

WATER SHORTAGE CONTINGENCY PLAN

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**Purissima Hills
Water District**
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LIST OF ABBREVIATIONS

AF	Acre-Feet
AFY	Acre-Feet per Year
Annual Assessment	Annual Water Supply and Demand Assessment
BAWSCA	Bay Area Water Supply and Conservation Agency
CWC	California Water Code
DEOP	Division Emergency Operations Plans
District	Purissima Hills Water District
DRA	Drought Risk Assessment
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utilities District
EOP	Emergency Operations Plan
FY	Fiscal Year
ISG	Individual Supply Guarantee
ISL	Interim Supply Limitation
LOS	Levels of Service
MGD	Million Gallons per Day
MJ-LHMP	Multi-Jurisdictional Local Hazard Mitigation Plan
RWS	Hetch Hetchy Regional Water System
SB	Senate Bill
SFPUC	San Francisco Public Utilities Commission
SWRCB	State Water Resources Control Board
Tier 1 Plan	Tier 1 Water Shortage Allocation Plan
Tier 2 Plan	Tier 2 Drought Response Implementation Plan
UWMP	Urban Water Management Plan
Valley Water	Santa Clara Valley Water District
Water ERP	Water System Emergency Response Plan
WSA	Water Supply Agreement
WSCP	Water Shortage Contingency Plan
WSDA	Water Supply and Demand Assessment
WSIP	Water System Improvement Program

1. INTRODUCTION

1.1 Planning for Water Shortages

A Water Shortage Contingency Plan (WSCP) is a strategic planning document design to prepare for and respond to a drought, water supply reductions, failure of a water distribution system, or other emergencies. California Water Code (CWC) Section 1063 requires every urban water supplier shall prepare and adopt a WSCP as part of its Urban Water Management Plan (UWMP). Purissima Hills Water District (the District) does not meet the definition of an urban water supplier, which serves more than 3,000 service connections or deliver more than 3,000 acre-feet (AF) of water in a year. The District currently has 2,201 accounts.

However, the District does need to comply with Senate Bill (SB) 552 which requires small water suppliers, which are defined as serving 1,000 to 2,999 service connections, to develop and maintain an abridged WSCP that includes specified drought-planning elements. The District has opted to prepare a WSCP that not only meets the requirements outlined in SB 552, but to prepare it so that it also meets the requirements set out for urban water suppliers. Thus, the District consulted the California Department of Water Resources (DWR) 2020 UWMP Guidebook during the preparation of this WSCP.

The WSCP outlines a plan for how the District intends to act in case of an actual water shortage condition. A water shortage may occur due to a number of reasons, such as population growth, climate change, drought, or catastrophic events. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. Drought, regulatory action constraints, and natural and man-made disasters may occur at any time. This WSCP is the District's operating manual that is used to prevent catastrophic service disruptions through proactive, rather than reactive, management. If and when shortage conditions arise, this WSCP allows the District's Board of Directors, its staff, and its customers to identify and efficiently implement pre-determined steps to manage a water shortage. The WSCP is a standalone document, meaning it can be created and amended as needed.

1.2 Water Shortage Contingency Plan Components

This WSCP serves as a guide for the District's intended actions during water shortage conditions to assure quick, adequate response in managing and mitigating possible water shortages. The WSCP provides the steps and water shortage response actions to be implemented in times of water shortage conditions. Specifically, this WSCP includes the following chapters:

- Section 1 – Introduction and Overview
- Section 2 – Background Information
- Section 3 – Water Supply Reliability Analysis
- Section 4 – Annual Water Supply and Demand Assessment Procedures
- Section 5 – Shortage Response Actions and Communication Protocols

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- Section 6 – Compliance Enforcement and Legal Authorities
 - Section 7 – Financial Consequences of WSCP Activation
 - Section 8 – WSCP Refinement Procedures, Plan Monitoring, and Adoption
 - Section 9 – References

1.3 Integration with Other Planning Efforts

The District is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA), which provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies that purchase wholesale water supplies from the San Francisco Public Utilities Commission (SFPUC). While the District does not receive water supply from Santa Clara Valley Water District (Valley Water), the District is represented on the Valley Water Commission. The District has considered other key entities in the development of this WSCP, including planning efforts by the SFPUC and Valley Water.

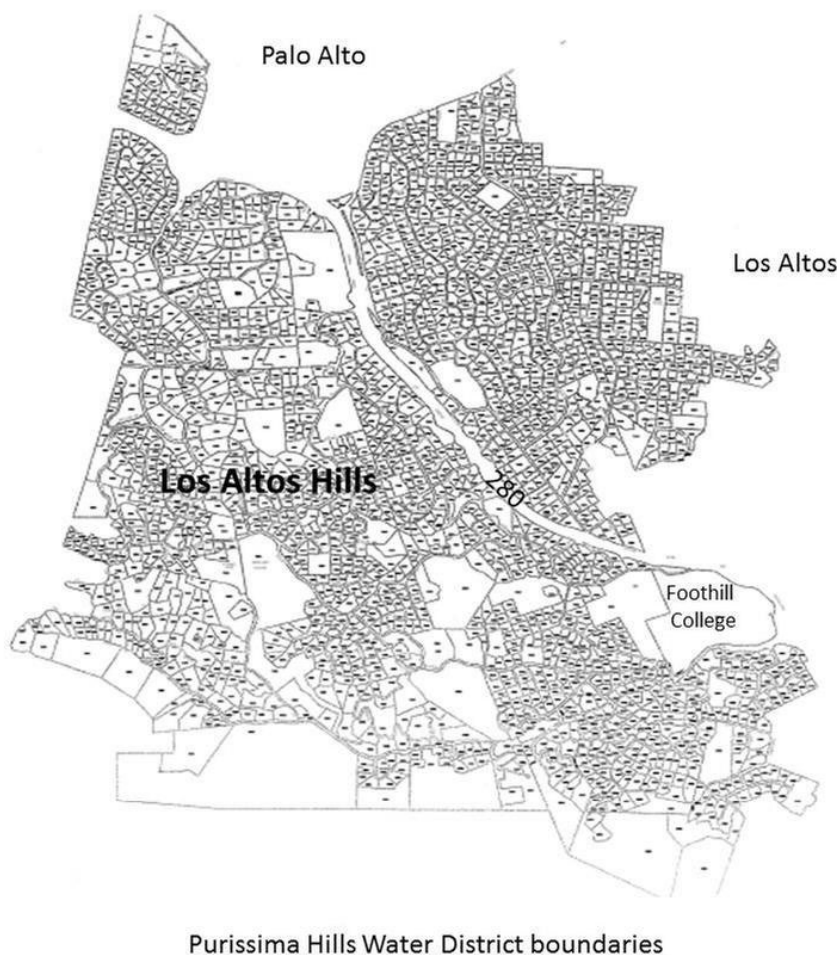
2. BACKGROUND INFORMATION

2.1 Purissima Hills Water District

The District is a community-governed public agency located in the Town of Los Altos Hills, a rural community adjacent to the City of Palo Alto, an unincorporated county land on the southern boundary. The District is governed by an elected Board of Directors comprised of five members. A General Manager oversees District operations performed by two office staff, an Operations Manager, and four field crew.

The District currently serves drinking water to approximately 6,200 residents in Los Altos Hills. A map of the District's service area is provided in **Figure 2-1**.

