

Alternative Water Supply Program Quarterly Report

December 2021

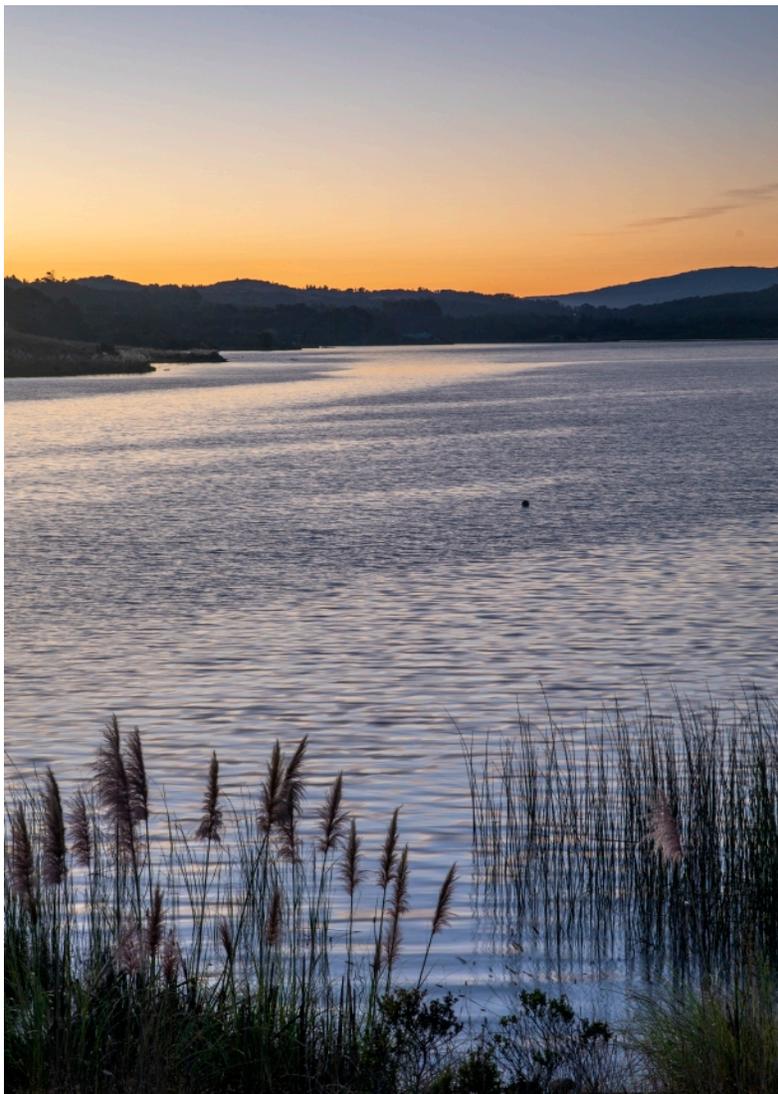


Photo: Upper Crystal Springs Reservoir, 2020

Table of Contents

Report Overview & Organization	4
Section 1. Program Highlights and Updates	5
1.1 Program Purpose	5
1.2 Quarterly Highlight	6
1.2.1 AWS Planning: Meeting Water Supply Needs through Diversity	6
1.3 Ongoing Program Activity Updates	9
1.3.1 Status of Ongoing Coordination with San Jose and Santa Clara	9
1.3.2 Financial Update.....	10
Section 2. Status of Projects	12
2.1 Regional Projects	14
2.1.1 Daly City Recycled Water Expansion.....	14
2.1.2 ACWD-USD Purified Water	15
2.1.3 Crystal Springs Purified Water (PREP).....	16
2.1.4 Los Vaqueros Reservoir Expansion	17
2.1.5 Bay Area Brackish Water Desalination	22
2.1.6 Calaveras Reservoir Expansion	23
2.2 Upcountry Projects	24
2.2.1 Groundwater Banking	24
2.2.2 Inter-Basin Collaborations	24
2.2.3 Dry Year Transfers	25
2.3 Local Projects	25
2.3.1 San Francisco Purified Water.....	25
2.3.2 Satellite Recycled Water.....	26
2.3.3 Innovations Program	26
2.4 Project Summaries	27
Section 3. Program Fundamentals	43
3.1 Introduction	43

3.2	Purpose of the Program	43
3.3	Planning Needs, Priorities and Service Objectives	45
3.3.1	Planning Objectives	46
3.3.2	Planning Approach: Plan for Obligations, Build for Demands.....	47
3.4	Making San Jose and Santa Clara Permanent Customers	49
3.5	New Alternative Water Supplies	50
3.5.1	Water Supply Programs not included in the AWS Program.....	51
3.6	Planning for Implementation	52
3.7	Trends and Risks	52
3.8	Timeframe	53
3.9	Moving Toward Environmental Review	53
3.10	Staffing	56
3.11	Water Supply Task Force	56
3.12	Funding and Expenditures	56
3.13	Professional Services Contracts	57
3.14	Adapting to an Uncertain Future	57

Report Overview & Organization

The Quarterly Report for the Alternative Water Supply (AWS) Program provides an update to the SFPUC Commission, stakeholders and the public on the status of regional and local water supply, storage and conveyance projects that are being planned to meet anticipated needs in the SFPUC's service area. The Quarterly Report provides updates every three months on program activities, but also contains discussion around relevant planning considerations, as well as background information so it can serve as a standalone document for the first-time reader.

This report provides updates on program and project-related activities that occurred between September and November of 2021. The Quarterly Report is divided into three sections: Section 1. Program Highlights and Updates; Section 2. Status of Projects; and Section 3. Program Fundamentals.

Section 1. Program Highlights and Updates. This section provides a discussion of program-level planning activities and considerations. Within this section, there is a discussion around different *Quarterly Highlights* each quarter. The highlights provide detail on one or two key themes and information on how they relate to the program, in order to provide context for future decision-making. Also included in this section is an update on *Ongoing Program Activities*.

For this report's *Quarterly Highlight*, there is **a discussion on how the SFPUC brings together a diversity of perspectives that are required for AWS planning.** This update provides a description of the AWS team and how it engages and collaborates with members within the SFPUC and outside to effectively advance AWS projects and plan and manage the AWS Program.

Section 2. Status of Projects. This section provides a summary of activities associated with each of the projects being evaluated as part of the AWS planning efforts. **The project status updates are broken out to include three to five sections based on their relevance:** *Project Background*, which provides a brief summary of the key elements and objectives of each project; *Current Planning Considerations*, which are included for context regarding the near-term activities for a project; and sections on *Activities This Quarter* and *Upcoming Activities* that are updated each quarter. **To provide a sense of the institutional complexity of the project, a schematic on *Project Partners & Interests* is included at the outset of each project section where the SFPUC is working with external partners.**

Section 3. Program Fundamentals. This reference section provides background information on AWS planning activities. It includes information on the rationale, priorities, structure, challenges, opportunities, schedule and resources related to the program. **For the first-time reader, this section provides a complete preface to the AWS Program and may be a useful starting point in reading this Quarterly Report.**

Section 1. Program Highlights and Updates

1.1 Program Purpose

The Alternative Water Supply (AWS) Program is evaluating new projects that will help meet future water supply needs in the San Francisco Public Utilities Commission (SFPUC) service area. This Program looks beyond existing infrastructure and surface water supplies of the Regional Water System (RWS) and local groundwater sources, to new and diverse or “alternative” water supply options such as groundwater banking, surface water storage expansion with a potential for diverse water supply sources, water transfers, purified water¹ (potable reuse), desalination as well as technological innovations and other tools that can increase supply or reduce demand.

Planning for and implementing alternative water supplies require a comprehensive and detailed planning effort that considers several interrelated planning challenges, many of which are different than those faced for traditional water supply planning at the SFPUC. These planning challenges include new and potential regulations, multi-party partnerships, and approaches for integrating supplies into the existing water system. Additionally, as with any long-term water supply planning effort, the SFPUC must also contend with future uncertainties such as instream flow needs, climate change, and future curtailments during droughts. These planning challenges and uncertainties highlight the importance of being thoughtful and adaptive in our planning efforts for the AWS Program.

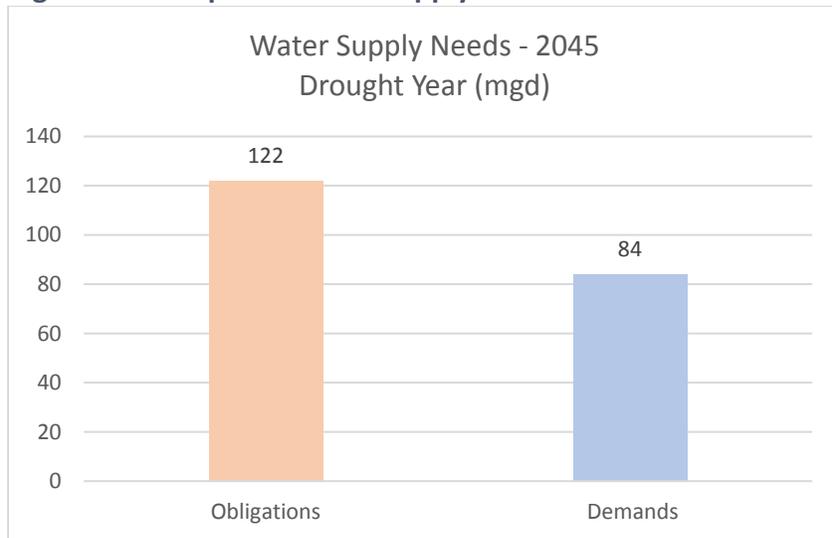
The central planning objective of the AWS Program is to meet anticipated water supply needs in drought years in the SFPUC’s retail and wholesale service areas through the 2045 planning horizon. The water supply needs account for 1) the potential instream flow requirements that would affect available water supplies; 2) the SFPUC’s contractual obligations to retail and wholesale customers, and an additional 9 million gallons per day (mgd) for the two interruptible customers² (Cities of San Jose and Santa Clara). Based on the difference between the SFPUC’s anticipated total obligations and expected supply availability in the RWS, the additional water supply need would be 122 mgd by 2045. However, demands over the planning horizon are projected to be lower than the obligations.³ Comparing demand projections to water supply availability in 2045, the water supply need would be 84 mgd (**Figure 1**).

¹ Purified water is the treated effluent from a wastewater treatment plant that has undergone advanced treatment, including filtration, reverse osmosis, disinfection and advanced oxidation.

² The SFPUC is contractually obligated to making a decision about whether to make San Jose and Santa Clara permanent customers by December 31, 2028.

³ Demands for supply from the RWS account for savings from conservation and offsets from non-RWS water supplies and onsite water recycling.

Figure 1. Anticipated Water Supply Needs in 2045



1.2 Quarterly Highlight

1.2.1 AWS Planning: Meeting Water Supply Needs through Diversity

Planning for the implementation, integration, and delivery of alternative water supplies is necessarily multi-faceted. Alternative water supply projects involve multiple water sources, including non-potable supplies where appropriate. They also include new conveyance and storage alternatives, many of which may not be owned or operated by the SFPUC. The projects vary significantly in their delivery, financing, operations, and institutional complexity from those undertaken entirely by the SFPUC to those delivered through a string of multi-party agreements with other public and private agencies. Prudent planning requires a complete understanding of the potential impacts of these projects to deliverability, ease of operations, rates, institutional relationships, system infrastructure, and future vulnerabilities and risks. Beyond traditional engineering feasibility and cost analyses, AWS planning therefore involves an understanding of the interrelated planning challenges of system integration, new institutional governance structures, and outreach and engagement that fosters confidence in the continued reliability of our water deliveries.

In 2020, the SFPUC established the AWS team within the Water Resources Division. A team of four professionals lead the effort, bringing their own diverse backgrounds to bear including experience in project management, planning, environmental review, engineering, and institutional development across water and wastewater projects. The group draws heavily on the SFPUC's in-house expertise in several disciplines to ensure that issues such as those related to system hydrology, system operations, water quality, environmental impacts, and finance are identified early in the planning process. **Figure 2** demonstrates the diversity of disciplines that the AWS team draws from regularly to inform the planning process.

Figure 2. Diversity of Perspectives in AWS Planning



1.2.1.A Tools and Processes

The SFPUC makes use of various tools to advance AWS project planning. To start, a critical step for the eventual success of project implementation is to ensure that all aspects of a project are considered by asking the right questions during the early planning stages. As projects evolve, these planning questions also change. The “Current Planning Considerations” section for each project described in Section 2 outlines the most relevant questions that the team is currently addressing. The questions vary from near-term challenges and technical and institutional feasibility to factors that help prioritize projects within the AWS Program, depending on the project. Articulating these questions helps the team approach planning with focus and thoughtfulness. These questions are developed by the AWS team after discussion and communication with experts across disciplines.

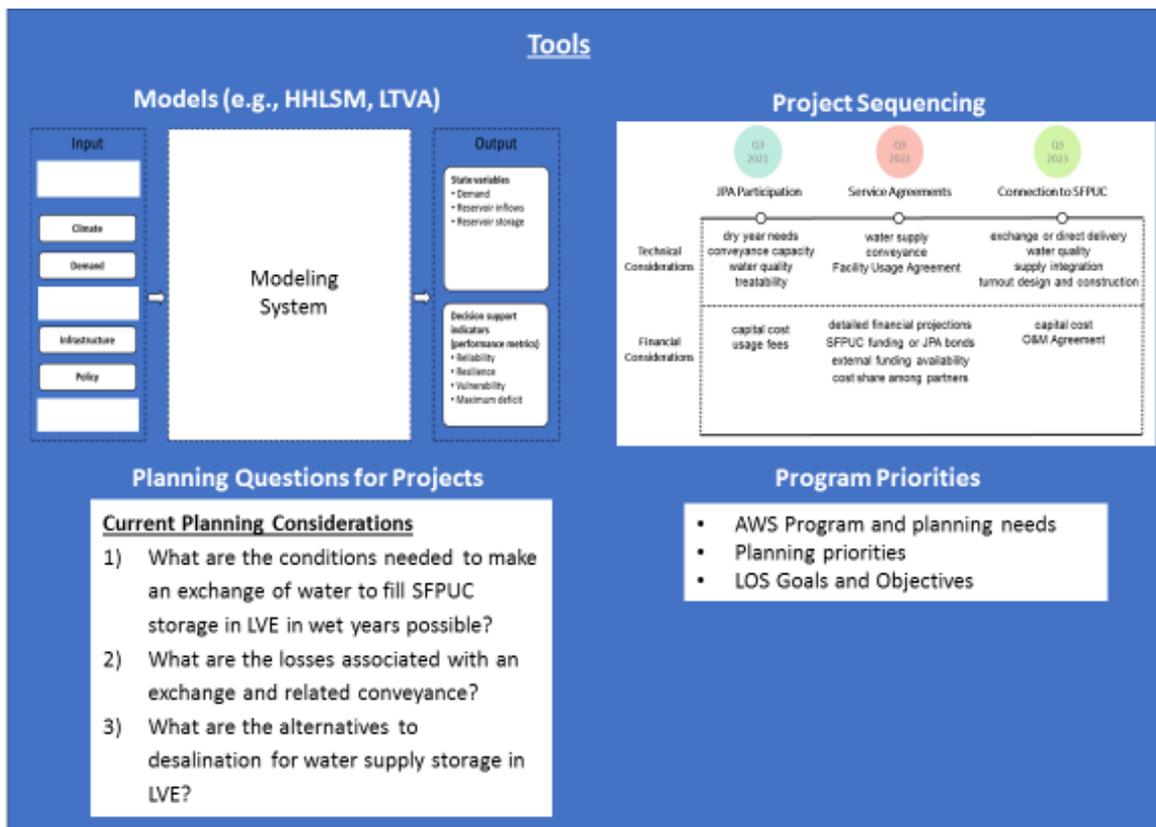
To guide the planning process, the AWS team relies on existing resources such as the SFPUC’s Level of Service (LOS) goals and objectives, current water policies and agreements, and planning priorities established for long-term water supply planning. The team is also developing a set of complementary Guiding Principles to help inform decision-making specifically for the AWS Program. As project planning matures, the team is also identifying key milestones where it is useful to draw linkages between project objectives and broader water supply planning goals. This concept of “project sequencing” brings together individual project-level thinking with

broader programmatic thinking among different projects and is a useful tool for effective and integrated AWS planning.

