf rebate program will allow residents in these districts an alternative option to limiting turf watering, and in turn increase conservation elements in accordance with the Water Shortage Contingency Plan.

This project is also consistent with the goals and priorities following regional water management plans that geographically overlap with the proposed water districts:

- [Kern County Integrated Regional Water Management Plan](#) (Section 11-5)
- [Upper Feather River Watershed Integrated Regional Water Management Plan](#) (Section 5-3)
- [Kaweah River Basin Integrated Regional Water Management Plan](#) (Section 9-14)
- [Yuba Water Agency \(YWA\) Groundwater Management Plan](#) (Section 5-2.3)

Readiness to Proceed

As Cal Water has already implemented other established rebate programs for other water conservation and landscape conversion elements, and successfully implemented turf rebate programs in the past, the online portal and preparatory work has largely been completed. The program will be ready to move forward immediately upon execution of grant agreement, if awarded.

There is no additional engineering or design work that Cal Water will need to perform to support or implement this project. There are also no new policies or administrative actions required to implement the project.

The project will include the following major tasks and milestones. Cal Water will also comply with all grant reporting requirements at the requested frequency.

1. July 2023: Notice of Award, Grant Agreement Execution, Marketing and Outreach Efforts Begin
2. August 2023 – June 2025: Rebate Program Implementation
 - Customer Application Review and Authorization
 - Customer’s Implement Landscape conversions
 - Cal Water conducts site visits (as necessary); ensures program terms and conditions have been met. Issues Rebate.
3. June 2025: Final Grant Report, Review of Performance Metrics

Evaluation Criteria F: Collaboration

This project encourages collaboration across participating Cal Water districts with their municipal counterparts, stakeholders, and customers. Local homeowner’s associations, the Cities of Visalia, Bakersfield, Marysville, Oroville, and Selma will all benefit from the proposed turf removal projects. This project will increase the possibility of future conservation improvements.

Please see Appendix A for letters of support from relevant project stakeholders.

Evaluation Criteria G: Additional Non-Federal Funding

This project will provide 71% (\$563,740.11 / \$798,910) of non-federal matching funds. Further information on this cost breakdown can be found in the attached budget narrative.

Evaluation Criteria H: Nexus to Reclamation

This proposed project will benefit California’s Central Valley Basin and the Bureau of Reclamation’s Central Valley Project, which supply water to these areas, through the water conservation value. This will reduce demand and increase conservation of purchased water and local groundwater.

Duplication of Effort and Conflict of Interest Disclosures

The California Water Service is not aware of any possible conflict of interests related to this grant application or project scope.

In addition to the proposed Turf Rebate Project, Cal Water operates additional rebate programs through their rebate portal, which requires an annual subscription fee to operate. As the use of the portal is approximately used half for turf removal rebates and the other half for concurrent rebate programs, outside of the scope of this work, Cal Water has only reflected half of the

operation and maintenance fees for this overlap of work in the budget and grant narrative in order to not duplicate or otherwise overlap with project scopes not reflected in this application. These concurrent rebate programs in no other way overlap in scope or effort with the funding request and scope of this grant application. This Project does not overlap with any other project currently submitted for Federal or Non-Federal funding consideration.

Environmental and Cultural Resources Compliance

Cal Water does not anticipate any permitting requirements.

Environmental Impact. This program should qualify for a categorical exemption under NEPA and CEQA, as necessary, as this program focuses on landscape and irrigation system improvements to existing urban landscape. It is anticipated that these improvements will result in water conservation and reduced dry-weather runoff and non-point source pollution leaving the Program area and entering the natural environment, including local streams and creeks leading to the Pacific Ocean. Participating customers may be required City, Homeowner Association, or other approvals before applying for the Cal Water program.

Endangered Species: Cal Water is not aware of any endangered species or federally designated critical habitats in the project areas.

Wetlands: There are no wetlands inside project implementation boundaries that potentially fall under CWA jurisdiction. The Feather, Kaweah, Tule Rivers would not fall on rebate sites, but are impacted by the project and may fall under CWA jurisdiction.

Water Delivery System: The early regional components of the Water Delivery Systems in the districts began in the 1920s and, with more infrastructure added in the 1950s-70s. Cal Water is frequently replacing and restoring system components to modernize and ensure they are able to safely meet customers' needs.

Irrigation Modification: The project will not result in any modification of, or effects, any individual features of an irrigation system, like head gates, canals, or flumes.

Archaeological Sites: There are no known archaeological sites to be impacted by the program.

National Register of Historic Places: The Project has the following total sites listed under the National Register of Historic Places:

- Bakersfield: 8
- Marysville: 7
- Selma: 0
- Oroville: 7
- Visalia: 5

Any site that requests to join in a Cal Water program must receive all necessary permits and permissions before submitting an application – including NRHP approvals—and they agree to this by signing the terms and conditions.

Clean Water Act (CWA): This Program will have a positive impact on CWA waterbodies, such as the Feather River, by reducing urban and stormwater runoff and non-point source pollution, and increasing onsite stormwater retention.

Archaeological Sites: There are no known archaeological sites to be impacted by the program.

Low Income or Minority Populations: The proposed program will benefit low income or minority populations by increasing affordability and allowing low-income communities to access beautification and water conservation landscape transformation opportunities.

Tribal Impact: The proposed Program will not limit access to or ceremonial use of Indian sacred sites or result in other impacts to tribal lands.

Invasive Species: The proposed Program will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known in the District areas. Within the landscape conversion (turf removal) component of the Program, evidence of invasive species at the site post implementation will deem the project ineligible for rebate. Information regarding invasive species and how to identify them is provided to customers participating in the landscape conversion component.

Project Budget

The funding amount Cal Water will provide is \$563,740.11 – or 71% -- of the total project cost of \$798,910. The remaining \$235,170 – or 29% -- of the total project cost is the grant request amount. The matching funds provided by Cal Water will go towards in-kind contributions to the rebate totals, and staffing costs. A more detailed breakdown of these costs can be found in the attached Budget Narrative.

Budget Proposal and Funding Plan

Table A. Summary of Non-Federal and Federal Funding Sources.

FUNDING SOURCES	AMOUNT
<i>Non-Federal</i>	
1. California Water Service Direct Contribution*	\$563,740.11
Non-federal Subtotal:	
REQUESTED RECLAMATION FUNDING:	\$235,170

Table B. Total Project Cost Table.

SOURCE	AMOUNT
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Costs to be reimbursed with the requested Federal funding	\$235,170
Costs to be paid by the applicant	\$563,740.11
Value of third-party contributions:	\$0
TOTAL PROJECT COST:	\$798,910

The project manager and employee who will oversee manage the Project will be Natalie Pavlovski, Interim Manager, Research, Analytics & Reporting. All staff salary calculations included in the budget narrative are based off blended salary rates from team members involved in the oversight and management of the Project.

Budget Narrative

Please see the attached Budget Detail and Narrative Spreadsheet for the Budget Narrative component of the application. There will be no additional costs incurred from the time period of the submittal of this application to the notice of award on this proposed Project. Letters of Commitment are attached to this application.

[Appendix A. Letters of Support & Commitment.](#)

[Appendix B. Official Resolution.](#)