Figure 2-1 District Service Area (PHWD, 2021)



2.2 San Francisco Public Utilities Commission

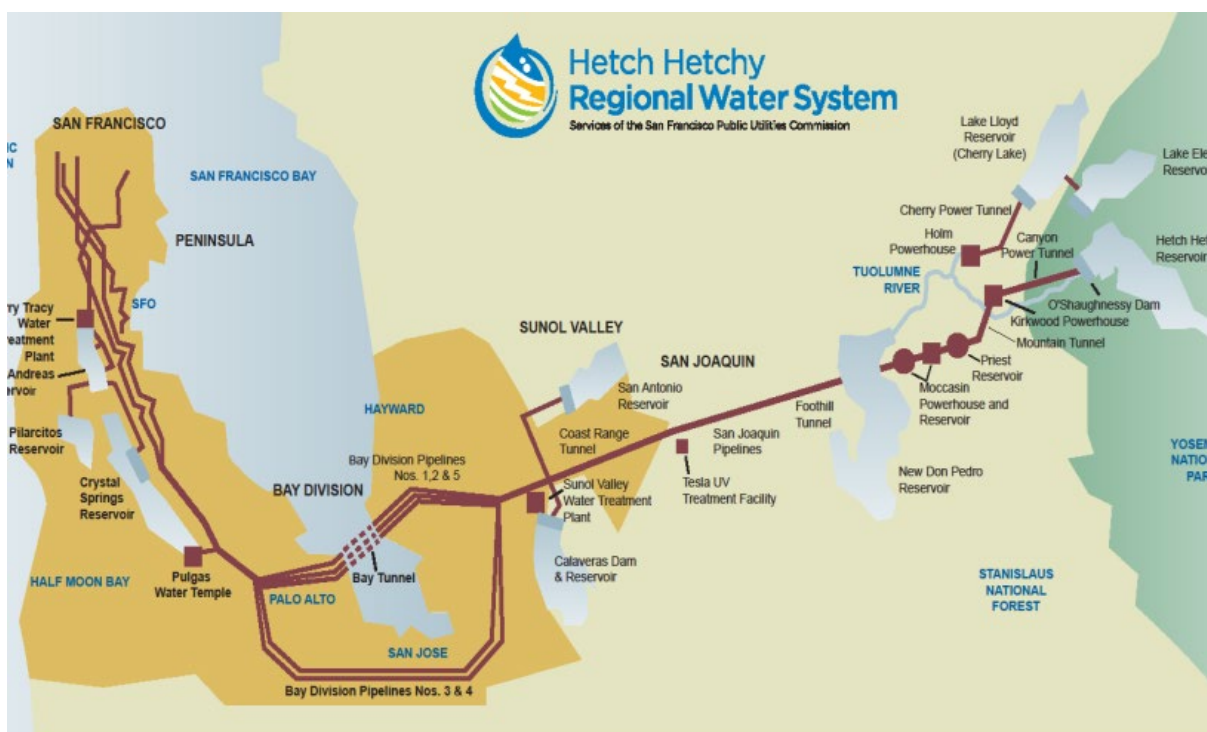
The District purchases 100% of its water supply from two San Francisco/Hetch Hetchy turnouts operated by the SFPUC. The RWS consists of more than 280 miles of pipelines, 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants. SFPUC's primary water supply originates from the Tuolumne watershed and from local reservoirs in the Alameda and Peninsula watersheds.

The SFPUC provides drinking water to over 2.7 million residents and businesses across Southern Alameda, Northern Santa Clara, San Mateo, and San Francisco counties. The SFPUC operates the Hetch Hetchy Regional Water System (RWS), which supplies high-quality drinking water from the Tuolumne River watershed and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85% of its supply from the Tuolumne River watershed, collected in Hetch Hetchy Reservoir. This water feeds into an aqueduct system delivering water 167 miles by

gravity to Bay Area reservoirs and customers. The remaining 15% of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The exact split between these resources varies from year to year depending on the water year hydrology and operational circumstances. A complete description of the SFPUC RWS is available in Section 3.1 of SFPUC's 2020 UWMP.

Details of the components of the RWS are shown in **Figure 2-2**.

Figure 2-2 SFPUC Regional Water System Schematic (SFPUC, 2021)



2.2.1 Water Supply Agreement

The SFPUC sells water to 26 of its 28 wholesale customers under the terms of the 25-year contract known as the Water Supply Agreement (WSA) between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County and associated individual water sales contracts with each Wholesale Customer. The WSA carries forward the SFPUC's "Supply Assurance" of 184 million gallons per day (MGD) to the Wholesale Customers. The SFPUC has agreed to deliver water to the Wholesale Customers up to the amount of the Supply Assurance, and this agreement is perpetual and survives the expiration of the WSA. The Supply Assurance is, however, subject to reduction due to water shortage, drought, scheduled RWS maintenance activities, and emergencies. The WSA also describes the temporary limitation on water sales established by the Phased Water System Improvement Plan (WSIP) in 2008. This "Interim Supply Limitation" limits water sales from the RWS to an average annual amount of 265

MGD. The WSA allocates the ISL between the SFPUC's retail customers and Wholesale Customers as follows:

- Wholesale supply allocation: 184 MGD
- Retail supply allocation: 81 MGD²

Of the wholesale supply allocation, the District's Individual Supply Guarantee (ISG) is 1.62 MGD.

2.2.2 Relationship with SFPUC Water Shortage Planning

This WSCP is designed and developed to be consistent with the SFPUC's water shortage planning, including their UWMP and WSCP.

2.2.3 SFPUC Water Supply Reliability

The SFPUC fully describes its water supply reliability during normal and dry years in its most recent UWMP, which can be found here: <https://sfpuc.org/about-us/policies-plans/urban-water-management-plan>.

Section 7 of SFPUC's 2020 UWMP describes the reliability of the RWS and local supplies to meet retail and wholesale demands through the year 2045. Section 7.3 describes several factors affecting future RWS supplies, including the adoption of the Bay-Delta Plan. The Bay-Delta Plan is the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, which establishes water quality control measures and flow requirements needed to provide reasonable protection of beneficial uses in the watershed.

In December 2018, the State Water Resources Control Board (SWRCB) adopted amendments to the Bay-Delta Plan. The amendments to the Bay-Delta Plan requires the release of 30-50% of the "unimpaired flow" on the three tributaries from February through June in every year type. In the SFPUC modeling of the new flow standard, it is assumed that the required release is 40% of unimpaired flow. If the Bay-Delta Plan Amendment is implemented, the SFPUC will be able to meet the projected water demands in normal years but would experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Amendment will require rationing in all single dry years and multiple dry years. Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water service reliability assessment presented in Section of SFPUC's UWMP looks at two future supply scenarios, both with and without implementation of the Bay-Delta Plan Amendment.

Section 8 of SFPUC's 2020 UWMP describes the projected retail and wholesale supplies and demands during normal, single dry, and multiple dry years with and without the implementation of the Bay Delta Plan Amendment.

With the Bay-Delta Plan Amendment:

-
- During normal years, the SFPUC will have adequate supplies to meet its projected retail and wholesale water demands.
 - During single dry years, the SFPUC estimates a retail supply shortfall of 14% to 25% and a wholesale supply shortfall of 36% to 46%.
 - During multiple dry years, the SFPUC anticipates up to 54% shortfalls for its wholesale customers and a shortfall up to 35% for its retail customers.