Additional tools are being used and/or developed to support an interdisciplinary approach to planning. In addition to the Hetch Hetchy Local Simulation Model (HHLSM), a new model that builds upon the work of the Long Term Vulnerability Assessment (LTVA) could help evaluate impacts to water supplies and delivery reliability under a range of future climate and demand scenarios. A financial model is also being developed to add an investment lens to comparing alternative projects in planning.

Figure 3 shows examples of tools that are being used to support an integrated approach to AWS planning.

Figure 3. Examples of Tools Used for AWS Planning



1.2.1.B Communication and Collaboration

Communication and collaboration play a key role in bringing the diverse perspectives together for AWS planning. The AWS team meets on a weekly basis to coordinate project planning efforts. The AWS team members also independently engage and collaborate with staff across

disciplines and senior managers within the SFPUC depending on the project needs. These experts and managers also form the Water Supply Task Force (WSTF), a standing committee of representatives from a broad cross-section of disciplines and management across the SFPUC, as represented in **Figure 2** above. The AWS team meets with the WSTF every two weeks to report on the status and upcoming milestones of individual projects, and to solicit input and advice. Access to the WSTF on an ongoing basis throughout planning is a key aspect of the SFPUC's integrated planning approach to AWS planning. As needed, the AWS team also leverages external experts to assist with planning efforts such as staying abreast of changing regulations for purified water through consulting contracts, and participation in conferences and workshops.

In addition to using internal tools and resources, the AWS team regularly communicates with Bay Area Water Supply & Conservation Agency (BAWSCA) and periodically meets with the Citizens Advisory Committee to solicit input and share updates. The AWS team also engages with State and local regulatory agencies such the State Water Resources Control Board, the Regional Water Quality Control Board, and the local San Francisco Department of Public Health on new regulations, funding, water rights, and compliance. With public-facing quarterly updates on the AWS Program such as this report and presentations, the team invites feedback from the Commissioners, external stakeholders, and the public. As planning continues to accelerate, the AWS team continues to take opportunities to expand our perspectives and enrich planning by leveraging all the expertise, tools, and resources that are available to support this program.

1.3 Ongoing Program Activity Updates

(Updated December 2021)

1.3.1 Status of Ongoing Coordination with San Jose and Santa Clara

Planning Considerations for San Jose and Santa Clara's Permanent Status

Planning of alternative water supplies is proceeding with the intention to be able to make San Jose and Santa Clara permanent customers of the SFPUC. Based on the request from San Jose and Santa Clara, that means providing at least 9 mgd of additional water supply guarantees to the two cities collectively. However, consistent with the SFPUC's planning priorities, the SFPUC must first meet instream flow requirements and meet ongoing obligations to existing permanent customers before making interruptible customers permanent or considering meeting increased demands of existing and interruptible customers. Distinct from San Jose and Santa Clara's all-year needs, meeting our existing obligations requires securing dry year supplies.

As SFPUC staff evaluate the technical and institutional feasibility of each of the projects included in the AWS Program, the timing, availability and location of the water supply benefits

associated with the projects are being considered. With these criteria, the SFPUC can review projects for their suitability as drought supply for existing permanent customers and also their suitability for meeting the needs of San Jose and Santa Clara. Depending on location and availability, a purified water project could be better suited to meeting San Jose and Santa Clara's needs rather than the drought needs of existing permanent customers alone.

Since August 2020, the Bay Area Water Supply & Conservation Agency (BAWSCA) has facilitated regular discussions with San Jose and Santa Clara to collectively consider project opportunities and interests. In addition to reviewing projects that are already listed in the AWS Program, the agencies are working together to identify new project opportunities that may provide multiple water supply benefits as well.

Activities in this Quarter

In this quarter, SFPUC staff met twice with San Jose and Santa Clara. The agencies agreed in principle to evaluate a purified water concept and alternatives that can 1) provide a reliable supplemental water supply source for San Jose and Santa Clara and 2) contribute to dry year reliability for the RWS. Staff are working together to identify the appropriate next steps in the planning process.

1.3.2 Financial Update

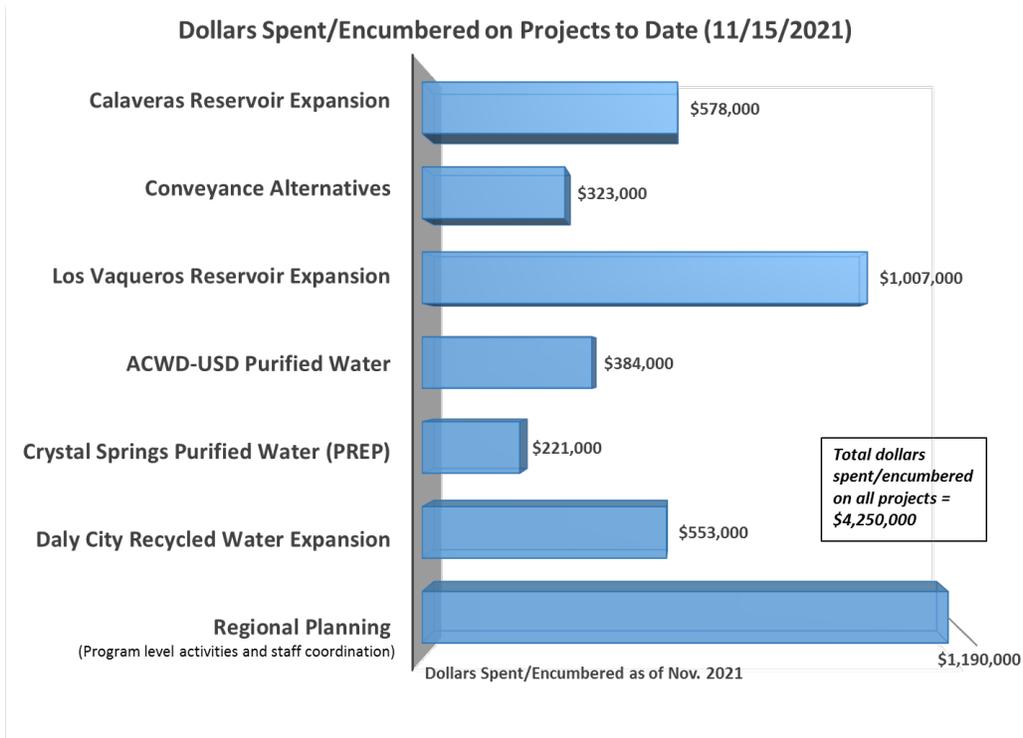
(Updated December 2021)

Funds became available to the AWS Program in July 2020, at the start of the previous fiscal year. Since that time, AWS Program staff have consistently been tracking staff time, task orders, and contract expenditures with partner agencies on the planning tasks associated with the alternative water supply projects.

Except for the Los Vaqueros Reservoir Expansion Project, which includes large expenditures such as design and permitting, other AWS Program activities largely involve feasibility studies, alternatives analyses, staff time and coordination from the SFPUC, and city attorney support. Regional Planning refers to program-level activities, program administration, reporting out, and coordination across the SFPUC to advance project planning.

The current status of project expenditures, notwithstanding any reporting lag, is shown in the **Figure 4** below. As increases in expenditures remain small quarter over quarter, staff will provide updates at least once a year. If expenditures increase at a higher rate, updates will be provided more frequently as part of the Quarterly Report.

Figure 4. AWS Program Expenditures



Section 2. Status of Projects

Staff are currently studying the feasibility of both regional and local projects that can contribute to meeting the needs and priorities identified for this planning effort. Three projects in the San Joaquin Valley (Upcountry Projects) have also been identified and planning for those is linked to the negotiations for the Bay-Delta Plan. Collectively, these projects represent new water supplies, local supply opportunities, a study of conveyance options, an innovations program, a potential local policy option, and a water transfer simulation that can help answer some planning questions. This section provides a status of each of these efforts, which are organized geographically and shown in **Figure 5**.

Each project status discussion that follows in Section 2.1, 2.2, and 2.3 includes the following sections: *Project Background* and *Current Planning Considerations*, which is included for purposes and context, and sections on *Activities This Quarter* and *Upcoming Activities* that are updated each quarter. **A schematic on *Project Partners & Interests* appears at the beginning of each of the regional projects in Section 2.1 in which there are multiple partners.**

Figure 5. Map of Regional AWS Program Activities



2.1 Regional Projects

2.1.1 Daly City Recycled Water Expansion

Project Partners & Interests

SFPUC	Daly City (Sanitation District)	Cal Water
Increase drought supply reliability	Reduce ocean discharges	Develop local supplies

Project Background

This project can make an additional 0.7 mgd of groundwater available in the South Westside Basin for drought supply. The project is envisioned to serve 13 cemeteries and other smaller irrigation customers with new recycled water supply, replacing existing groundwater pumping from the Basin. This will free up groundwater, enhancing the reliability of the Basin. The project has been a regional partnership between the SFPUC, Daly City, and the California Water Service Company (Cal Water), in coordination with the Town of Colma and the irrigation customers who are located largely within Cal Water’s service area. As a private water utility, Cal Water’s participation in the project is subject to approval by the California Public Utilities Commission (CPUC). SFPUC customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts. In this way, this project supports the Groundwater Storage and Recovery (GSR) Project, which is under construction.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) Can the project be phased to maximize benefits over time?
- 2) How will the responsibilities and costs be allocated among the project partners?

Activities this Quarter

SFPUC staff and the consultant team are close to completing the alternatives’ analysis. Preliminary conclusions show that the baseline recycled water project, on balance, is the most favorable alternative considering benefits, costs, engineering, and operational complexities. There is a potential to phase in an Indirect Potable Reuse (IPR) component at a later stage to maximize beneficial reuse and groundwater recharge.

The consultant team has initiated work on updating the cemetery demands on their existing expansion plans, which would help clarify whether there is sufficient recycled water supply to meet future demands as well as potential effects on groundwater basin storage.

Regular meetings with our partner agencies, Daly City and Cal Water continued this quarter. Main topics of discussion include different approaches on how the cost share could be structured among the partners as well as additional studies Cal Water needs to facilitate design of the storage tank.

Upcoming Activities

In the coming quarter, SFPUC will have a better understanding of future cemetery demands and will work with the partners to develop more details about the cost share and other terms of a preliminary agreement to move the project into design, and consider additional outreach to the cemeteries.

2.1.2 ACWD-USD Purified Water

Project Partners & Interests

SFPUC	Alameda County Water District (ACWD)	Union Sanitary District (USD)
Increase Dry Year Supply	Reduce dependence on SFPUC Regional Water System	Reduce Bay discharges

Project Background

This project could provide a new purified water supply utilizing USD's treated wastewater. Purified water produced by advanced water treatment at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or put to other uses in ACWD's service area. With the additional water supply to ACWD, an in-lieu exchange with the SFPUC could result in more water left in the RWS. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and the SFPUC's Bay Division Pipelines.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) What is the maximum potential purified water that can be produced and put to beneficial use from this project?
- 2) What are a range of potentially feasible alternatives for treatment and delivery?
- 3) What are the considerations and tradeoffs of two alternatives that the partners wish to study, and what are the associated costs and infrastructure needs?

Activities this Quarter

During this quarter, the project team finalized the updated work plan based on the alternatives that were identified in the spring. The alternatives include purified water concepts that could recharge the groundwater basin through Quarry Lakes as a first phase and provide water supply

to ACWD or SFPUC directly as a second phase. There are two variations of this phased concept based on whether or not planned capital improvements at the wastewater treatment facility are assumed. The two alternatives will result in the analysis of different treatment options.

Upcoming Activities

In the coming quarter, that the consultant team will analyze the two selected alternatives.

2.1.3 Crystal Springs Purified Water (PREP)

Project Partners & Interests

SFPUC	Silicon Valley Clean Water
	City of San Mateo
Increase Dry Year Supply or Supply for San Jose / Santa Clara	Reduce Bay discharges
Cal Water	BAWSCA
	Redwood City
Develop local supplies	Increase dry year supply

Project Background

The Crystal Springs Purified Water (also referred to as the Potable Reuse Exploratory Plan or PREP) Project is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be delivered via pipeline 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Early studies analyzed the feasibility of treatment and distribution and provided feasible scenarios for institutional structure and costs.

Current Planning Considerations

To evaluate the merits of the project as a water supply to meet dry year needs, the SFPUC will need to answer the following near-term planning questions:

- 1) What is the preferred operational scenario for the project?
- 2) How will a new water supply in Crystal Springs Reservoir affect water quality and operational needs of the RWS?
- 3) What are the feasible alternatives to delivery through Crystal Springs Reservoir? How do the costs and benefits of the alternatives compare?

To answer these questions, the SFPUC and partner agencies including BAWSCA, Cal Water, Redwood City, SVCW and San Mateo developed a scope of work for Phase 3 of the feasibility study.

Activities This Quarter

This quarter, the SFPUC, partner agencies and the consultant team continued to make progress on the Phase 3 feasibility study by completing an alternatives’ ranking exercise. Each agency provided feedback on its preferred alternatives in terms of volume, type of potable reuse project (IPR, direct potable reuse (DPR), or a combination of both) and critical next steps. SFPUC staff is interested in moving forward on a reuse project that includes both reservoir augmentation to Crystal Springs Reservoir and DPR options to achieve the maximum water supply potential of 12 mgd.

Upcoming Activities

Next steps for the project team include completing the feasibility study by reaching an agreement among the partners on the selected alternatives to move into design, creating a fact sheet on potable reuse, and developing a draft term sheet among the partner agencies.

2.1.4 Los Vaqueros Reservoir Expansion

Project Partners & Interests

CCWD	ACWD	SFPUC with BAWSCA
EBMUD	Zone 7 Water Agency	
Increase water supply reliability	Increase water supply reliability	
	Valley Water	Increase Dry Year Supply or Supply for San Jose / Santa Clara
San Luis & Delta Mendota Water Authority	Grassland Water District	DWR (State)
Increase water supply for irrigation		USBR (Federal)
	Protect wildlife refuges	Provide approvals and funding

Project Background

The LVE Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority (JPA). The JPA formation was finalized and filed with the State in October. Once the JPA board is established, JPA will provide governance and administration for the project and JPA members will assist in the design, construction, operation, and administration of the Project.