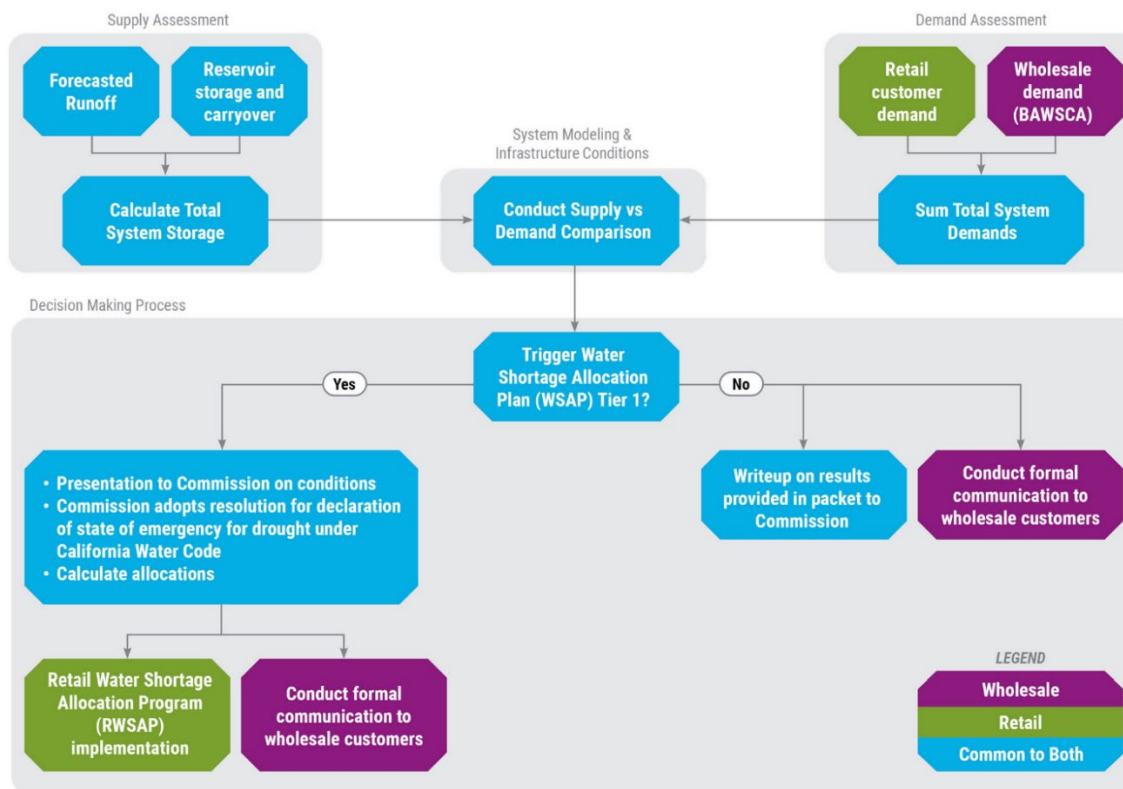
Without the Bay-Delta Plan Amendment:

- During normal water years, the SFPUC will have adequate supplies to meet its projected retail and wholesale water demands.
- During single dry years, there are no anticipated shortages of RWS supplies.
- During multiple dry years, SFPUC projects a 15% shortfall for its wholesale customers and a 5% shortfall for its retail customers.

2.2.4 SFPUC Water Shortage Contingency Plan

The District is alerted to a shortage in its supplies when the SFPUC makes a formal announcement about a water shortage in its RWS, otherwise known as a system-wide shortage. A Wholesale Customer Annual Meeting is held in the last week of February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to the District summarizing the water supply availability for the coming year. The overall process is described in **Figure 2-3**.

Figure 2-3 Water Supply & Demand Assessment Process



2.3 Tier 2 Drought Response Implementation Plan (Tier 2 Plan)

The Tier 2 Plan allocates water made available by the SFPUC among the wholesale customers during shortages caused by drought. This Plan is adopted pursuant to Section 3.11.C of the July 2009 WSA between the SFPUC and wholesale customers. The Tier 2 Plan applies when the SFPUC determines that a system-wide water shortage of 20 percent or less exists, as set forth in a declaration of water shortage emergency adopted by the SFPUC pursuant to CWC Sections 350 *et seq.* The Tier 2 Plan applies only to water acquired and distributed by the SFPUC to the Wholesale Customers and has no effect on water purchased or obtained by a wholesale customer from any source other than the SFPUC.

The Tier 2 Plan is intended to be integrated with the Tier 1 Water Shortage Allocation Plan (Tier 1 Plan). The Tier 1 Plan: provides for the allocation by the SFPUC of water between SFPUC retail (in-city customers) and the Wholesale Customers collectively during system-wide water shortages of 20 percent or less; contemplates the adoption by the Wholesale Customers collectively among the 26 individual Wholesale Customers; commits the SFPUC to implement this Plan; and provides the transfer of both banked water and shortage allocations between and among the Wholesale Customers and commits the SFPUC to implement such transfers.

The Tier 2 Plan allocates water among Wholesale Customers in proportion to each Wholesale Customer's Allocation Factor. The Wholesale Customer Allocation Factors will only be calculated

at the onset of a drought and will remain the same until the SFPUC declares the shortage condition over. The Wholesale Customer Allocation Factors will be recalculated during subsequent shortage periods for use during those specific periods.

BAWSCA is initiating development of a new Tier 2 Plan beginning in January 2022. The Tier 2 Plan update process will also consider whether to extend the Tier 2 Plan's applicability to shortages greater than 20 percent.

3. WATER SUPPLY RELIABILITY ANALYSIS

This section provides an analysis of water supply reliability and the circumstances that may create a shortage condition for the District's water supply. In preparation of this WSCP, the District conducted a water supply reliability assessment, which includes estimates of SFPUC water supply to the District and associated cutback percentages for a range of potential near-term and long-term hydrologic conditions and regulatory scenarios. This assessment is available in **Appendix A**.

3.1 Water Supply

The District is 100% reliant on the SFPUC RWS for its water supply. In fiscal year (FY) 2019-2020, the District purchased 1.75 MGD from the SFPUC RWS. These purchases represent 1.3% of the 132.23 MGD purchases from the SFPUC by Wholesale Customers (BAWSCA agencies) in FY 19-20 (BAWSCA, 2021). Based on the BAWSCA Regional Demand and Conservation Projections Report (2020), demand within the District's service area is projected to increase to 2.2 MGD (26%) by 2045, while population is estimated to increase 17% (see **Table 3-1**).

In October 2021, Governor Gavin Newsom signed SB 9, the California Housing Opportunity and More Efficiency Act, which is intended to expand housing production in California. SB 9 streamlines the process for a homeowner to create a duplex or subdivide an existing lot in residential areas. A recent study conducted by the University of California, Berkely concluded that approximately 700,000 additional new units would become market-feasible as a result of SB 9 (Metcalf, Garcia, Carlton, and Macfarlane, 2021). With potential impacts from SB 9, actual demand growth may trend higher than projected.

Table 3-1 District Demand and Population Projections

	<i>Actual</i>	<i>Projected</i>				
	2020	2025	2030	2035	2040	2045
Population	6,150	6,833	6,898	7,025	7,112	7,199
Demand, before Conservation Savings (MGD)	---	2.1	2.1	2.2	2.2	2.2
Demand, with Passive and Active Conservation Savings (MGD)	1.75	2.1	2.1	2.1	2.1	2.2

Source: (BAWSCA, 2020)

As mentioned in Section 2.2.1 of this WSCP, the District's ISG is 1.62 MGD. This is a permanent supply guarantee which extends beyond the WSA term. In normal years, the District's ISG is assumed to be the available supply. In drought years, the available supply is what the SFPUC has communicated to the District and BAWSCA after it completes its Annual Water Supply and Demand Assessment. However, the District is currently purchasing above its ISG. In FY 2019-2020, the District purchased 1.75 MGD from the RWS and is projected to see demands even further

exceed its ISG with continued population growth. According to the Tier 2 Plan, each agency's total annual purchases from the SFPUC will be compared to its ISG, with any annual purchases above its ISG subtracted from the agency's total annual SFPUC purchases prior to calculating its allocation. As a result, the District will experience more significant shortfalls in future droughts as demands further exceed ISG.

3.2 Water Supply Reliability

The amount of water available from the SFPUC's RWS is affected by regulatory constraints on the Tuolumne River and additional reliability constraints.

3.2.1 Adoption of the 2018 Bay-Delta Plan Amendment

In December 2018, the SWRCB adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. The SWRCB is required by law to regularly review this plan. The adopted Bay-Delta Plan Amendment was developed with the stated goal of increasing salmonid populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the "unimpaired flow" on the three tributaries from February through June in every year type. In the SFPUC modeling of the new flow standard, it is assumed that the required release is 40% of unimpaired flow.

If the Bay-Delta Plan Amendment as currently written is implemented, the SFPUC will be able to meet the projected water demands presented in the SFPUC 2020 UWMP in normal years but would experience supply shortages in single dry and multiple dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years. The SFPUC has initiated an Alternative Water Supply Planning Program to ensure that San Francisco can meet its Retail and Wholesale Customer water needs, address projected dry years shortages, and limit rationing to a maximum 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate change. As the region faces future challenges – both known and unknown – the SFPUC is considering this suite of diverse non-traditional supplies and leveraging regional partnerships to meet retail and wholesale customer needs through 2045.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, over a dozen lawsuits have been filed in both state and federal courts, challenging the SWRCB's adoption of the Bay-Delta Plan Amendment, including a legal challenge filed by the federal government, at the request of the

U.S. Department of Interior, Bureau of Reclamation. This litigation is in early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implemented and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented through the water quality certification process set forth in Section 401 of the Clean Water Act as part of the Federal Energy Regulatory Commission's licensing proceedings for the Don Pedro and La Grange hydroelectric projects. It is currently unclear when the license amendment process is expected to be completed. This process and the other regulatory and/or adjudicatory proceedings would likely face legal challenges and have lengthy timelines, and could result in a different assignment of flow responsibility (and therefore a different water supply impact on the SFPUC).

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB Resolution No. 2018-0059 adopting the Bay-Delta Plan Amendment directed staff to help complete a "Delta watershed-wide agreement, including potential flow measures for the Tuolumne River" by March 1, 2019, and to incorporate such agreements as an "alternative" for a future amendment to the Bay-Delta Plan to be presented to the SWRCB "as early as possible after December 1, 2019." In accordance with the SWRCB's instruction, on March 1, 2019, the SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.

3.2.2 Additional Reliability Constraints

The issue of climate change has become an important factor in water resources planning in the State, and is frequently considered in water management planning processes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gases have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, observational data show that a warming trend occurred during the latter part of the 20th century and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources, including impacts on watersheds in the Bay Area. Generally, these studies have determined that climate change will have the following impacts:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, annual average, intensity and variability of precipitation, and an increased amount of precipitation falling as rain rather than snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality and quantity;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2020 update of the Bay Area Integrated Regional Water Management Plan, which includes assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of a changing climate on the RWS.

3.3 Drought Risk Assessment

Since the District does not meet the definition of an urban water supplier, the District is not required to develop a drought risk assessment (DRA). However, because the District is 100% reliant on the SFPUC for its water supplies, the District can refer to the DRA developed by the SFPUC, which is available in Section 8.5 of its 2020 UWMP. The SFPUC developed the DRA in compliance with Water Code Section 10635(b) which must include an assessment of water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years.

The SFPUC's DRA includes two scenarios, with and without the implementation of the Bay-Delta Plan Amendment, to show the drought conditions under two potential regulatory scenarios that may occur over the 2021-2025 period. The Bay-Delta Plan Amendment implementation scenario considers the implementation of the full Bay-Delta Plan Amendment in 2023.

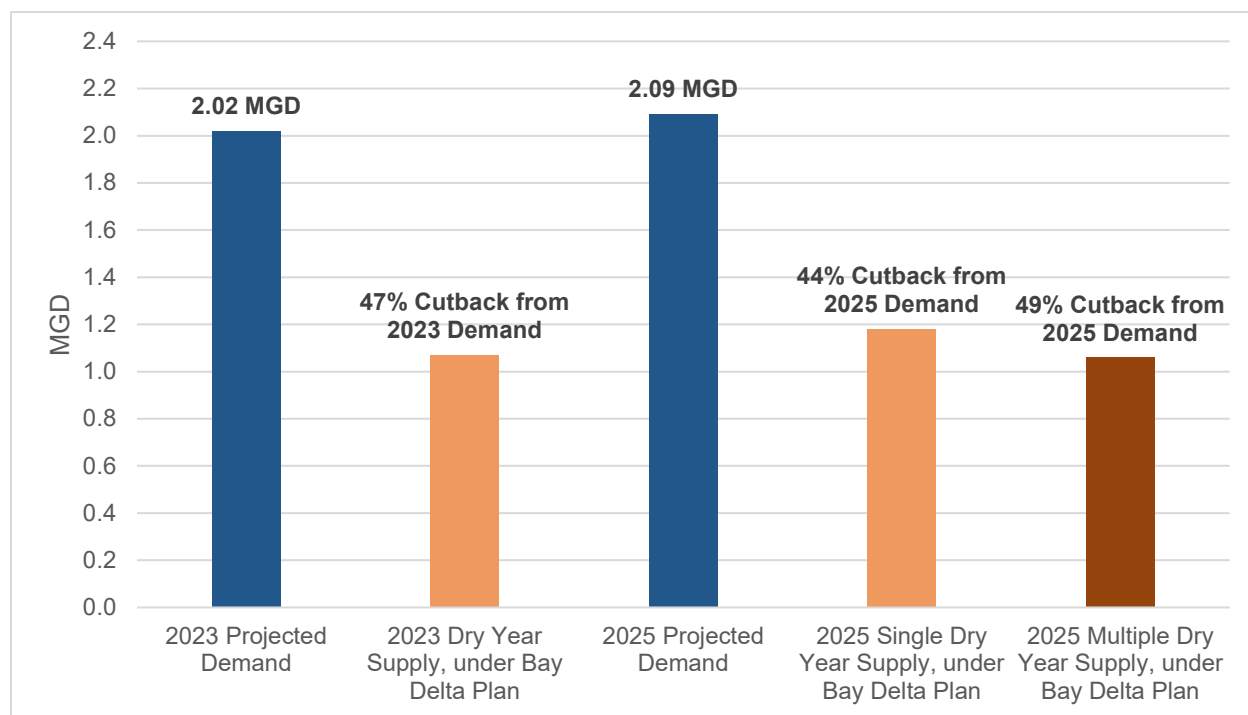
3.3.1 With Full Implementation of the Bay Delta Plan Amendment

In this dry-year sequence, the SFPUC projects there would not be anticipated reductions in RWS supplies prior to the implementation of the Bay-Delta Plan Amendment in 2023. The RWS supply reductions would reach 40% upon the implementation of the Bay-Delta Plan Amendment in 2023 until the end of the drought sequence in 2025. The split between wholesale and retail customers

(see SFPUC UWMP Section 8.2.4) at this shortage level informs available retail RWS supplies considered in this analysis.

Under this scenario, supply allocated to BAWSCA agencies is projected to decrease to 82.8 MGD in a single dry year and 74.5 MGD in following multiple dry years, representing collective cutbacks of 47.1% to Wholesale RWS purchases. The Tier 2 Plan does not apply to shortages of that magnitude, therefore the exact cutbacks to the District under this scenario is undetermined. The information provided by BAWSCA to support the BAWSCA agencies in preparing UWMPs assumes that the District would receive cutbacks of up to 47% in 2023 and 49% in 2024. Actual cutbacks would likely be even more significant, given the District’s per capita use relative to other BAWSCA agencies.