Meanwhile, CCWD is leading the planning, design and permitting efforts, with funds provided by the State and federal government, and contributions from Local Area Partners (LAPs) through Multi-Party Cost Share Agreement amendments.

The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. However, securing a water supply and ensuring conveyance is available can both be significant barriers to realizing the full water supply potential of storage for SFPUC customers. In particular, issues related to conveyance have been the focus for SFPUC staff in determining the extent of participation in the LVE project.

Specifically, to better understand the conveyance options and effects related to decision-making for the LVE Project, two subprojects were developed to support this project. These are listed here and described in the subsequent sections:

1. **Conveyance Alternatives** (evaluating conveyance from LVE to RWS facilities);
2. **The Bay Area Regional Reliability (BARR) Partnership Shared Water Access Program (SWAP)**, which is a simulation to evaluate the potential impacts of conveyance from LVE to San Antonio Reservoir within the RWS, as well as an exchange with ACWD.

In addition, water supply options are being considered for storage in LVE. One of these options is treated in-Delta diversions through the **Brackish Water Desalination Project**, which could be a source of supply as an exchange with CCWD. This project is described separately under the AWS Program.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) What are the water supply options that are available to fill storage in Los Vaqueros Reservoir for the SFPUC? What are the opportunities and constraints associated with water supply?
- 2) Are exchanges with partner agencies a feasible alternative to direct deliveries to the SFPUC? If so, under what conditions?
- 3) Are there feasible alternatives to conveyance through the South Bay Aqueduct for the SFPUC?

Activities this Quarter

During this quarter, there have been several significant developments in planning, permitting, design, and funding as described below. The updates are grouped in the paragraphs that follow.

Planning, Permitting and Design

A number of permit applications have been submitted and are awaiting approval in this quarter, including, but not limited to:

- U.S. Fish and Wildlife Service (USFWS) terrestrial Biological Assessment (BA)
- USFWS Bald and Golden Eagle Protection Act ‘take’ permit
- USFWS Incidental Take Permit application for terrestrial species
- Federal and state Endangered Species Act permit

The 90% design was sent to the DWR Division of Safety of Dams (DSOD) in this quarter for review. The Los Vaqueros Dam Expansion Technical Review Board, including representatives from the DSOD continue to meet and review the dam design during this quarter. Final dam design is anticipated by spring 2022.

The 30 percent design of the Transfer-Bethany Pipeline Turn-in to the California Aqueduct was submitted to DWR for review. Evaluation of alternative alignments through sensitive areas and coordination with interested parties is ongoing.

Design of Pumping Plant No. 1 Replacement is progressing, with completion of the 10 percent design, and 30 percent design anticipated in January 2022. Inspections of the Transfer Pipeline are anticipated in Fall 2022. An assessment of options to meet CCWD’s water supply and quality objectives during construction of the dam when reservoir releases are not available is ongoing.

State and Federal Funding

On October 20, 2021, the California Water Commission unanimously voted the LVE Project feasible and eligible for \$470 million in Proposition 1 funding as part of WSIP. With bipartisan support, \$50 million in federal funding was appropriated for the LVE Project for fiscal year (FY) 2022. This is in addition to the \$14 million that was appropriated in federal funds in FY21.

Local Area Partners

In November, the local Area Partners executed Amendment No. 3 to the Multi-party Cost Share Agreement which provides funding by up to \$6,279,848 divided equally among the seven Project partners, with a maximum contribution by the SFPUC of \$897,121.

Los Vaqueros Reservoir Expansion Joint Powers Authority (JPA)

The JPA Agreement was fully executed and filed with the State in October. The first JPA Board meeting has been scheduled during which Directors will be sworn in and the Chair and Vice Chair will be elected. The agenda and supporting information will be available on JPA website: www.losvaquerosjpa.com. The first monthly meeting of the JPA Board took place in November 2021.

Upcoming Activities

There are several key milestones projected in the coming months. In the next quarter, staff expect the following activities to take place:

- Identification and preliminary characterization of water supply options
- SFPUC staff recommendation on conveyance and storage

2.1.4.A *Conveyance Alternatives*

Project Background

The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The first and preferred path is through the South Bay Aqueduct (SBA), and the second pathway is through EBMUD.

The SBA is a 49-mile aqueduct, which is part of the State Water Project, owned by DWR. There are three State Water Project contractors (SBA Contractors) who maintain contract capacity for use of the SBA. They are Zone 7 Water Agency, ACWD, and Valley Water. The SBA is in close geographical proximity to SFPUC's San Antonio Reservoir and the Sunol Valley Water Treatment Plant. SFPUC staff, in coordination with BAWSCA, have been working with the SBA Contractors to develop a clear understanding of what the maximum potential use of the SBA could be that would be of benefit to the SFPUC and what constraints may exist to achieving those benefits.

Current Planning Considerations

As indicated under the LVE Project, identifying a viable conveyance pathway is critical for the SFPUC's participation. The primary focus of this task has been to understand the capacity within the SBA and evaluate an alternative through EBMUD.

Activities this Quarter

Significant advances have been made to evaluate potential water quality impacts of bringing new water supplies through the SBA into San Antonio Reservoir or the Sunol Valley Water Treatment Plant through the Bay Area Regional Reliability Shared Water Access Program (BARR SWAP) effort described in the next section.

Once there is confidence in treatability and available conveyance capacity through the SBA, SFPUC, through the JPA will enter into agreements with DWR regarding the terms and conditions for SBA use.

In addition to direct deliveries to SFPUC facilities, SFPUC staff are also pursuing exchanges with SBA Contractors. ACWD is a Wholesale Customer and the SFPUC shares common customers with Valley Water, including San Jose and Santa Clara. Discussions have been ongoing through this quarter with both agencies regarding potential exchanges. The potential for an exchange

with ACWD is being evaluated through the BARR SWAP project described in the subsequent update.

As an alternative to use of the SBA, the SFPUC is also evaluating conveyance pathways through EBMUD. EBMUD and the SFPUC share an emergency intertie through the City of Hayward, however this alternative considers the development of a new non-emergency intertie. The SFPUC retained a consultant team to evaluate three potential alignments for conveyance. Based on preliminary analysis, this new conveyance alternative will not likely be cost competitive with use of the SBA, which is an existing pipeline.

Upcoming Activities

In the coming quarter, final evaluation of both conveyance alternatives is expected to be complete.

2.1.4.B Bay Area Regional Reliability Shared Water Access Program (BARR SWAP)

Project Background

As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.

The BARR agencies initially proposed two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021. This work is supported with grant funds from the U.S. Bureau of Reclamation and the participating water agencies.

The first proposed pilot (Pilot 1A) is a desktop simulation that assumes the existence of some facilities that are currently not in place. The second pilot (Pilot 2A) was a physical exchange of water between two federal Central Valley Project (CVP) Contractors, CCWD and Valley Water.

Current Planning Considerations

This simulation will test the conveyance of water from an expanded Los Vaqueros Reservoir through the SBA. The agencies participating in this simulation are the SFPUC, ACWD, and BAWSCA. This BARR SWAP project will help the SFPUC evaluate two aspects of LVE Project feasibility:

- 1) Potential water quality impacts and treatment needs associated with a new water supply through the SBA into San Antonio Reservoir and Sunol Valley Water Treatment Plant; and
- 2) Potential for exchange with ACWD, offsetting demand on the RWS.

Activities this Quarter

In this quarter, for Pilot 1A, a final report which includes the technical memoranda on the impacts of bringing in a new source of supply from the LVE Project through the SBA and blending that supply with the RWS either in San Antonio Reservoir or directly at the Sunol Valley Water Treatment Plant (Sunol WTP) was drafted. An Executive Summary and final presentation are being prepared. Together with the final Technical Memoranda, this will feed into the BARR SWAP analysis.

Pilot 2A has been delayed due to current drought conditions, but is still planned. Meanwhile, a new pilot exchange among CVP Contractors EBMUD and CCWD is planned as a third pilot BARR SWAP project.

Upcoming Activities

In the next quarter, the Pilot 1A project team will complete internal review of the water quality and treatability analysis final report. The Pilot 1A project team is working on developing treatment unit costs for a potential new source of supply and will continue to make progress in evaluating the potential financial implications and necessary institutional agreements needed to enable exchanges with ACWD and Valley Water.

2.1.5 Bay Area Brackish Water Desalination

Project Background

The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between CCWD, EBMUD, SFPUC, Valley Water, and Zone 7 Water Agency. The project could provide a new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. While this project has independent utility as a water supply project, for the current planning effort the SFPUC is considering it as a source of supply for storage in LVE. While the allocations remain to be determined among partners, the SFPUC is considering a water supply benefit of between 5 and 15 mgd during dry year conditions when combined with storage at LVE.

Current Planning Considerations

In the current planning, SFPUC is considering brackish water desalination as a source for storage in LVE. For that scenario, the current planning questions include:

- 1) What are the conditions needed to make an exchange of water to fill SFPUC storage in LVE in wet years possible?

- 2) What are the losses associated with an exchange and related conveyance?
- 3) What are the alternatives to desalination for water supply storage in LVE?

Activities this Quarter

Staff have previously identified some water rights issues associated with exchanges needed to store water from this project in LVE. A decision was made to wait until a planned pilot exchange of Central Valley Project water between Valley Water and CCWD (Pilot 2A described in the previous section) is completed. That pilot has been delayed due to current drought conditions, so no additional work has resumed for this project, but is planned.

Upcoming Activities

Next steps will depend on the outcome of the planned Central Valley Project exchange.

2.1.6 Calaveras Reservoir Expansion

Project Background

This storage project envisions the expansion of Calaveras Reservoir to store excess RWS supplies or other source water in wet/normal years. No expansion of water rights from the local watershed is anticipated. With the Calaveras Dam Replacement project in place, Calaveras Dam impounds a capacity of 96,850 acre-feet, or 31 billion gallons of water. Through an expansion, up to an additional 289,000 acre-feet, or 94 billion gallons of additional storage could be realized. Calaveras Reservoir is owned and operated by the SFPUC for the benefit of RWS customers. Unlike all other regional projects under review in this program, no external partners are anticipated at this time.

Current Planning Considerations

The current planning questions include:

- 1) What are the feasible dam raise scenarios for the physical storage structure and what are some preliminary cost estimates?
- 2) What are the conveyance alternatives, including infrastructure and operational considerations, for an expanded Calaveras Reservoir?
- 3) How can different water supply alternatives be integrated to maximize efficient use of expanded storage at Calaveras?

Activities this Quarter

During this quarter, the project team initiated hydraulic modeling to analyze the alternatives identified to bring water upcountry to Calaveras Reservoir.

Upcoming Activities

Alternatives identified will continue to be evaluated in the next quarter.

2.2 Upcountry Projects

2.2.1 Groundwater Banking

Project Background

Groundwater banking in the Modesto Irrigation District (MID) and Turlock Irrigation District service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area. For example, additional surface water could be provided to irrigators in wet years, which would offset the use of groundwater, thereby allowing the groundwater to remain in the basin rather than be consumptively used. The groundwater that remains in the basin can then be used in a subsequent dry year for irrigation, freeing up surface water that would have otherwise been delivered to irrigators to meet instream flow requirements.

Activities this Quarter

There is no change in status for this project over the reporting period.

Upcoming Activities

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement. Progress on this potential water supply option will depend on the negotiations of the Voluntary Agreement.

2.2.2 Inter-Basin Collaborations

Project Background

Inter-Basin Collaborations could provide net water supply benefits in dry years by sharing responsibility for instream flows in the San Joaquin River and Delta more broadly among several tributary reservoir systems. One mechanism by which this could be accomplished would be to establish a partnership between interests on the Tuolumne River and those on the Stanislaus River, which would allow responsibility for streamflow to be assigned variably based on the annual hydrology.

Activities this Quarter

No new development has occurred during this reporting period.

Upcoming Activities

As is the case with Groundwater Banking, feasibility of this option is included in the proposed Tuolumne River Voluntary Agreement.

2.2.3 Dry Year Transfers

Project Background

During the planning and implementation of the Phased WSIP, the SFPUC pursued a long-term agreement to transfer 2 mgd from MID in dry years only. The negotiations were terminated in 2012. Subsequently, the SFPUC has initiated discussions with Oakdale Irrigation District to secure a similar dry year transfer.

Activities this Quarter

No new water transfer developments occurred during this reporting period.

Upcoming Activities

While no transfer has been secured to date, the SFPUC continues to engage in discussions with partners to explore potential transfer opportunities on the Tuolumne River and throughout the San Joaquin Valley.

2.3 Local Projects

This section describes new alternative water supply projects in SFPUC's retail service area can offset future retail demands from the RWS. This list supplements the SFPUC's robust efforts in conservation, water recycling, onsite water reuse, and local and regional groundwater that have been underway for decades. Ongoing efforts are described in [Section 3.5.1](#).

2.3.1 San Francisco Purified Water

Project Background

The San Francisco Purified Water Project is a concept that envisions providing a new, local drinking water supply in San Francisco. In 2020, the SFPUC successfully completed PureWaterSF, a small-scale research and demonstration DPR project at its headquarters. While much more research and investigation are needed before a project is conceptualized, there is a statewide push to increase reuse and reduce wastewater discharges. With the absence of large remaining non-potable applications and the lack of infrastructure in San Francisco to support other types of potable reuse, San Francisco would have to consider treated water augmentation in which purified water could be blended at one or more of San Francisco's drinking water reservoirs.

Activities this Quarter

This quarter, analysis of dry weather flows, existing infrastructure, anticipated regulations, reservoir operations, and land availability were underway, supporting the analysis to maximize the potential purified water opportunities in San Francisco.

Upcoming Activities

The Task Order to study purified water opportunities and develop a stepwise approach for planning has begun and will continue through Spring 2022.

2.3.2 Satellite Recycled Water

Project Background

The proposed Satellite Recycled Water Project would provide a tertiary recycled water supply to meet the demands of dual-plumbed⁴ buildings in San Francisco that do not currently have a non-potable water supply source. This project would provide an appropriate water supply source for non-potable irrigation, as well as commercial and industrial uses not addressed by the Non-Potable Ordinance (NPO).

Activities this Quarter

In this quarter, SFPUC's consultant team prepared a draft report evaluating the cost of acquiring a site that could accommodate a potential recycled water plant. The draft report also considered land acquisition strategies and evaluated the availability and cost of land in the future. The team also evaluated infrastructure requirements for a potential recycled water plant.

Upcoming Activities

Evaluation of the cost of acquiring a site for a satellite treatment facility and infrastructure requirements will continue in the next quarter.

2.3.3 Innovations Program

Project Background

This program supports development of new technologies and initiatives to demonstrate the feasibility of atmospheric water generation technology, heat recovery in non-potable systems, expanded leak detection, and breweries treating process water for reuse. Included in the Innovations Program are demonstration of new technologies and grant funds to support partnership opportunities. Examples of projects within the Innovations Program include a grant program to treat process water in breweries and grants to support onsite reuse projects with heat recovery systems. San Francisco's Onsite Water Reuse Program allows for the collection, treatment, and use of alternate water sources for non-potable applications in individual buildings and at the district-scale. The onsite water reuse systems under the NPO apply to new, large development projects in San Francisco. The SFPUC is also pursuing a prospective project to expand leak detection and a project to test atmospheric water generation technology.