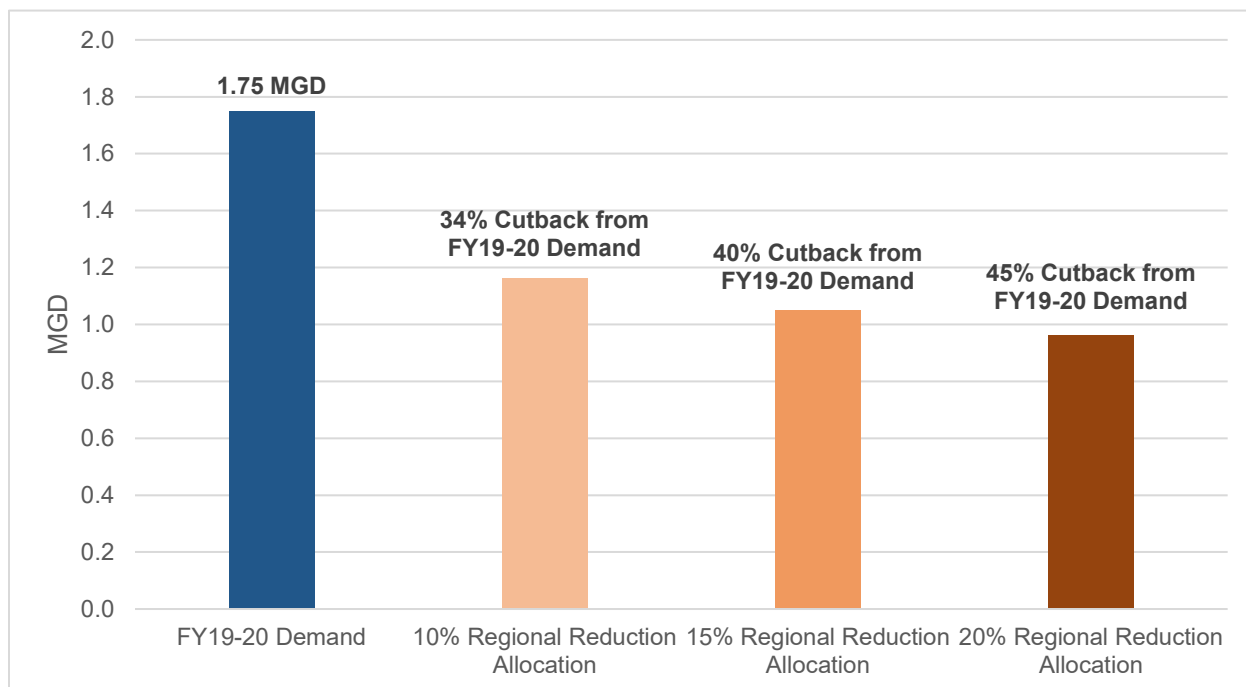
Figure 3-1 District Supply and Demand with Bay-Delta Plan Implementation (2023 and 2025)



3.3.2 Without Bay Delta Plan

Assuming the availability of existing supplies at current demand levels, the SFPUC projects there are no anticipated reductions in RWS supply in the 2020 UWMP. However, in October 2021, BAWSCA developed draft allocation scenarios based upon FY 2019-20 water use for its Wholesale Customers. Under 10, 15, and 20 percent regional shortages, BAWSCA agencies will collectively observe shortages of 14%, 20%, and 25% respectively, as described in the 2018 Amended and Restated Water Supply Agreement (WSA) as Tier 1 allocations (BAWCA, 2021). As described in the Tier 2 Plan, draft allocations for the District would result in cutbacks of up to 45% (see **Figure 3-2**).

Figure 3-2 District Supply and Demand without Bay-Delta Plan Implementation (FY19-20)



4. ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

The Annual Water Supply and Demand Assessment Procedures (Annual Assessment) is used to determine if there will be a shortfall in water supplies for the current and one dry year. The evaluation will ensure appropriate shortage response actions are implemented in a timely manner as needed to produce expected demand response or supply enhancement outcomes.

The District is not required to develop an Annual Assessment since the District is not an urban water supplier. However, the District is required by SB 552 to report annually water supply condition information to the SWRCB via the Electronic Annual Reporting System. Since the District purchases 100% of its water supplies from SFPUC, the District can compare its SFPUC allocation to its projected demands for the year to determine if there is an anticipated supply shortage. As described in Section 2.3.2, each year the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS. The SFPUC's annual Water Supply and Demand Assessment (WSDA) is a robust planning system that considers a range of input factors unique to SFPUC's water supplies and system configuration while also providing the flexibility to consider new factors. Traditional surface water supplies from the SFPUC's up country, East Bay, and Peninsula reservoirs are the backbone of the water supply, but the SFPUC extends and protects those supplies in many additional ways by:

- Partnering with the community to help save water through robust conservation programs;
- Minimizing the need for additional water to serve new developments through an onsite water reuse program;
- Recycling wastewater resources to deliver water for large non-potable uses;
- Utilizing local groundwater supplies to supplement surface water supplies;
- Investigating new, alternative water supply options such as purified water and desalination; and
- Investing in innovations that allow for creative solutions to meet diverse needs.

These efforts help the SFPUC conserve water and diversify supplies to reduce likelihood of water shortage condition.

4.1 Decision-Making Process

Regardless of the expectation of shortage conditions, as part of the normal course of business, the SFPUC provides a water supply condition update to its executive team every two weeks throughout the year. The SFPUC also provides water supply estimates to its Wholesale Customers on a monthly basis beginning February 1. A Wholesale Customer Annual Meeting is held in the last week of February at which the SFPUC makes a presentation on current water supply conditions

and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to Wholesale Customers summarizing the water supply availability for the coming year.

If the RWS appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such shortage. A presentation would be made to the Commission as part of the General Manager's report, showing conditions of precipitation to date, snowpack, and storage levels with more information as necessary depending on the particulars of the supply forecast. Depending on the level of shortage, the Commission may adopt a resolution declaring a water shortage emergency under the CWC, or lesser actions such as a call for voluntary conservation efforts.

Prior to the initiation of any water delivery reduction on its customers, the District would determine if a shortage is anticipated. If a shortage is anticipated, the District would review this Plan to determine appropriate actions to manage the shortage. These actions would be presented to the Board and communicated to the public as appropriate.

4.2 Data and Methodologies

The following sections include a description of the key data inputs and methodologies that are used to evaluate the water system reliability for the coming year. Because the District receives 100% of its supply from the SFPUC, the District relies on the SFPUC for its supply information.

4.2.1 Evaluation Criteria

The District will evaluate water supplies purchased from the SFPUC. Because the District solely relies on potable water supply from the SFPUC, the evaluation of the District's supplies will be based on information provided by the SFPUC or BAWSCA. The District will also evaluate any state-mandated drought or water use restrictions.

4.2.2 Unconstrained Customer Demand

Unconstrained customer demand is the expected water use prior to projected shortage response actions that may be implemented due to a water shortage event. During a drought cycle, unconstrained customer demand usually increases due to higher air temperatures and lower precipitation levels. The District has taken this potential increase into consideration. As mentioned in Section 3.1, demand within the District's service area is projected to increase to 2.2 MGD by 2045, while population is estimated to increase by 17%. The District's unconstrained customer demand may be affected by the potential impacts of SB 9.

4.2.3 Available Supply

To project and evaluate water supply conditions, the SFPUC uses measurements of precipitation and snowpack in the watersheds above Hetch Hetchy, Cherry, and Eleanor Reservoirs. Snowpack conditions are evaluated regularly by the Cooperative Snow Survey (conducted by the SFPUC in partnership with state and federal agencies) beginning in late January of each year. The SFPUC also estimates snowpack conditions using information from airborne snow observatory and other sources. The SFPUC maintains a hydrological model of the watersheds that uses this information to project expected runoff for the coming year. This process also includes a statistical analysis of additional expected precipitation. In addition to projected runoff, the determination of projected available water supply also takes into account stored water throughout the RWS, water acquired by the SFPUC from the non-SFPUC sources, inactive storage, reservoir losses, and allowances for carryover storage.