⁴ Dual-plumbing is a plumbing system with two sets of pipes. One set of pipes is designed and used for the transmission of recycled water within buildings and structures, including lateral supply pipelines, and which is separate from the existing set of pipes or any potable water distribution system that complies with all material and construction specifications contained in City codes and other applicable State and Federal laws. There are several dual-plumbed buildings in San Francisco that installed the plumbing to comply with the Recycled Water Ordinance.

Activities this Quarter

The SFPUC installed two atmospheric water generation panels, one at Hummingbird Farm and one at the San Francisco Botanical Garden. The SFPUC partnered with SOURCE to install the technology and will be conducting water quality analysis and water production. As part of the Onsite Water Reuse Grant Program, Anchor Brewing recently completed construction of a brewery process water reuse system with grant assistance from the SFPUC. The facility has a capacity of recycling 20 million gallons of brewery process water annually. Recently amended in 2021, the Non-potable Water Ordinance (Article 12C of the San Francisco Health Code) requires new development projects of 100,000 gross square feet or more to install and operate an onsite water reuse system.

The SFPUC continues to use several technologies and approaches to detect potential leaks in its system. This includes an ongoing pilot of the Ecologics acoustic leak detection platform.

Upcoming Activities

The SFPUC will continue developing projects to demonstrate the potential for water savings and supply with innovations in the coming quarter.

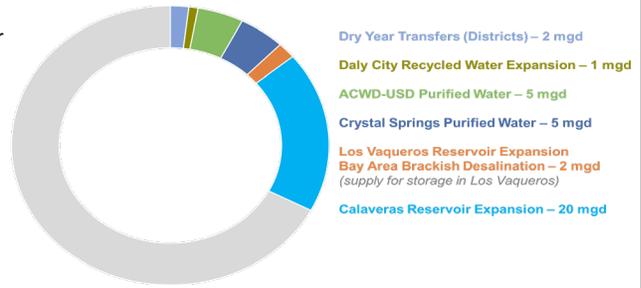
2.4 Project Summaries

In the following pages, single page summaries of each project are provided, along with current planning and development schedules and additional details of each project included in this program.

Summary of Alternative Water Supply Program

Project Description

As the SFPUC plans to 1) meet environmental flow obligations requirements and projected customer obligations demands for existing customers; 2) evaluate serving new permanent customers and providing additional supply for existing customers; and 3) prepare for future climate effects and other uncertainties through the 2045 water supply planning horizon, there is a need to look beyond current surface water supplies and operations of the San Francisco Regional Water System (RWS) and local groundwater sources. The Alternative Water Supply (AWS) Program was established to evaluate new and diverse “alternative” water supply options such as expanding storage, groundwater banking, transfers, purified water (potable reuse), desalination, and technological innovations that can increase supply.



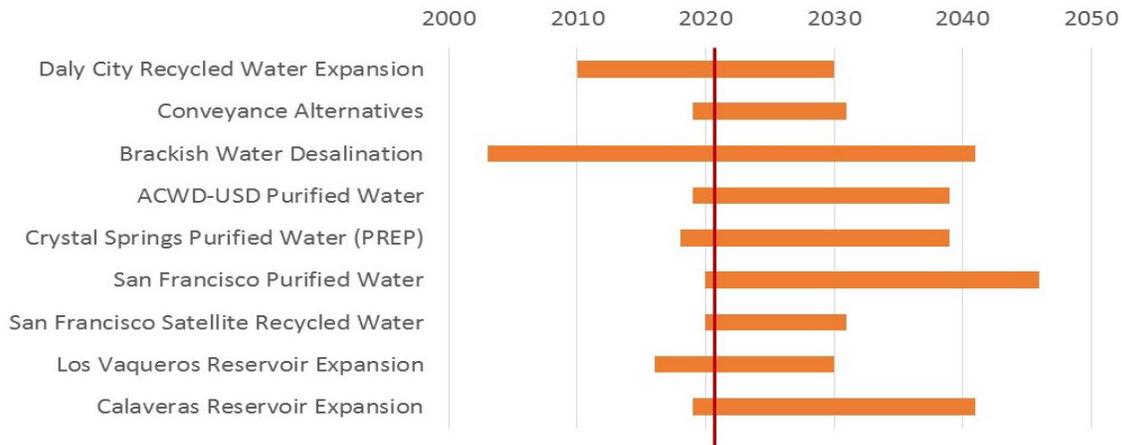
Potential New Alternative Water Supply Options

There are 14 projects listed as part of the SFPUC’s AWS pProgram. While they all support the SFPUC’s goal of balancing meeting future water needs, they are not all necessarily centered around the surface water supply source. The projects that can provide direct water supply benefits and are currently being evaluated include four regional water supply projects, two regional storage expansion projects, and two local water supply projects in San Francisco.

General Program Information				SFPUC Budget Information	
Average Annual Supply		Availability		10-Yr CIP Budget Allocation	
Varies		Varies		Regional	\$288M
				Local	\$10.3M
				Current FY '21 Allocation	
				\$17M	
				\$6.3M	
Total Project Costs				Capital Cost/Acre-Foot	
Est. Capital Cost:	TBD	Est. Annual O&M:	TBD	TBD	

Programmatic Schedule

Proposed Schedule of Projects



Current Status	Risks and Uncertainties	Benefits
Planning	<ul style="list-style-type: none"> Determining incremental water supply benefits Integrating new supplies with existing supplies 	<ul style="list-style-type: none"> Potential to meet future water supply needs
18-Month Outlook <ul style="list-style-type: none"> Feasibility studies underway to identify and analyze project concepts 		

Daly City Recycled Water Expansion

Project Description

This project can make an additional 0.7 mgd available in the South Westside Basin for drought supply. The project is envisioned to serve 13 cemeteries and other smaller irrigation customers with an average annual recycled water supply of 1.25 mgd, offsetting existing groundwater pumping from the South Westside Basin. This will free up groundwater, enhancing the reliability of the Basin. The project has been a regional partnership between the SFPUC, Daly City, and the California Water Service Company (Cal Water), in coordination with the Town of Colma and the irrigation customers who are located largely within Cal Water’s service area. As a private water utility, Cal Water’s participation in the project is subject to approval by the California Public Utilities Commission (CPUC). SFPUC customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts. In this way, this project supports the Groundwater Storage and Recovery (GSR) Project, which is under construction.



Holy Cross Cemetery Colma, CA

Project Partners

Daly City, Town of Colma, Cal Water and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
0.7 MGD	Drought and All Years	Recycled Water / Groundwater Offset	Regional	TBD

Total Project Cost

Est. Capital Cost:	\$85.0M	Est. Annual O&M:	\$2.0M
---------------------------	---------	-----------------------------	--------

SFPUC Budget Information

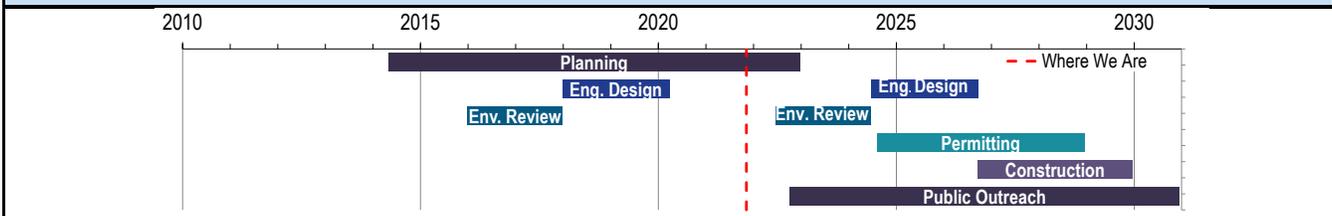
10-Yr CIP Budget Allocation:	\$85.0M	Current Allocation:	\$2.5M
-------------------------------------	---------	----------------------------	--------

Institutional Complexity

SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
<p>Planning</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Identify Project ownership and cost structure among Partners (SFPUC, Daly City, Cal Water) Evaluate project alternatives Develop Term Sheet for project Outreach and communication with cemeteries and Colma 	<ul style="list-style-type: none"> Securing customers (cemeteries and others) Partner buy-in and involvement Finalizing and procuring storage tank location Realizing groundwater offset benefits through GSR Loss of 1-2 SFPUC retail customers, dependent on negotiations with partners 	<ul style="list-style-type: none"> Reducing reliance of cemeteries on groundwater pumping for irrigation will increase the reliability of the Southwest Groundwater Basin for drinking water supply Recycled water supply may be available for additional customers (to be identified) Diversifying water supply portfolio Replace some potable water used for irrigation with recycled water (0.05 mgd)

SFPUC-Alameda County Water District - Union Sanitary District Purified Water Partnership

Project Description

This project will provide a new purified water supply utilizing Union Sanitary District (USD)'s treated wastewater and further treating it through a multi-barrier advanced treatment process to meet or exceed drinking water standards. While the potential volume of supply will be determined through a feasibility evaluation, prior studies indicate the potential for at least 4 mgd of new supply. Purified water produced at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or for other uses in Alameda County Water District's (ACWD's) service area. With the additional water supply to ACWD, an in lieu exchange with the SFPUC would result in more water left in the SFPUC's Regional Water System. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and SFPUC. A range of scenarios considering treatment capacity, distribution potential and feasibility are being considered through an evaluation between the three partner agencies.



Quarry Lakes, Alameda County

Project Partners

Union Sanitary District (USD), Alameda County Water District (ACWD) and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	All Years	Purified Water	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

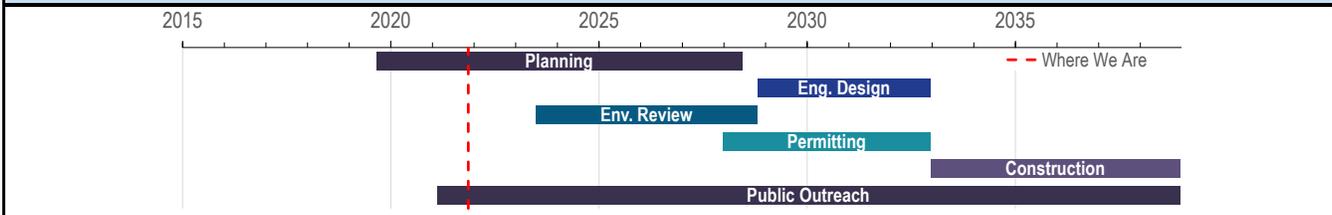
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.0M	Current Allocation:	\$2.5M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
<p>Planning</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Develop and analyze the two selected alternatives 	<ul style="list-style-type: none"> Uncertainty of planned capital improvements at wastewater treatment plant may affect purified water treatment requirements Potential water quality change to Quarry Lakes 	<ul style="list-style-type: none"> Leverages existing facilities to provide water supply

Crystal Springs Purified Water

Project Description

This is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir in San Mateo County, within the SFPUC's Regional Water System (RWS). Treated wastewater from Silicon Valley Clean Water and/or the City of San Mateo would go through a water purification process that uses multi-barrier treatment technology to meet state and federal drinking water quality standards. The purified water would then be transmitted 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Treatment Plant. In addition to the SFPUC and the wastewater agencies, Cal Water, Redwood City and BAWSCA are also participating in the project. Initial feasibility analyses have been completed. Additional planning, including analysis of feasible operational scenarios, impacts to RWS operations, and the evaluation of Direct Potable Reuse (DPR) alternatives, are needed to further evaluate the feasibility and impacts of this project.



Crystal Springs Reservoir

Project Partners

Silicon Valley Clean Water, City of San Mateo, Cal Water, Redwood City, Bay Area Water Supply and Conservation Agency (BAWSCA) and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	All Years	Purified Water	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

SFPUC Budget Information

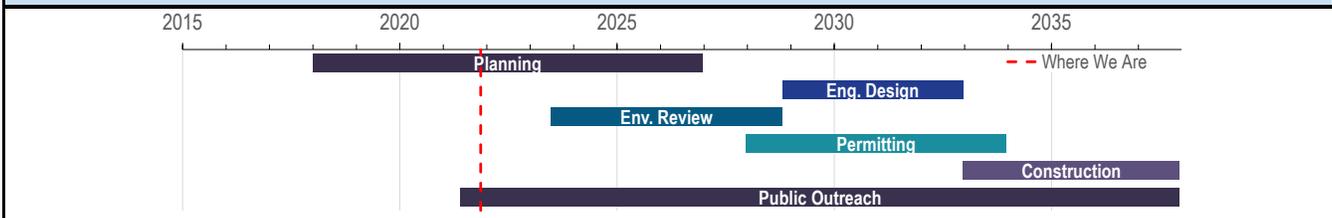
10-Yr CIP Budget Allocation:	\$4.5M	Current Allocation:	\$2.0M
------------------------------	--------	---------------------	--------

Institutional Complexity

SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
<p>Planning</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Continue analysis of impacts of new water supply into Crystal Springs Reservoir Perform modeling analysis Refine model inputs 	<ul style="list-style-type: none"> Operational and water quality challenges in Crystal Springs Reservoir Construction challenges in parts of distribution area Water supply during non-drought years would impact operations and storage availability in the Regional Water System 	<ul style="list-style-type: none"> Reduces Bay discharges Provides a new drought-resistant water supply

Los Vaqueros Reservoir Expansion

Project Description

The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. The main objectives of the expansion include increasing water supply reliability for municipal, industrial and agricultural customers as well as ecosystem benefits to south-of-Delta wildlife refuges and Delta fisheries. While the existing reservoir is owned and operated by Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority that will be set up prior to construction. Meanwhile, Contra Costa Water District is leading the planning, design and environmental review efforts. The LVE Project includes construction of new pipelines, upgrades to existing facilities and reoperation of some facilities. Storage in LVE can provide a dry year water supply benefit to the SFPUC's Regional Water System (RWS). Currently, SFPUC staff are pursuing scenarios of 20,000 - 40,000 acre-feet of storage. In addition, water supply and conveyance to the RWS need to be determined before the SFPUC determines the extent of participation in the LVE project. Conveyance Alternatives, Brackish Water Desalination, and BARR simulation are planning efforts that are linked directly to this project.



Los Vaqueros Reservoir

Project Partners

Alameda County Water District (ACWD), CCWD, East Bay Municipal Utility District (EBMUD), SFPUC, Zone 7 Water Agency, and the San Luis Delta Mendota Water Authority

SFPUC Project Manager

Senobar Lanigan

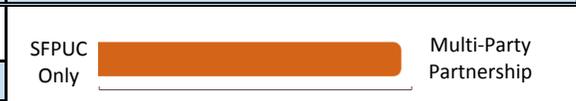
General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
To be identified in a separate project	Drought and/or All Years	Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	\$100M	Est. Annual O&M:	TBD
--------------------	--------	------------------	-----

Institutional Complexity

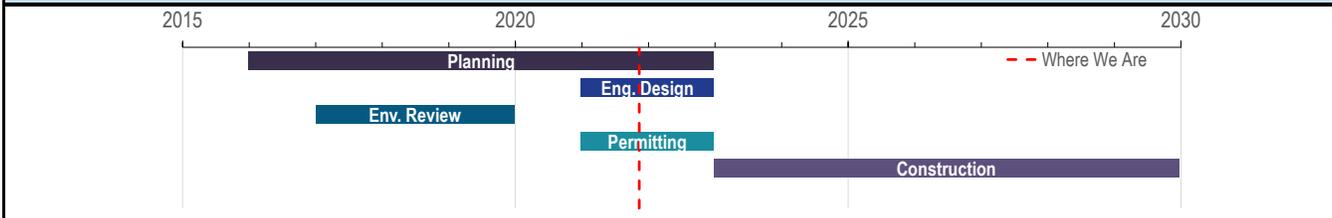


SFPUC Budget Information

10-Yr CIP Budget Allocation:	TBD	Current Allocation:	\$2.5M
------------------------------	-----	---------------------	--------

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Planning; Environmental Review 18-Month Outlook <ul style="list-style-type: none"> Project cost allocations JPA board meeting Feasibility of water supply options Staff recommendations on conveyance and storage 	<ul style="list-style-type: none"> Capacity and institutional constraints for conveyance to RWS Firm water supply source Depending on conveyance option, water quality risks and/or need for pretreatment 	<ul style="list-style-type: none"> Provides operational flexibility, particularly in drier years Allows the SFPUC to manage existing supply more efficiently

Conveyance Alternatives

Project Description

This project is dependent on the SFPUC's participation in the Los Vaqueros Expansion Project in Contra Costa County. Through this evaluation, SFPUC staff will evaluate the potential mechanism(s) available to transfer or exchange water for the benefit of SFPUC Regional Water System (RWS) customers. The volume of water that can be transferred would be the same volume of water that is stored by SFPUC in Los Vaqueros Reservoir Expansion Project (to be determined).