The RWS relies on precipitation and snowmelt captured and stored in its reservoirs. During droughts, water supply deliveries can exceed inflows, such that water stored in previous years is relied upon to meet demands. Because of the importance of carry-over storage, the SFPUC constantly monitors and evaluates water supply conditions in the RWS. Look-ahead forecasts are updated as a year's hydrology and operations change. Generally, in early winter of any year, SFPUC staff can begin providing a forecast of water supply conditions for the upcoming year based on known and anticipated winter and spring precipitation and snowpack. The predictive power of this forecast improves greatly through the spring. The annual precipitation, snowmelt, and carry-over storage together constitute the SFPUC's reservoir storage condition. Using data for each of these factors, the SFPUC can determine whether the reservoir system will be capable of serving full deliveries to its customers.

4.2.4 Infrastructure Considerations

On an ongoing basis, the SFPUC's Hetchy Water and Power, Water Supply and Treatment Division, and Hydrology and Water Systems group conduct analyses of the RWS that incorporate planned facilities outages and multiple levels of projected system demands to evaluate and plan for potential water delivery constraints. These groups meet quarterly to share plans and coordinate how facility outages, changes in service area demand, wet or dry weather, and other variables shape the operating plans each year. Facility outages due to maintenance or upgrades are coordinated in an adaptive manner to respond to changes as they occur. For new water supplies or new capital projects related to supply distribution, impacts on the system are evaluated extensively prior to initiation of any changes. Results from these modeling efforts are considered in the annual WSDA.

4.2.5 Other Factors

Any known or potential local and state regulatory conditions will be evaluated and assess their probable impacts on water supply availability as appropriate.

5. SHORTAGE RESPONSE ACTIONS AND COMMUNICATION PROTOCOLS

5.1 Six Standard Water Shortage Levels

As required by SB 552, this section describes the six standard shortage levels that represent shortages from the normal reliability and triggering mechanisms for each shortage stage. The shortage levels have been standardized to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. This is an outgrowth of the severe statewide drought of 2012-2016, and the widely recognized public communication and state policy uncertainty associated with the many different local definitions of water shortage stages. A catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, a fire, or other potential emergency events, is represented by Stage 6, a more than 50% reduction in supplies.

The six standard water shortage levels (see **Table 5-1**) correspond to progressively increasing estimated shortage conditions (up to 10-, 20-, 30-, 40-, 50- percent, and greater than 50 percent shortage compared to the normal reliability condition) and align with the response actions the District would implement to meet the severity of the impending shortage.

Table 5-1 Water Shortage Stages and Triggering Mechanisms

	Stage 1 Up to 10%	Stage 2 Up to 20%	Stage 3 Up to 30%	Stage 4 Up to 40%	Stage 5 Up to 50%	Stage 6 Above 50%
Supply Deficit	Estimated demand is projected to exceed total supply by up to 10%	Estimated demand is projected to exceed total supply up to 20%	Estimated demand is projected to exceed total supply up to 30%	Estimated demand is projected to exceed total supply up to 40%	Estimated demand is projected to exceed total supply up to 50%	Estimated demand is projected to exceed total supply by over 50%
Water Quality	Contamination of up to 10% of water supply (exceeds primary drinking water standards).	Contamination of up to 20% of water supply (exceeds primary drinking water standards).	Contamination of up to 30% of water supply (exceeds primary drinking water standards).	Contamination of up to 40% of water supply (exceeds primary drinking water standards).	Contamination of up to 50% of water supply (exceeds primary drinking water standards).	Contamination of over 50% of water supply (exceeds primary drinking water standards).
Disaster Loss	As necessary.	As necessary.	As necessary.	As necessary.	As necessary.	As necessary.

5.2 Shortage Response Actions

The District has determined that setting water budgets is the most appropriate and effective way to respond to a water shortage. The budget-based approach implements one action that sets a water budget at each stage and allows customers to decide how to cut their water use to meet their set water budget. At the onset of a drought, the District will conduct an analysis to determine the targeted savings needed per water shortage stage. Using this information, the District will then determine a water budget per account. The District will analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas. In setting water budgets, the District may choose from a variety of approaches, outlined below.

Per Capita Allocation Method: The per capita allocation method is only applicable for residential customer types. To implement this method, an accurate count of the number of occupants per metered account is required, and then each occupant is assigned a fixed daily amount of water. This method does not take into account differences in dwelling type, existing landscaping needs, or special individual circumstances.

Uniform Allocation Method: The uniform allocation method is only applicable for residential customer types. This method applies a fixed daily amount per dwelling unit for all residential customers. This method does not distribute water equitably to all customers, especially since it does not take into consideration the number of individuals living in each dwelling unit.

Inside/Outside Allocation Method: The inside/outside method, also referred to as the seasonal method, applies a percent reduction to both indoor and outdoor use. To determine an individual customer's allocation, a base year of water use is selected, and reductions are applied to both inside and outside use. Water use during the winter season is identified as reflecting typical "inside use." The average water use by a customer during the winter months (typically November, December, January, February) of the base year is used as the baseline for determining inside use for all 12 months. Water use in excess of the baseline during other months of the year is considered "outside use." The monthly inside/outside allocation is a sum of the inside use and the outside use reduced by their respective percentages. This method can be applied to all customer sectors.

Percentage Allocation Method: The percentage allocation method requires water allocation to be based on a straight percent reduction of past use. As an example, to achieve a specified reduction goal, all customers would be allotted a specific percentage of the amount of water that they used in each billing period in the base year. This method can be applied to all customer sectors.

In addition to setting water budgets, the District will also implement several irrigation measures. All measures considered by the District are listed in **Table 5-2**.

Table 5-2 Shortage Response Actions

Stage	Percent Supply Reduction	Shortage Response Actions
1	Up to 10%	- Implement a public information and advertising campaign - Implement a voluntary water conservation program for residential and commercial account
2	Up to 20%	- Outdoor watering without drip irrigation systems of the same irrigation zones on a property with potable water is restricted to two days a week, no more than 20 minutes a day, and only after 8:00 p.m. and before 10:00 a.m. - All outdoor residential pools must be covered with a suitable pool covering when not in use - The use of potable water for decorative fountains or the filling or topping-off of decorative lakes or ponds is prohibited, with the exception for those decorative fountains, lakes, or ponds which utilize recycled water or other non-potable water - All organizations watering horse arenas, recreation fields or athletic fields with potable water must ensure that irrigated horse arenas or fields are not overwatered or saturated - Set water budgets for each residential and commercial account
3	Up to 30%	- Outdoor watering without drip irrigation systems of the same irrigation zones on a property with potable water is restricted to two days a week, no more than 20 minutes a day, and only after 8:00 p.m. and before 10:00 a.m. - All outdoor residential pools must be covered with a suitable pool covering when not in use - The use of potable water for decorative fountains or the filling or topping-off of decorative lakes or ponds is prohibited, with the exception for those decorative fountains, lakes, or ponds which utilize recycled water or other non-potable water - All organizations watering horse arenas, recreation fields or athletic fields with potable water must ensure that irrigated horse arenas or fields are not overwatered or saturated - Set water budgets for each residential and commercial account (decreased budget as compared to Stage 2)