South Bay Aqueduct

The three conveyance alternatives that will be explored as part of this project using the South Bay Aqueduct (SBA) include 1) a transfer with ACWD; 2) a transfer with Valley Water; and 3) delivery to San Antonio Reservoir. Partners will include the SBA Contractors (ACWD, Zone 7 Water Agency, Valley Water), particularly any agency identified as a feasible transfer partner. Of the three options along the SBA, only one (delivery to San Antonio) provides a water supply directly into the RWS. Any conveyance option utilizing the SBA will likely include pipeline improvements and may also include pretreatment and/or pumping, depending on the option pursued. Reliability of the SBA is critical to the viability of these options.

In addition to the SBA, SFPUC is also considering other alternatives, including the potential for a new intertie with the East Bay Municipal Utility District (EBMUD).

Project Partners

SFPUC and BAWSCA working with SBA Contractors: Alameda County Water District (ACWD), Zone 7 Water Agency, and Valley Water

SFPUC Project Manager

Senobar Lanigan

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Dependent on water supply	All Years	Transfer	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

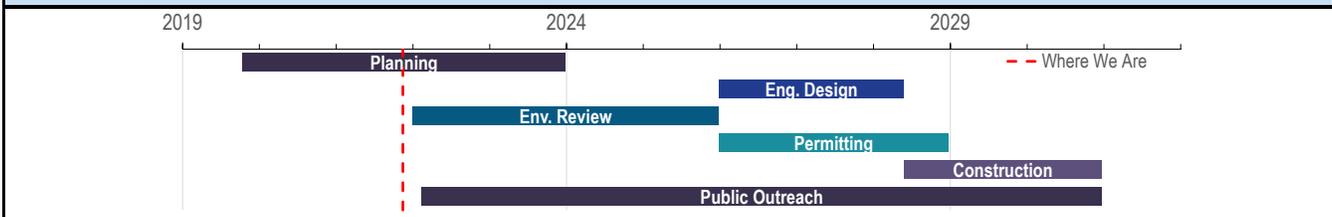
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$3.0M	Current Allocation:	\$2.0M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)

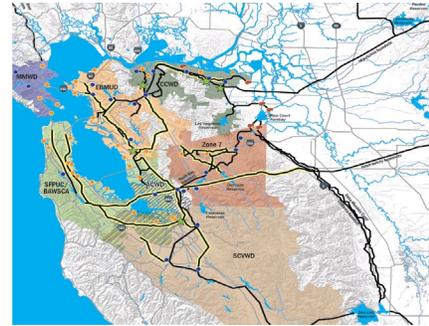


Current Status	Risks and Uncertainties	Benefits
<p>Planning</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Identify preferred conveyance and delivery alternative and plan next steps 	<ul style="list-style-type: none"> Institutional arrangements / willingness of stakeholders Treatment and pre-treatment in some cases WQ challenges 	<ul style="list-style-type: none"> Leverages existing infrastructure For exchanges with ACWD treatment will be delegated to a partner familiar with SBA as a source

Bay Area Regional Reliability (BARR) Shared Water Access Program (SWAP)

Project Description

In 2016, eight of the Bay Area's largest water utilities formed a partnership to explore opportunities to transfer and exchange water across service areas to better serve customers, particularly in times of droughts and emergencies. The partnership is intended to leverage the existing infrastructure and interconnections that exist between the partnering agencies. The Bay Area Regional Reliability (BARR) Partnership includes the following agencies: 1) Alameda County Water District (ACWD), 2) Bay Area Water Supply & Conservation Agency (BAWSCA), 3) Contra Costa Water District (CCWD), 4) East Bay Municipal Utility District (EBMUD), 5) Marin Municipal Water District (MMWD), 6) the San Francisco Public Utilities Commission (SFPUC), 7) Valley Water (formerly Santa Clara Valley Water District and 8) Zone 7 Water Agency.



BARR Service Areas

The BARR Partnership has received two grants from the US Bureau of Reclamation to support for collaborative drought planning. A Drought Contingency Plan was completed in 2017. Currently, the BARR Partnership is planning to test water transfer scenarios through a Shared Water Access Program (SWAP) so that future transfers can be implemented more readily in times of drought or emergency. The SFPUC is participating in a water transfer simulation with ACWD and BAWSCA that would simulate the use of the South Bay Aqueduct (SBA) for an exchange with ACWD and a transfer into San Antonio Reservoir.

Project Partners

SFPUC and BAWSCA working with SBA Contractors: Alameda County Water District (ACWD), Zone 7 Water Agency, and Valley Water

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Dependent on water supply	Drought Years	Conveyance/Transfer	Regional	TBD

Total Project Cost				Institutional Complexity	
Est. Capital Cost:	TBD	Est. Annual O&M:	TBD	<div style="background-color: #e67e22; width: 100px; height: 15px; margin: 0 auto;"></div>	Multi-Party Partnership
SFPUC Budget Information				<small>Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.</small>	
CIP Budget Allocation:	\$0.3M				

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Conceptual 18-Month Outlook <ul style="list-style-type: none"> Conduct water transfer simulation through SBA, considering operational, water quality, financial and legal impacts Review water quality and treatability analysis TMs Evaluate financial implications and exchange agreements 	<ul style="list-style-type: none"> Institutional arrangements / willingness of stakeholders Exchange limitations caused by change in water quality parameters of concern 	<ul style="list-style-type: none"> Encourages regional water supply planning and collaboration Leverages existing infrastructure

Bay Area Brackish Water Desalination (Regional Desalination)

Project Description

The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between Contra Costa Water District (CCWD), SFPUC, Valley Water, and Zone 7 Water Agency. East Bay Municipal Utility District (EBMUD) and the Alameda County Water District (ACWD) may also participate. The project could provide 10-20 mgd of new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. The project relies primarily on available capacity in an extensive network of existing pipelines and interties that already connect the agencies, as well as existing wastewater outfalls and pump stations. The new infrastructure needed for this project includes a treatment facility and upgrades to existing facilities. Zone 7 Water Agency would likely need a new intertie with EBMUD. Depending on the conveyance system used, additional pretreatment and/or facility upgrades may be needed.



Bay Delta Wetland

Early planning studies conducted between 2003-2015 assumed that the project would provide a steady water supply of 9 mgd to the SFPUC in all years; however, the SFPUC is currently seeking drought year supply via storage in Los Vaqueros Reservoir from this project. The final volume share will be subject to negotiation with other partners. The SFPUC would not directly receive desalinated water, but would take delivery of water through a series of transfers and exchanges.

Project Partners

Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), Valley Water, Zone 7 Water Agency and SFPUC

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Dry Years (with storage) and/or All Years	Desalination / Transfers	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

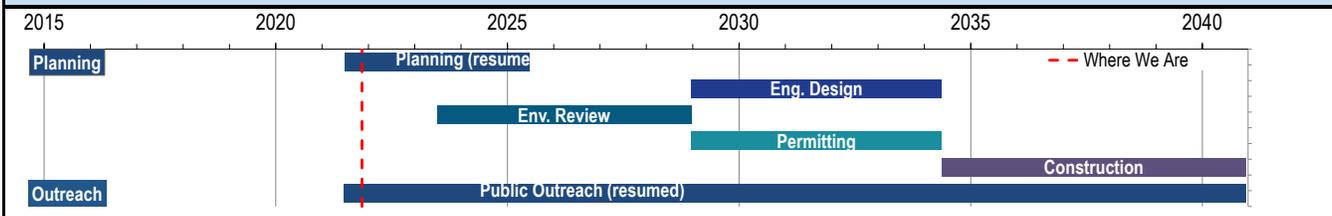
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.0M	Current Allocation:	\$1.5M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Feasibility analysis to resume after planned BARR pilot (2A) is completed
- Supply potential and delivery mechanism to be worked out among partners

Risks and Uncertainties

- Some impacts to sensitive fish may be unavoidable
- Water rights and permitting likely to be challenging
- Conveyance options are limited to transfer water to Regional Water System

Benefits

- Availability during dry years
- Lower GHG emissions than seawater desalination
- Leverages existing infrastructure
- Storage option in Los Vaqueros provide dry year benefits

Calaveras Reservoir Expansion

Project Description

This storage project envisions the expansion of Calaveras Reservoir to store excess Regional Water System (RWS) supplies or other source water in wet/normal years. No expansion of water rights from the local watershed is anticipated. With the Calaveras Dam Replacement project in place, Calaveras Dam holds a capacity of 96,850 acre-feet, or 31 billion gallons of water. Through an expansion, up to an additional 289,000 acre-feet, or 94 billion gallons of storage could be realized. Calaveras Reservoir is owned and operated by the SFPUC for the benefit of RWS customers. No external partners are anticipated at this time. The expansion of Calaveras Reservoir would provide storage for additional water that can be available in all water year types. The proposed project would include raising the dam, increasing the capacity of the outlet structures and the spillway, and the addition of any transmission and pumping needed to bring water to Calaveras Reservoir. Constraints including water availability and conveyance will need to be evaluated.



Calaveras Reservoir

Project Partners

SFPUC Only

SFPUC Project Manager

Susan Hou

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
N/A	Drought Years and/or All Years	Local Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

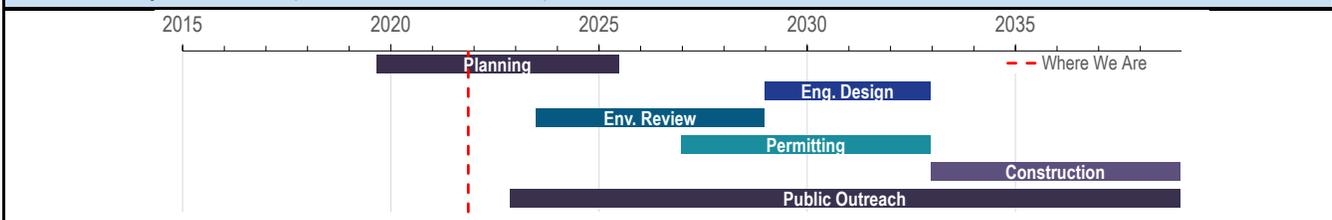
SFPUC Only D Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$3.5M	Current Allocation:	\$2.5M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
<p>Planning</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> • Consultant team identifying and evaluating conveyance alternatives 	<ul style="list-style-type: none"> • Availability of additional water from the Tuolumne River to divert to storage 	<ul style="list-style-type: none"> • Provides operational flexibility, particularly in dry years • Increases storage capacity in the SFPUC's largest reservoir • Increases utilization of Tuolumne River and other wet/normal year supply

Groundwater Banking

Project Description

Groundwater banking in the Modesto Irrigation District and Turlock Irrigation District (the Districts) service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area. For example, additional surface water could be provided to irrigators in wet years, which would off-set the use of groundwater, thereby allowing the groundwater to remain in the basin rather than be consumptively used. The groundwater that remains in the basin can then be used in a subsequent dry year for irrigation, subsequently freeing up surface water that would have otherwise been delivered to irrigators to meet instream flow requirements.



Irrigation in MID service area

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement.

Project Partners

MID and TID
Groundwater users within the MID/TID service areas that also receive surface water deliveries from the Districts

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Unknown	Drought Years	Groundwater / Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
---------------------------	-----	-----------------------------	-----

Institutional Complexity

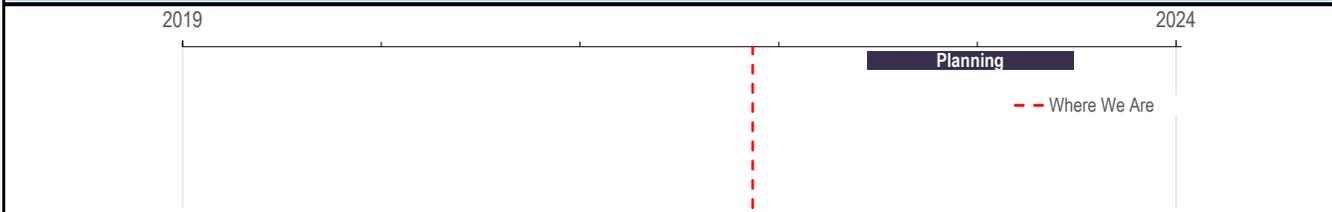
SFPUC Only	<div style="background-color: #e67e22; width: 100px; height: 15px; margin: 0 auto;"></div>	Multi-Party Partnership
------------	--	-------------------------

SFPUC Budget Information

CIP Budget Allocation:	\$0.0M
-------------------------------	--------

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
<p>Conceptual</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Evaluate next step based on negotiations of Tuolumne River Voluntary Agreement 	<ul style="list-style-type: none"> Institutional challenges relating to water rights and basin management 	<ul style="list-style-type: none"> Additional storage, with availability in dry years

Inter Basin Collaborations

Project Description

Inter-Basin Collaborations could provide net water supply benefits in dry years by sharing responsibility for in-stream flows in the San Joaquin River and Delta more broadly among several tributary reservoir systems. One mechanism by which this could be accomplished would be to establish a partnership between interests on the Tuolumne River and those on the Stanislaus River, which would allow responsibility for streamflow to be assigned variably based on the annual hydrology. The Tuolumne system tends to spill more excess flow in wetter years than the Stanislaus, and this excess flow could be shaped and credited to meet Stanislaus system requirements, while New Melones Reservoir in the Stanislaus system is refilling. Then the stored water could be partially used to provide required streamflow to meet Stanislaus and Tuolumne requirements in future dry years.



Inter-Basin Collaborations could also include groundwater banking, utilizing the connections between the OID and MID surface water service areas.

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement. Any collaboration would need to protect the interests of all participants.

Reservoirs on the tributaries to the San Joaquin River

Project Partners

Tuolumne interests (SFPUC, MID, TID)
 Stanislaus interests (OID, SSJID, USBR)
 Groundwater users that also receive surface water for irrigation

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Varies	Storage or Exchanges	Regional	Unknown

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

SFPUC Budget Information

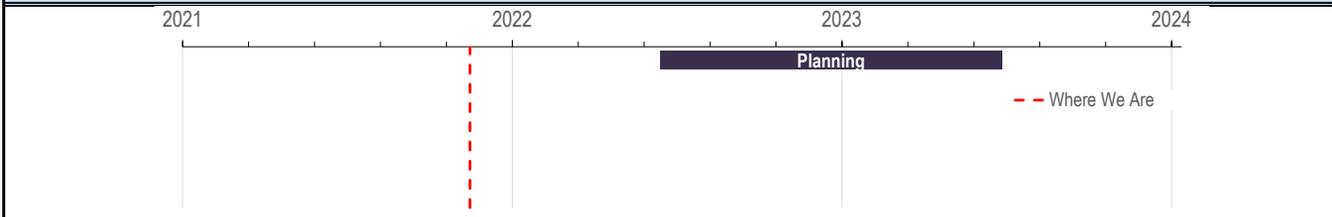
CIP Budget Allocation:	N/A
------------------------	-----

Institutional Complexity

SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Conceptual	<ul style="list-style-type: none"> • Collaboration will require agreements and operational changes among many public and private parties 	<ul style="list-style-type: none"> • Better management of basins can lead to greater regional water supply availability • Water supply and environmental benefits
18-Month Outlook <ul style="list-style-type: none"> • Meeting with other parties to be scheduled pursuant to Voluntary Agreement negotiations 		

Dry Year Transfers - Districts

Project Description

In 2008, the SFPUC Commission adopted the Water System Improvement Program (WSIP) Phased Variant to ensure that the SFPUC could continue to reliably meet the projected needs of its customers through 2030. One element of WSIP Phased Variant was a drought year water transfer. Coupled with the Regional Groundwater Storage and Recovery Project (GSR), this project was intended to ensure drought reliability in the planning horizon. The SFPUC pursued a long-term agreement to transfer 2 mgd from Modesto Irrigation District (MID) in drought years. However, the negotiations were terminated in 2012. Subsequently, SFPUC staff initiated discussions with the Oakdale Irrigation District (OID) to secure a similar drought year transfer. While no transfer has been secured to date, the SFPUC continues to pursue discussions with partners to explore potential transfer opportunities on the Tuolumne River and throughout the San Joaquin Valley.



Don Pedro Reservoir

Project Partners

SFPUC
Oakdale Irrigation District
Modesto Irrigation District

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Drought Years	Transfer	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

SFPUC Budget Information

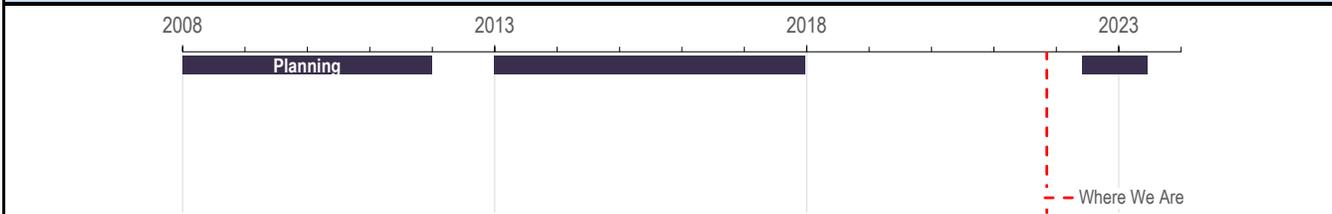
CIP Budget Allocation:	TBD
------------------------	-----

Institutional Complexity

SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Conceptual	<ul style="list-style-type: none"> Institutional arrangements / willingness of stakeholders Availability of supply 	<ul style="list-style-type: none"> Leverages existing supply and existing infrastructure
18-Month Outlook <ul style="list-style-type: none"> Resume discussions with Districts 		

San Francisco Purified Water

Project Description

The San Francisco Purified Water Project is a concept that envisions providing approximately 5 million gallons per day of new, local drinking water supply in San Francisco. The project would treat secondary effluent sourced from one of San Francisco's wastewater treatment plants through a multi-stage, multi-barrier advanced treatment process to produce water that meets state and federal drinking water standards. The treated water would then be blended at one or more of San Francisco's drinking water reservoirs. This treatment and distribution process is referred to as treated water augmentation, and State regulations are still under development (anticipated by 2023). The SFPUC would have no external partners in developing the project infrastructure, but close coordination with regulators, other utilities contemplating similar projects, and our communities will be very important throughout the planning and development of this project.



Southeast Treatment Plant

Before engaging in project planning, SFPUC conducted initial research and testing around water quality, process reliability, and operational needs for purified water opportunities. Initial outreach with staff and local communities was also carried out. This building-scale research project (PureWaterSF) was completed in 2020 with grant support from the U.S. Bureau of Reclamation and the Water Research Foundation. Data revealed that the treatment processes operated as anticipated. A feasibility study is underway to identify potential size, scale and other next steps. This study will be completed in 2022. Additional research, testing, training and outreach is also anticipated.

Project Partners

SFPUC only

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
5 mgd	All Years	Purified Water	Local	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

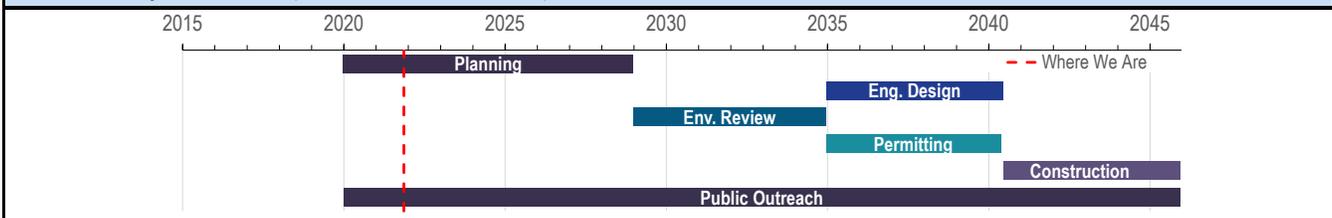
SFPUC Only ■ Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.5M	Current Allocation:	\$0.5M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Research / Conceptual 18-Month Outlook <ul style="list-style-type: none"> Study purified water opportunities Develop a stepwise approach for planning 	<ul style="list-style-type: none"> Regulatory framework not in place until after 2023 Need for additional testing, analysis and study Public perception 	<ul style="list-style-type: none"> Reduces Bay discharges Takes advantage of treated recycled water availability

Satellite Recycled Water

Project Description

The proposed Satellite Recycled Water Project would provide a tertiary recycled water supply to meet the demands of dual plumbed buildings in San Francisco that do not currently have a non-potable water supply source. Based on prior surveys, there is likely less than 0.5 mgd of demand for existing buildings that have the ability to use non-potable water, but lack the supply. This project would include a small centralized tertiary treatment facility, storage tank, and transmission lines that would be located nearest to a majority of the end uses. This project would provide an appropriate water supply source for non-potable irrigation, as well as commercial and industrial uses not addressed by the Non-Potable Ordinance (NPO).



Rendering of Chase Center in San Francisco

Project Partners

SFPUC only

SFPUC Project Manager

Taylor Chang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Up to 0.5 mgd	All Years	Recycled Water	Local	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
--------------------	-----	------------------	-----

Institutional Complexity

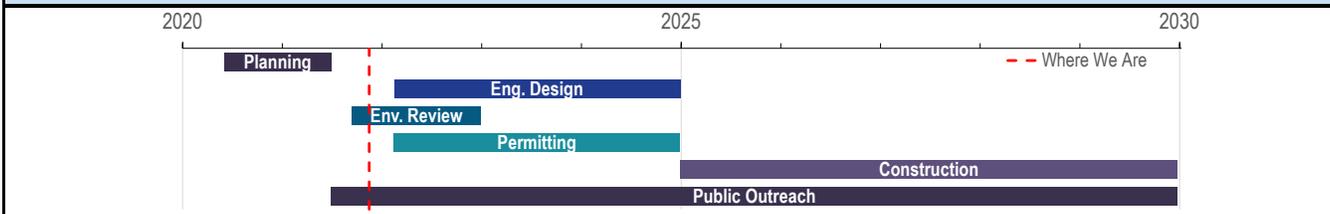
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$4.8M	Current Allocation:	\$0.8M
------------------------------	--------	---------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Conceptual

18-Month Outlook

- Carry out feasibility study including alternatives analysis

Risks and Uncertainties

- High cost relative to customer potential
- Land availability
- Complexity of serving dispersed customers
- Potential for cross-connections

Benefits

- Bridges gap not met by Non Potable Ordinance (NPO) for non-potable needs
- Reduces Bay discharges
- Potential for potable offset
- Matches right water for right use

Innovations Program

Project Description

This program supports development of new technologies and initiatives to demonstrate the feasibility of atmospheric water generation, heat recovery systems in non-potable systems, expanded leak detection, and breweries treating process water for reuse. Included in the Innovations Program are demonstration of new technologies and grant funds to support partnership opportunities. Examples of projects within the Innovations Program include grant funding to support the reuse of process water in breweries, and onsite reuse projects with heat recovery systems. The SFPUC is also testing leak detection technologies and will pilot the use of atmospheric water generation technology locally.



Fog on Golden Gate Bridge

Project Partners

Various

SFPUC Project Manager

Paula Kehoe

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Varies	Varies	Local	Local	N/A

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	N/A
--------------------	-----	------------------	-----

Institutional Complexity

SFPUC Only	Multi-Party Partnership
Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.	

SFPUC Budget Information

CIP Budget Allocation:	\$0.5M
------------------------	--------

Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Planning; Pilot Testing 18-Month Outlook • Continue developing projects to demonstrate potential for water savings and supply	• Individual projects may be small, making them costly	• Identifies new technology opportunities to increase efficiency and water availability

Section 3. Program Fundamentals

3.1 Introduction

This section includes background information on the Alternative Water Supply (AWS) Program and is intended to serve as a program reference. It includes information on how the AWS Program was established, program goals, planning priorities, program schedules, and information on resources for program administration such as staffing, funding, and contracting. Much of the information included in this section will be the same from one quarterly report to the next. However, new information may occasionally be added to the section, and useful information presented in the upfront sections of previous quarterly reports may be moved into this section from time to time. When new information is added, or if significant updates are made to previously included background information, the sections will be marked as “updated”.

3.2 Purpose of the Program

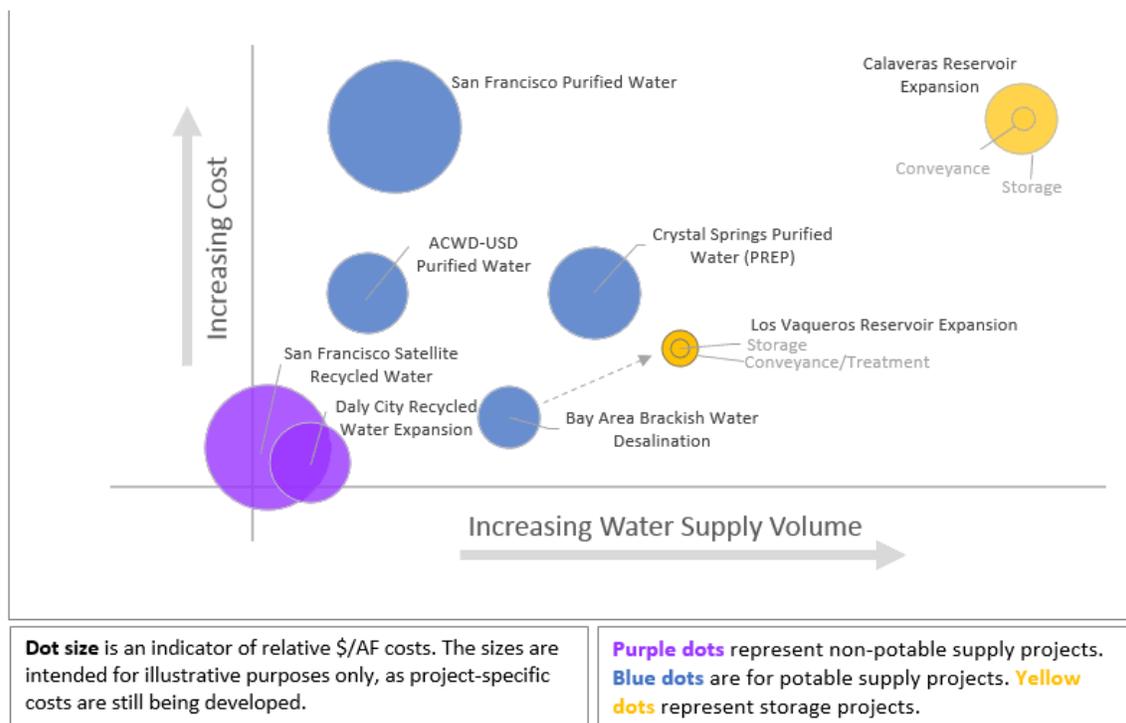
As the SFPUC plans to 1) meet environmental flow requirements and projected obligations for existing customers; 2) evaluate serving new permanent customers and providing additional supply for existing customers; and 3) prepare for future climate effects and other uncertainties through the 2045 water supply planning horizon, there is a need to look beyond current surface water supplies and operations of the San Francisco Regional Water System (RWS) and local groundwater sources. The AWS Program was established to evaluate new and diverse “alternative” water supply options such as expanding storage, groundwater banking, transfers, purified water (potable reuse), desalination, and technological innovations.

There are 14 projects listed as part of the SFPUC’s AWS Program. Among them, there are four regional water supply projects, two regional storage expansion projects, and two local water supply projects in San Francisco. In addition to regional and local water supply projects, the AWS Program includes evaluating and supporting existing infrastructure and pursuing complementary infrastructure options to meet future water supply needs. Included in this category are one evaluation of conveyance to deliver new supplies, one simulation of a transfer that can provide insight into the feasibility of a new water supply and exchange opportunities, and one project to explore new ways of increasing supply or offsetting demand increases in San Francisco. Studies are underway to evaluate all these projects. Finally, there are also three additional water supply projects that would require partnerships with Irrigation Districts on the Tuolumne and/or Stanislaus Rivers (referred to here as upcountry projects). These projects may be analyzed in the coming months, in conjunction with negotiation efforts with the State on the Bay Delta Water Quality Control Plan (Bay-Delta Plan). The upcountry projects are described in these quarterly reports, and more information will be provided on their development as it becomes available.

The SFPUC is still in the early stages of planning and significant uncertainties about cost, volume and timing of supply availability remain. However, all the projects under consideration will require significant capital investments and ongoing operations and maintenance support. Storage projects can provide significant water supply volume and can be operated to maximize dry year deliveries when the SFPUC's anticipated needs are greatest, but they require water supply. Desalination and potable reuse projects offer supplies in the range of 5-12 mgd each, but will likely have significant permitting, water rights and other regulatory considerations. They are also more difficult to operate intermittently for dry year supply. The lowest-cost projects being considered will likely be the non-potable supply projects, but non-potable demands are increasingly limited, particularly in San Francisco. The tradeoffs associated with projects and other technical, institutional, operational, and financial considerations will continue to be studied and reported on through the planning phase of project development for the AWS projects.

The relative volume and cost of the alternative water supply projects are shown in **Figure 6** below. Purple dots represent non-potable supply projects, blue dots represent potable supply projects, and yellow dots represent storage projects.