Stage	Percent Supply Reduction	Shortage Response Actions
4	Up to 40%	• Outdoor watering without drip irrigation systems of the same irrigation zones on a property with potable water is restricted to two days a week, no more than 20 minutes a day, and only after 8:00 p.m. and before 10:00 a.m. • All outdoor residential pools must be covered with a suitable pool covering when not in use • The use of potable water for decorative fountains or the filling or topping-off of decorative lakes or ponds is prohibited, with the exception for those decorative fountains, lakes, or ponds which utilize recycled water or other non-potable water • All organizations watering horse arenas, recreation fields or athletic fields with potable water must ensure that irrigated horse arenas or fields are not overwatered or saturated • Set a water budget for each residential and commercial account (decreased budget as compared to Stage 3)
5	Up to 50%	• Prohibit landscape irrigation • All outdoor residential pools must be covered with a suitable pool covering when not in use • The use of potable water for decorative fountains or the filling or topping-off of decorative lakes or ponds is prohibited, with the exception for those decorative fountains, lakes, or ponds which utilize recycled water or other non-potable water • All organizations watering horse arenas with potable water must ensure that irrigated horse arenas are not overwatered or saturated • Set a water budget for each residential and commercial account (decreased budget as compared to Stage 4)
6	Above 50%	• Prohibit landscape irrigation • All outdoor residential pools must be covered with a suitable pool covering when not in use • The use of potable water for decorative fountains or the filling or topping-off of decorative lakes or ponds is prohibited, with the exception for those decorative fountains, lakes, or ponds which utilize recycled water or other non-potable water • All organizations watering horse arenas with potable water must ensure that irrigated horse arenas are not overwatered or saturated • Set a water budget for each residential and commercial account (decreased budget as compared to Stage 5)

5.3 Supply Augmentation

Supply augmentation measures are actions that the District may integrate into normal water management planning for shortage conditions. The District is currently engaged in planning efforts to identify supply augmentation actions that would assist in resolving future District water shortages. As these opportunities advance, the District will include them in future updates to this document.

5.4 Operational Changes

Operational changes are actions that can be implemented to address water shortage on a short-term basis, which may be related to supply augmentation or demand-reduction response actions. The District is currently engaged in planning efforts to identify operational changes that would assist the District in addressing a water shortage. As these operational changes are finalized, the District will include them in future updates to this document.

5.5 Emergency Response Plan

The District has a completed Emergency Response Plan that is in compliance with America's Water Infrastructure Act of 2018. This document includes information about the risks to the District's system and outlines response plans for a variety of emergency situations.

The SFPUC maintains various planning documents which collectively address its emergency preparedness and planned response in the event of a catastrophic interruption of water supplies due to power outages, earthquakes, or other disasters. Should a catastrophic interruption occur, the SFPUC will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency (California Government Code, California Emergency Services Act Article 2, Section 8558).

5.6 Shortage Response Action Effectiveness

Once a shortage is identified, the District will work to set water budgets at each shortage stage appropriate to that stage and its shortage. Thus, water budgets will be set so as to not exceed the available supply in that shortage stage.

5.7 Water Shortage Mitigation

In the event that the District needs additional water during a water shortage, it may rely on its emergency interties with the City of Palo Alto and California Water Service- Los Altos (CalWater). Water through these interties is able to serve the District's entire service area. The District has two interties with Palo Alto (8-inch and 12-inch) and two with Cal Water (6-inch and 12-inch). If there is not sufficient water available through these interties, the District would initiate water-purchasing options to provide public health needs, including water hauling. Water haulers would be contacted using the list of licensed water haulers posted at the below link.

<https://www.cdph.ca.gov/Programs/CEH/DFDCS/Pages/FDBPrograms/FoodSafetyProgram/Water.aspx>.

5.8 Communication Protocols

The District is required to establish a process for communicating water budgets to customers during water shortages as indicated in SB 552. Timely and effective communication is a key element of water shortage contingency planning implementation. The amount of savings achieved by the District is dependent on the response and water conservation requests. Generally, a well-informed public is more willing to comply if mandatory water use restrictions are necessary. Proposed outreach includes, but not limited to, social media posts, bills inserts or newsletters, flyers, post-cards, presentations at community events, targeted outreach via email and phone, and press releases. These communication methods would also be utilized to communicate strategies the District would undertake to mitigate a water shortage, such as water hauling.

5.8.1 Drought-Planning Contacts

Per SB 552, the District is required to provide drought planning contacts, which include all of the following:

- At least one contact at the water system for water shortage planning and response and the development of the plan.
- Contacts for local public safety partners and potential vendors that can provide repairs or alternative water sources, including, but not limited to, local community-based organizations that work with the population in and around areas served by the water system, contractors for drilling wells, vended water suppliers, and emergency shower vendors.
- State and local agency contacts who should be informed when a drought or water shortage planning is emerging or has occurred.
- Regional water planning groups or mutual aid networks, to the extent they exist.

Contact information for these drought planning contacts is listed in **Table 5-3**. **Table 5-4** lists Public Safety Contacts, which can also be found in the Emergency Response Plan.

Table 5-3: Drought Planning Contacts

Drought Planning Contact	Contact Information
Water System	Purissima Hills Water District General Manager 650-948-1217
Local Public Safety Partners and Vendors	Contacts listed in Table 5-4 below and in Emergency Response Plan Section 1.3.2
State and Local Agency Contacts	Contacts listed in Table 5-4 below and Emergency Response Plan Section 1.3.2
Regional Water Planning Groups	Bay Area Water Supply and Conservation Agency Water Resources Manager 650-349-3000

5.8.2 Public Safety Contacts

Table 5-4: Public Safety Contacts

Public Safety Contact	Contact Information
Fire Department	Los Altos Hills County Fire District J. Logan General Manager (650) 949-1044
County Office of Emergency Services	County of Santa Clara Office of Emergency Management (408) 808-7800
County Environmental Health Specialist	County of Santa Clara Department of Environmental Health Marilyn C. Underwood, PhD marilyn.underwood@deh.sccgov.org (408) 591-7721
State Water Board District Engineer	District 17 Engineer (510) 620-3474
Major Water Uses/Wholesalers	San Francisco Public Utilities Commission (415) 551-3000
County Public Health	County of Santa Clara Public Health Department (408) 792-5050
Critical Customers	Pinewood School (650) 209-3030
	Gardner Bullis School (650) 559-3200 kschermerhorn@lasdschools.org

Public Safety Contact	Contact Information
	Foothill College (650) 949-7777
	Town of Los Altos Hills (650) 941-7222 Woojae Kim Public Works Director/City Engineer (650) 947-2516
GSA Contact / Regional Water Planning Contact	Santa Clara Valley Water District Vanessa De La Piedra (408) 630-2788
CalWarn Contact	Paul Gilbert-Snyder paul.gilbert-snyder@ebmud.com (510) 287-0432

6. COMPLIANCE ENFORCEMENT AND LEGAL AUTHORITIES

6.1 Compliance Enforcement

At the onset of a drought, during preparation of its water budgets, the District will also establish the processes for allowing variances, settling appeals, and implementing enforcement actions. Examples of appeals include plant establishment or critical services. Examples of enforcement actions include fees or flow restrictors. Penalties will be assessed for non-compliance with water emergency reduction requirements and water waste prohibitions.

6.2 Legal Authorities

The General Manager, or designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The General Manager, or designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan. The contact information for the General Manager can be found in Table 5-1.

7. FINANCIAL CONSEQUENCES OF WSCP ACTIVATION

The following section is a description of the financial consequences of, and responses for, drought conditions. The description includes a description of potential revenue reductions and expense increase associated with activated shortage response actions and a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.

The factors that determine the District's water rates are based on the revenues, maintenance costs, operations costs, and capital improvement costs. The District relies primarily on revenues from water service charges to fund the costs of providing services to its customers. In January 2022, the District completed an updated water rate study to support the District's operating and capital funding needs through 2025 and keep rates aligned with the cost of providing service. The study proposed to increase the water rates by 9% on April 1, 2022, 9% on January 1, 2023, and 9% on each subsequent January 1 through 2026. This study is available in **Appendix B**.