Figure 6. Relative Volume and Cost of Alternative Water Supply Projects



3.3 Planning Needs, Priorities and Service Objectives

(Updated December 2021)

The need to pursue the various alternative water supply options stems from the significant water supply needs that the SFPUC faces within the planning horizon and because traditional supplies are increasingly limited. While these needs will continue to evolve over time, our adaptive planning approach is focused on being able to explore and plan a diverse set of water supply options to meet needs when they arise while continuing to provide reliable and sustainable water supply to all our retail and wholesale customers.

Among the water supply needs before the SFPUC, the most significant is represented by the need to make up for new instream flow requirements on the Tuolumne River. In December of 2018, the State Water Resources Control Board (State Board) adopted amendments to the Bay-Delta Plan. For the SFPUC, the effect of this action is a requirement to leave 40% of unimpaired flows in the Tuolumne River to achieve fishery improvements in the Bay-Delta system. SFPUC staff determined that the impact of this new flow requirement in the Tuolumne River would be a reduction in available water supplies by approximately 93 mgd during dry years at the current contract levels of demand.

The SFPUC is pursuing litigation against the State Board and is simultaneously seeking a compromise solution through a Voluntary Agreement with the State of California. In the meantime, water supply projects take years and even decades to plan and implement. Complexities of implementing alternative water supply projects can require even longer lead times for planning than traditional water supply projects. Thus, there is an urgency to plan new water supply opportunities that provide dry year reliability so that we can continue to meet our highest priority needs and our LOS Goals and Objectives.

In our planning framework, water supply needs will be met in the order of priority. These planning priorities, which were first articulated for the Commission in August 2016, have been slightly modified over time and are expressed as follows:

1. Offset instream flow needs and meet regulatory requirements (*obligatory*)
2. Meet existing obligations to existing permanent customers (*obligatory*)
3. Make current interruptible customers permanent (*policy decision*)
4. Meet increased demands of existing and interruptible customers (*policy decision*)

In conjunction with these planning priorities, the SFPUC considers how well we can achieve our LOS Goals and Objectives related to water supply and sustainability when considering new water supply opportunities. The key LOS Goals and Objectives relevant to this effort can be summarized as:

- Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts
- Diversify water supply options during non-drought and drought periods
- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers
- Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat
- Maintain operational flexibility (although this LOS Goal was not intended explicitly for the addition of new supplies, it is applicable here)

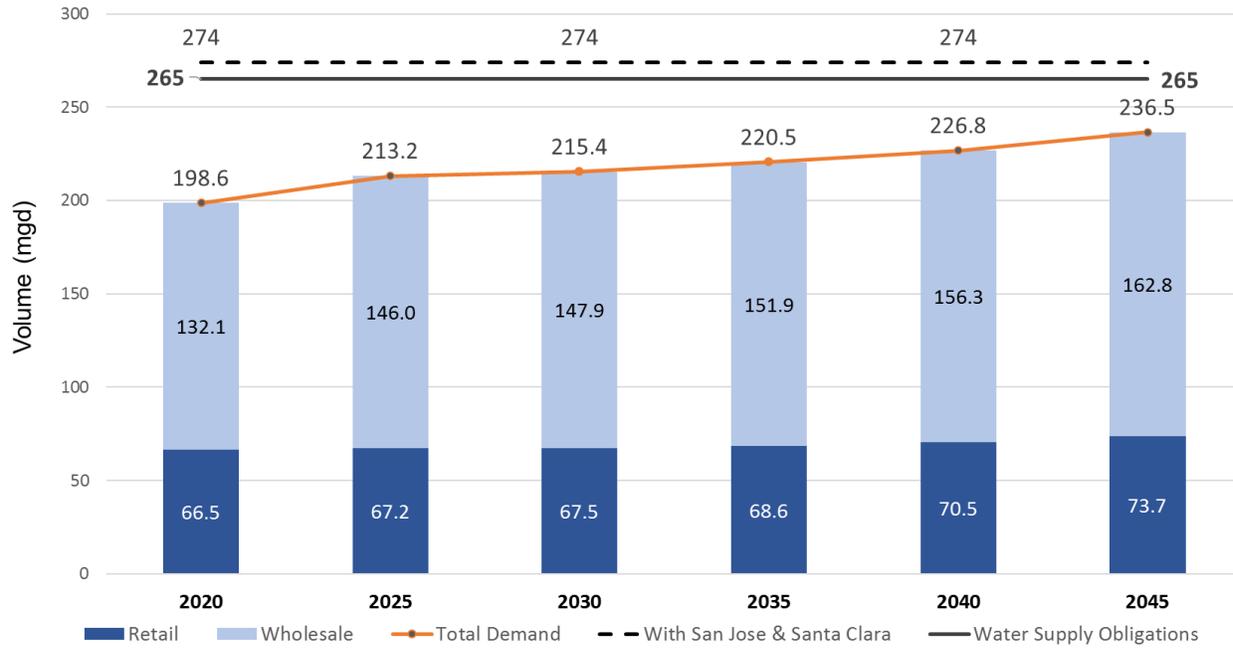
Together, the planning priorities and LOS Goals and Objectives provide a lens through which we consider the water supply options and opportunities as we strive to meet all our foreseeable water supply needs.

3.3.1 Planning Objectives

Consistent with the SFPUC's LOS Goals and Objectives, the AWS Program aims to plan for and develop new capital projects that can ensure the delivery of reliable water service to its customers throughout the planning horizon. Maintaining reliable water service includes balancing water demands with supply availability, and it also includes having the necessary treatment, conveyance, storage, and distribution infrastructure to support water supply deliveries.

On the demand front, the SFPUC has contractual obligations to provide 184 mgd (Supply Assurance) to Wholesale Customers. Similarly, the SFPUC provides 81 mgd to retail customers. Together, this represents 265 mgd of water supply delivery obligations. San Jose and Santa Clara, interruptible customers of the SFPUC, have requested a minimum permanent supply of 9 mgd and up to 15.5 mgd of dedicated supply. The Commission will have to make a policy decision by 2028 on whether to provide this new supply assurance. For planning purposes, the AWS Program includes 9 mgd for San Jose and Santa Clara, enabling the Commission to make this commitment in the future. **Figure 7** below shows the current and potential future obligations, as well as demand projections consistent with the SFPUC's 2020 Urban Water Management Plan.

Figure 7. SFPUC’s Water Supply Obligations and Projected Demands



Meanwhile, other uncertainties remain on the supply side of the equation. Based on the SFPUC’s system modeling, the Regional Water System would be able to deliver 257 mgd in 2045 under planned drought conditions and current water supply policies, including rationing. Implementation of the Bay Delta Water Quality Control Plan (Bay-Delta Plan), as adopted, would reduce supply availability during droughts by 93 mgd. Changes in precipitation associated with climate change, new permitting requirements and regulations, and future curtailments are additional factors that can affect supply availability within the planning horizon. These supply-side uncertainties can also trigger the exploration of new water supplies.

3.3.2 Planning Approach: Plan for Obligations, Build for Demands

Recognizing that through the 2045 planning horizon 1) projected demands are lower than the SFPUC’s obligations and 2) there are uncertainties around supply availability, the AWS team is developing a stepwise planning approach to meet customer obligations and implement new projects. It is important to note that while the SFPUC must prepare to meet its obligations by identifying feasible water supply and associated capital improvement projects, implementation of these large infrastructure projects may be deferred until the need is more imminent for the SFPUC to meet delivery needs. Through the planning process, key decision points for each project must be identified with an understanding of its own risks and benefits, so that the SFPUC can make informed decisions at multiple points within the project on whether and how to proceed. With this adaptive approach, the SFPUC can minimize the financial and operational risks of overcommitting or having insufficient water supplies to fill the gap between demand and supply as both continue to evolve.

Developed in line with this framework, the focus of the current planning effort and the AWS Program is on meeting water supply needs that are evaluated based on the contractual obligations, projected demands, and the available supplies. With the variability in the obligations and projected demands, it is important for the AWS team to simultaneously, aggressively plan for obligations and advance those projects that will ensure that projected demands are met. The matrix below shows the water supply needs under different planning scenarios.

Planning for Obligations (2045) Drought Year	Obligations (mgd)		Available Water Supply (mgd)		Water Supply Needs (mgd)
	Obligations for Permanent Wholesale Customers, Anticipated Obligations for Interruptible Customers, and Retail Allocation	274	Water supply available with no new instream flow requirements	257	17
		Water Supply available with implementation of the Bay-Delta Plan and rationing	152	122	
Planning for Demands (2045) Drought Year	Demands (mgd)		Available Water Supply (mgd)		
	Projected Demands in the Retail and Wholesale Service Areas accounting for conservation, and offsets from onsite water recycling and non-SFPUC System supplies	236.4	Water supply available with no new instream flow requirements	257	-
		Water Supply available with implementation of the Bay-Delta Plan and rationing	152	84	

As shown in the matrix, the water demands account for the demand offsets or the reduction resulting from conserving water and implementation of onsite water recycling programs in San Francisco. The SFPUC provides comprehensive water conservation program services open to all residents and businesses in San Francisco by way of the following programs:

- The Innovations Program (described in Section 2) promotes exploration of new ways to conserve and reuse water, recover resources, and diversify water supplies.
- The Local Water Program provides conservation assistance, promotes recycled water to meet San Francisco’s most significant irrigation needs, mandates non-potable supplies for toilet flushing and irrigation in new developments and develops local groundwater to enhance the City’s drinking water supply sustainably now and into the future.
- The Onsite Water Reuse Program allows for the collection, treatment, and use of alternate water sources for non-potable applications in individual buildings and at the district-scale. Under the Non-potable Ordinance (NPO), onsite water reuse systems are required for new, large development projects in San Francisco. Recently amended in

2021, Article 12C of the San Francisco Health Code, the NPO requires new development projects of 100,000 gross square feet or more to install and operate an onsite water reuse system.

The SFPUC has implemented conservation programs to minimize both indoor and outdoor retail water demands, resulting in a per capita residential water consumption rate of 42 gallons per person per day, a rate that is half the statewide average. Although not a core part of AWS planning, the demand offsets are accounted for and updated as part of AWS Planning. Recent demand offsets are estimated at 1.9 mgd, i.e., an equivalent reduction in the retail demands.

With the adoption of the Bay-Delta Plan in 2018, the AWS team is proceeding with the assumption that it would be implemented. Although the flow volume may change with the Voluntary Agreement negotiations, the current water supply need to meet obligations is estimated to be 122 mgd. Under the same flow scenario, the water supply needed to meet projected demands is estimated to be 84 mgd.

With the central objective of meeting water supply needs, the planning approach for the AWS Program allows for a process that understands the range of estimated needs and supply availability in the context of uncertainties. It thus informs the different decisions from identifying and conceptualizing projects, planning them, to implementing or advancing them forward.

3.4 Making San Jose and Santa Clara Permanent Customers

Currently, the Cities of San Jose and Santa Clara are interruptible customers of the SFPUC. While the SFPUC has never interrupted water supply to San Jose and Santa Clara, the 2009 Water Supply Agreement (WSA) with the Wholesale Customers allows the SFPUC to issue a conditional notice of termination of supply if sufficient long-term water supplies from the RWS are not available. As customer demands increase and uncertainties loom regarding future water supply availability, San Jose and Santa Clara would like to become permanent customers of the SFPUC. Permanent status would give San Jose and Santa Clara the ability to guarantee water supply availability to support planned growth in the northern portion of each of these cities. For San Jose and Santa Clara to become permanent customers of the SFPUC, an additional 9 mgd of new, year-round supplies would be needed to meet historic demand levels and up to 15.5 mgd would be needed to meet planned demand through 2045. The 2045 water supply needs for the AWS Program account for the 9-mgd deliveries to San Jose and Santa Clara as part of anticipated wholesale customer obligations.

Customer	Historic Demand	Projected Demand
San Jose	4.5 mgd →	9 mgd
Santa Clara	4.5 mgd →	6.5 mgd

Under the 2009 WSA, as amended, the SFPUC is committed to making a decision about whether to make San Jose and Santa Clara permanent customers by December 31, 2028. In order to give San Jose and Santa Clara permanent status, the SFPUC would have to identify specific water supplies based on which to provide individual supply guarantees at the combined historic level of 9 mgd. Environmental review for the identified project(s) should be complete for the SFPUC to be able to select water supply alternatives to implement.

Through the evaluation of alternative water supplies, the SFPUC intends to identify supplies that can meet anticipated dry year needs and help the SFPUC Commission make a policy decision regarding permanent status for San Jose and Santa Clara by 2028.

3.5 New Alternative Water Supplies

While the RWS will remain the backbone of the SFPUC's wholesale and retail supply into the future, stresses on that system and new water supply needs require that we consider alternative water supplies and creative and sustainable new solutions within the planning horizon to remain resilient and fully meet our needs. In addition to the opportunities identified, SFPUC staff are also continuing to seek more options. The new supply categories that are being used for the AWS planning effort are described in the paragraphs below.

Storage (volume dependent on supply availability and conveyance). Both surface water and groundwater storage provide opportunities to hold water when we have it so that it can be available when we need it most (dry years). The amount of water storage we can use is dependent on the amount of additional supplies that could be secured as well as the capacity of the conveyance facilities that connect storage to our distribution system. The Calaveras Reservoir Expansion Project and the Los Vaqueros Reservoir Expansion (LVE) Project would provide new storage opportunities. The Daly City Recycled Water Expansion Project would offset groundwater pumping in Colma, leaving more groundwater in the South Westside Basin, supporting the reliability of the ongoing Groundwater Storage and Recovery (GSR) Project during dry years. In addition, the SFPUC is exploring opportunities for inter-basin collaborations and regional groundwater banking in the Tuolumne River watershed. Expanding the capacity of Hetch Hetchy Reservoir was considered but is not being pursued in the planning horizon at this time.

Dry Year Transfers (~2 mgd). A transfer of water from another agency utilizing existing facilities during dry years would be an ideal way to efficiently utilize existing water supplies. However, during droughts is when there is a significant shortage in water supply, so securing dry year transfers has proven difficult in the past due to institutional complexities. We are continuing to pursue all feasible opportunities.

Purified Water (Potable Reuse) (~10-25 mgd). Potable reuse is the process by which treated effluent from a wastewater treatment plant undergoes advanced treatment, including

filtration, reverse osmosis, disinfection, and advanced oxidation, to produce purified water (the product) that can be compared to drinking water standards. Depending on the nature of the project, this purified water can be used to augment surface water supplies, recharge a groundwater basin, or be blended in a drinking water reservoir for direct distribution. The latter form of potable reuse (treated water augmentation) is not yet regulated, but expected to be in 2023. Several utilities in California are considering purified water projects.

Unlike dry year transfers or storage projects that can enhance drought period reliability, potable reuse projects are generally designed to be operated in all years, including wet/normal years when use and storage capacity for that water may be limited or unavailable. As we pursue these projects, SFPUC staff continue to look for design and technology solutions for intermittent or scalable use.

Desalination (~5-15 mgd). The Brackish Water Desalination Project could provide 5-15 mgd of new supply for the SFPUC. The proposed project would be located in East Contra Costa County with partners including CCWD, Zone 7 Water Agency and Valley Water. East Bay Municipal Utility District (EBMUD) and ACWD may also participate in the project. Like potable reuse projects, a regional desalination project would likely need to be operated year-round to maintain the integrity of the treatment systems unless scalable design or technology solutions are identified. However, developed in conjunction with the LVE Project, this project could be used to provide greater dry year supply reliability.

3.5.1 Water Supply Programs not included in the AWS Program

(Updated December 2021)

In 2008, the SFPUC Commission adopted the Phased Water Supply Improvement Program (WSIP), a variant of the proposed WSIP Program that included 10 mgd of conservation, recycled water and groundwater in San Francisco, and 10 mgd of conservation, recycled water and groundwater in the wholesale service area.

San Francisco is implementing its 10 mgd increment of local supply through the Local Water Supply Program. The program includes the San Francisco Groundwater Supply Project to augment San Francisco's retail water supply with local groundwater, and several recycled water projects, including the Westside Enhanced Water Recycling Project, to provide non-potable water for irrigation.

Individual wholesale customers have implemented active conservation programs in their service areas to maintain low per capita use and are similarly investing in groundwater and water recycling programs to offset potable demands. The SFPUC does not track non-RWS supplies in the wholesale service area; however, we share best practices and coordinate on planning and messaging through BAWSCA and common planning efforts.

It's important to note that the projects identified to meet the 10 mgd local water supply commitments under WSIP were being planned well before the new water supply needs of 84 mgd to 122 mgd were identified; therefore, they do not count toward meeting the current water supply needs that are the focus of the AWS Program.

3.6 Planning for Implementation

If all the projects identified through the SFPUC's current AWS planning process to date could be implemented, there would still be a supply shortfall to meet dry year demands with San Jose and Santa Clara all-year water supply needs included. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect our ability to implement it.

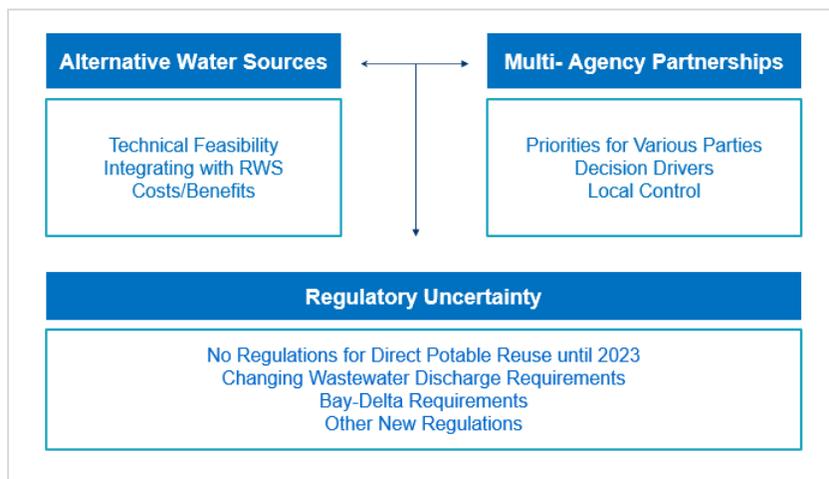
Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project, partnership and policy opportunities that can help bridge the anticipated water supply gaps. In 2019 a survey was completed among water and wastewater agencies within the SFPUC service area to try to identify additional opportunities for purified water. Such opportunities remain limited, but staff continue to pursue all possibilities, and water supply options identified here may be augmented over time.

3.7 Trends and Risks

Of the regional⁵ water supply options being considered, there is only one (Calaveras Reservoir Expansion) that does not involve multi-party partnerships with institutional complexities. In all other cases, the SFPUC relies on our partner water and wastewater utilities to move forward due to jurisdictions over water sources or infrastructure. Therefore, other agencies' priorities, decision-making processes, funding, and other constraints are also factors in the feasibility, cost, and schedule of these regional projects (**Figure 8**).

⁵ Outside the SFPUC's retail service area.

Figure 8. Special Considerations for the Alternative Water Supply Program



Another risk facing some of the projects is regulatory uncertainty. While the State Board has adopted regulations for some forms of potable reuse, including groundwater injection and surface water augmentation, it has yet to pass regulations concerning direct potable reuse (DPR). Without clear regulatory guidance, projects with DPR components are at risk due to uncertainties concerning water quality criteria, treatment technologies, and overall feasibility.

3.8 Timeframe

Planning remains in the early stages for the proposed Alternative Water Supply projects. Given the level of complexity and uncertainty, project implementation is expected to take between 10 and 30 years. As planning continues, the timing of water supply needs will be taken into account such as implementation of Bay-Delta Plan requirements during the next drought or the decision by 2028 to make San Jose and Santa Clara permanent customers.

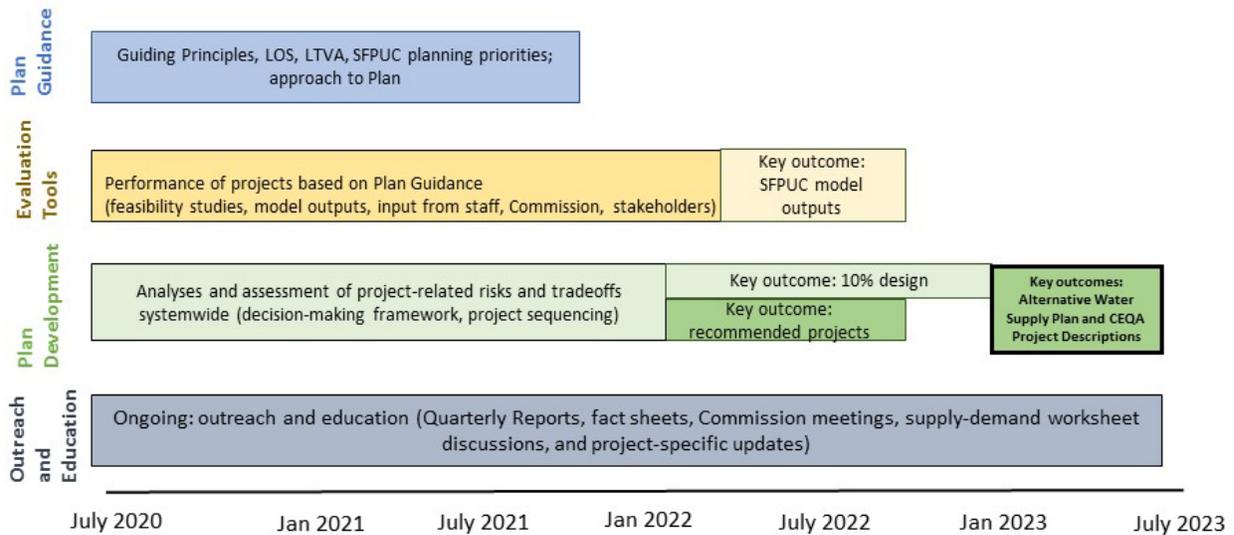
3.9 Moving Toward Environmental Review

As with traditional infrastructure projects, there is a need to progress systematically from planning to environmental review, and then on to detailed design, permitting and construction of these alternative water supply projects. Given the complexity and inherent challenges described in the previous sections, these projects will require a long lead time to develop and implement. However, the SFPUC’s dry year needs may be imminent and decisions to make San Jose and Santa Clara must be made by 2028.

SFPUC staff have developed an approach and timeline to substantially complete planning and initiate environmental review by July 2023 (**Figure 9**) for a majority of the alternative water supply projects under consideration. This approach will allow sufficient time for environmental

review so that decisions about the permanent status of San Jose and Santa Clara can be made by 2028.

Figure 9. Alternative Water Supply Plan Development Process

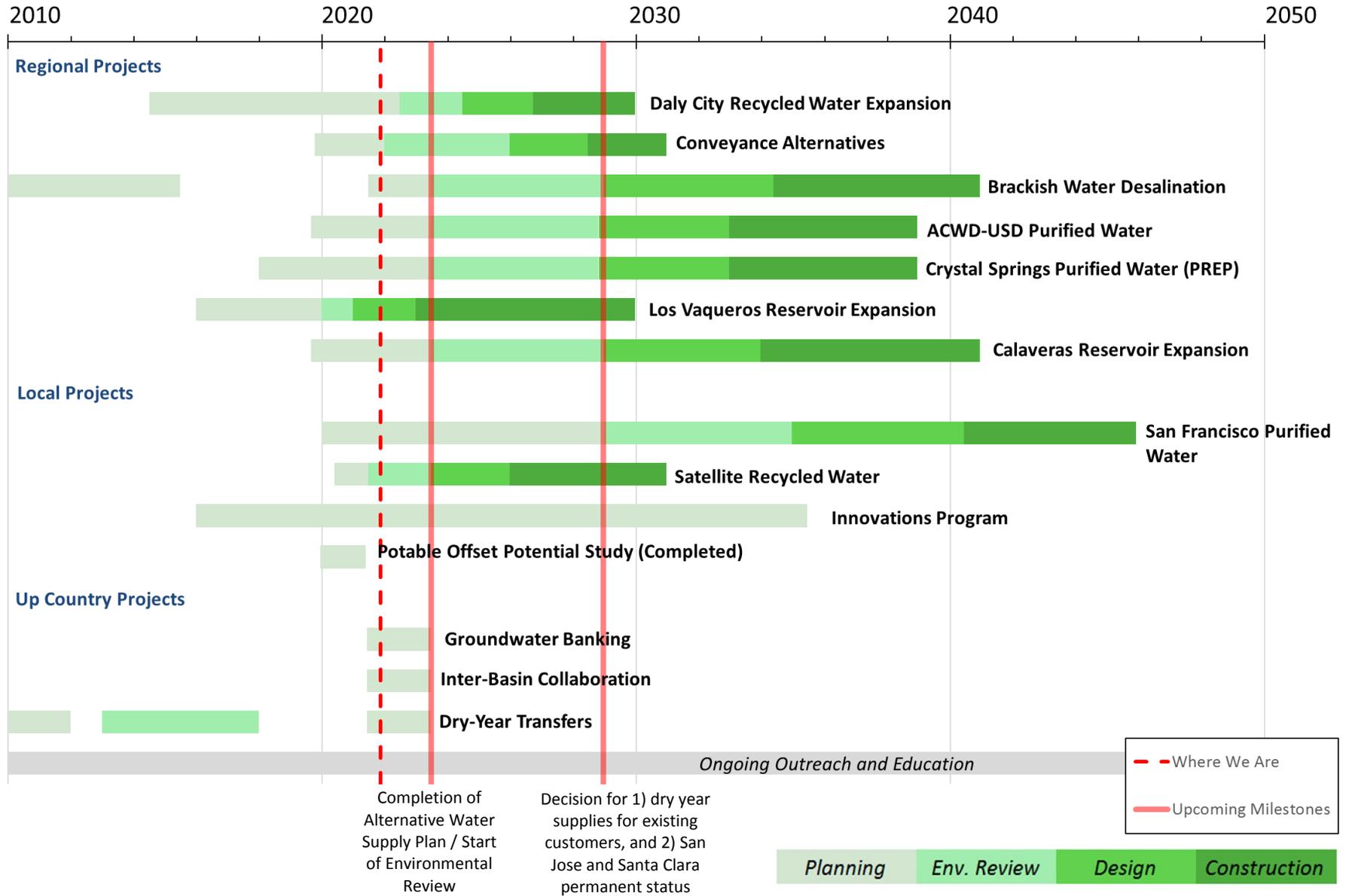


Although individual project evaluations and regular reporting and coordination are already underway, there is a need for a cohesive Alternative Water Supply Plan (AWS Plan) that ties together the planning objectives, assumptions and approach to guide the planning and evaluation process ahead of significant project development decisions by the Commission. As shown in **Figure 9** above, the AWS Plan will be developed concurrently with ongoing project-level feasibility analyses and program reporting and outreach.

Typically, a minimum of 10 percent design is needed to obtain the level of project detail required to begin preparation of an environmental document. To achieve this, the SFPUC will need to work closely with its partners to complete the feasibility phase of the projects and make decisions about which projects to pursue no later than 2023. The Los Vaqueros Reservoir Expansion (LVE) Project is an exception to this schedule because of external project drivers. In this case, the SFPUC decided to continue to participate in planning and design in September of 2020 and will need to decide whether to participate in the broader project implementation by December 2021. SFPUC staff are working toward having necessary project planning information and Plan guidance in place in time for the Commission to make an informed decision.

A high-level schedule overview of each alternative water supply project is shown on the next page.

Proposed Programmatic Schedule



3.10 Staffing

In order to advance the planning for several of these Alternative Water Supply projects expeditiously, the SFPUC has established a new group within the Water Resources Division, and a manager for this group was hired in December of 2020. In February and March of 2020, two new project managers were hired to focus on the detailed project-specific regional planning efforts underway, and a third project manager was added to the team in June 2021 to focus more resources on the development of the AWS Plan by 2023.

3.11 Water Supply Task Force

Success in planning water supply projects will ultimately depend on our ability to operate and integrate these new supplies into our existing water supply network. This goal is even more challenging when the new water supplies are from very different sources than our existing surface water and groundwater supplies.

To advance these Alternative Water Supply projects in a thoughtful way, the SFPUC has established a Water Supply Task Force within the SFPUC that brings together a cross-functional group including planning, policy, environmental management, operations, water quality, finance, legal, and communications resources. Through early and frequent communications on all of the proposed projects, this group helps to anticipate long-term risks and challenges and address them early in the planning process. The Water Supply Task Force convenes every two weeks and has continued to do so remotely since March 2020.

3.12 Funding and Expenditures

(Updated December 2021)

Funding of \$17 million was encumbered for regional projects for the current fiscal year 2020-2021. For local projects, \$4.3 million in funding is currently available to pursue exploration and planning for reuse.

The regional funds are aimed at completing planning studies for the Daly City Recycled Water Expansion Project, Crystal Springs Purified Water Project, ACWD-USD Purified Water Project, LVE Project, and Conveyance Alternatives. We anticipate that we will move into the design phase of the Daly City Recycled Water Project (unless a non-recycled water alternative is preferred after an alternatives analysis) and if conveyance is not a barrier, we could enter into Service Agreements and participate in a JPA for the construction and implementation of the LVE Project. The level of funding sought in this period assumes we will be in a position to continue to move forward on all of the current planning efforts.

3.13 Professional Services Contracts

The Water Resources Division is managing two as-needed joint venture contracts with a capacity of \$4 million each with 1) Carollo Engineers and Water Resources Engineering (WRE) and 2) Woodard and Curran and SRT Consultants. Some of the capacity in these contracts will be used for planning studies associated with the Alternative Water Supply program, as needed to meet planning objectives. These vehicles enable the SFPUC to move quickly to evaluate specific planning needs. If necessary, other as-needed contracting capacity through the Water Enterprise may also be available. We are currently working through a Water as-needed contract to conceptualize an alternative intertie with EBMUD and completing work to report the results of PureWaterSF through another contract. We anticipate utilizing additional professional services support to advance planning efforts.

3.14 Adapting to an Uncertain Future

The AWS Program is intended to identify, screen and plan for new alternative water opportunities that can help meet the SFPUC's foreseeable water supply needs over the planning horizon. Recognizing that these projects would introduce new sources of supply and require new partnerships, this program necessarily requires an integrated and holistic planning approach, both within the SFPUC and with external partners. Given the uncertain nature of planning needs, it also requires some built-in adaptability and flexibility. As this section described, the AWS Program has the infrastructure and resources needed to continue to plan in a changing environment.