Since the District purchases 100% of its water supplies from the SFPUC, the District's potential revenue reductions and expense increase associated with activated shortage response actions is dependent on the SFPUC. The SFPUC includes a variable component to water rates for most customer classes. As a result, as sales decrease, revenues are lost on a per unit basis. Because the marginal cost of water production is relatively small, as production is reduced, the cost of service remains the same. For both retail and wholesale customers, a reduction in water purchases – whether voluntary or mandated – would require the SFPUC to raise rates, cut costs, or use existing fund balance reserves to cover its expenses. The financial planning and rate-setting process is complex and iterative. While major impacts of a water shortage on rates are described below, the full process, especially for large water shortages, would incorporate significant discussion about tradeoffs and financial impacts.

The SFPUC's current retail water rates have a provision for a "drought surcharge" that automatically increases adopted rates in the event of a declared water shortage. The drought surcharge is calculated so that, account for the expected reduction in retail water usage, total revenues are equal to what they would have been within the reduction. The drought surcharge protects the SFPUC's financial stability during water shortages and provides customers an incentive to meet conservation targets.

For wholesale customers, the rate-setting process is governed by the terms of the WSA, which provides that, in the event of a water shortage emergency, the Commission may adjust wholesale rates in an expedited water concurrently with the imposition of drought surcharges on retail customers. Beyond drought rate setting and emergency rate setting, rates are annually in coordination with the SFPUC annual budget process and are based on the forecasted whole share of regional water system expenditures and total purchases. If wholesale customer usage is expected to decrease either voluntarily, or due to shortages – this would be incorporated into the wholesale rate forecast, and rates may increase.

8. WSCP REFINEMENT PROCEDURES, PLAN MONITORING, AND ADOPTION

8.1 Refinement Procedures

This section describes the District's reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the WSCP in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

This WSCP was adopted on <<DATE>> by the District Board of Directors. This WSCP is an adaptive management plan that is designed to be responsive to the effectiveness of water shortage actions during a declared water shortage. As such, the WSCP is subject to adjustments and refinements as needed to ensure that actions are appropriate and effective. In the event that water shortage response actions are not producing the necessary demand reductions, the District will take adaptive measures necessary to achieve further demand reductions among the various customer categories. This may include adding new or modifying existing water use restrictions, creating targeted outreach programs or implementing additional conservation incentive programs.

The WSCP is a standalone document and can be updated at any time by the District.

8.2 Monitoring and Reporting

This section describes the District's description of the monitoring and reporting requirements and procedures that have been implemented to ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.

Monitoring and reporting key water use metrics is fundamental to water supply planning and management. Monitoring is also essential to ensure that the response actions are achieving their intended water use reduction purposes, or if improvements or new actions need to be considered. Monitoring for customer compliance tracking is also useful in enforcement actions.

Under normal water supply conditions, potable water production figures are provided monthly by the SFPUC. As indicated in the 2020 WSCP for the City and County of San Francisco the SFPUC tracks actual water savings through monthly consumption reports that are generated from the customer billing system. Based on a comparison between monthly consumption data, the SFPUC can determine reductions in water use for both retail and wholesale customers. The SFPUC also conducts ongoing monitoring of its watersheds, reservoirs, and other components of the RWS. Additionally, the District's customer water meters are read on a monthly basis. The District will also participate in monthly agency meetings with SFPUC and BAWSCA to monitor and discuss monthly allocation charts.

The WSCP is an adaptive management plan that can be revised and refined to ensure its shortage response actions are effective and produce desired results. Results of monitoring and reporting efforts will be used to evaluate the effectiveness of shortage response actions. If demand

reductions consistently fall short of the targeted water savings, the District Board of Directors may declare increasingly severe water shortage stages and associated demand management programs to accomplish the necessary reductions.

9. REFERENCES

- Bay Area Water Supply & Conservation Agency (BAWSCA). 2020. Bay Area Water Supply & Conservation Agency's Regional Water Demand and Conservation Projections. June 26.
- BAWSCA. 2021. Updated Draft Tier 2 Drought Allocations Incorporating Proposed Change to Tier 2 Calculation. October 27.
- Metcalf, B., Garcia, D, Carlton, I., and Macfarlane, F. 2021. A Turner Center Report – Will Allowing Duplexes and Lot Splits on Parcels Zoned for Single-Family Create New Homes? Assessing the Viability of New Housing Supply Under California's Senate Bill 9. Retrieved from <https://turnercenter.berkeley.edu/wp-content/uploads/2021/07/SB-9-Brief-July-2021-Final.pdf>
- Purissima Hills Water District. 2021. Purissima Hills Water District Boundaries. Retrieved from <https://www.purissimawater.org/home/districtboundaries.html>
- Purissima Hills Water District. 2022. Purissima Hills Water District Emergency Response Plan.
- San Francisco Public Utilities Commission. 2021. 2020 Urban Water Management Plan.

APPENDIX A. WATER SUPPLY RELIABILITY ANALYSIS TECHNICAL MEMORANDUM

TECHNICAL MEMORANDUM

TO: Phil Witt, Purissima Hills Water District

PREPARED BY: Nolan Meyer

REVIEWED BY: Andree Johnson

DATE: January 21, 2022

RE: Water Supply Reliability Analysis

This Water Supply Reliability Analysis Technical Memorandum (TM) has been developed in support of the development of the Purissima Hills Water District (District) Water Shortage Contingency Plan (WSCP). This TM includes estimates of San Francisco Public Utilities Commission (SFPUC) water supply available to the District (Section 1) and associated cutback percentages for a range of potential near-term and long-term hydrologic conditions and regulatory scenarios (Section 2). This TM then analyzes the impacts of various water supply actions on the District's overall supply reliability for such scenarios (Section 3).

1. DEMAND AND AVAILABLE SUPPLY

In fiscal year (FY) 2019-2020, the District purchased an average of 1.75 million gallons daily (MGD) from the SFPUC Regional Water System (RWS). These purchases represent 1.3% of the 132.23 MGD purchases from the SFPUC by Wholesale Customers (BAWSCA agencies) in FY19-20 (BAWSCA, 2021c). Demand within the District's service area is projected to increase to 2.2 MGD (26%) by 2045, while population is estimated to increase 17% (Table 1). However, demand and population increases may exceed current projections as a result of SB 9, which requires cities to allow one additional residential unit onto parcels zoned for single-dwelling units

Table 1: PHWD Demand and Population Projections

	<i>Actual</i>	<i>Projected</i>				
	2020	2025	2030	2035	2040	2045
Population	6,150	6,833	6,898	7,025	7,112	7,199
Demand, before Conservation Savings (MGD)	---	2.1	2.1	2.2	2.2	2.2
Demand, with Passive and Active Conservation Savings (MGD)	1.75	2.1	2.1	2.1	2.1	2.2

Source: (BAWSCA, 2020)

Under the 2009 Water Supply Agreement (WSA) between PHWD and SFPUC, PHWD receives an ISG of 1.62 MGD from SFPUC. This is a permanent supply guarantee which extends beyond the WSA term.

In normal years, the District's ISG is assumed to be the available supply. However, the District is currently purchasing above its ISG. In FY 2019-2020, the District purchased 1.75 MGD from the RWS and is projected to see demands even further exceed its ISG with continued population growth.

2. CUTBACKS UNDER VARIOUS SCENARIO

This section describes the District's water supply reliability under various drought scenarios, focused on the two scenarios evaluated in the SFPUC 2020 Urban Water Management Plan:

- Reliability without Bay-Delta Plan Implementation
- Reliability with implementation of the Bay-Delta Plan as adopted by the State Water Resources Control Board (SWRCB)

2.1 Drought (Without Bay-Delta Plan Implementation)

In October 2021, BAWSCA developed draft allocation scenarios based upon FY 2019-20 water use for its Wholesale Customers. Under 10, 15, and 20 percent regional shortages, BAWSCA agencies will collectively observe shortages of 14%, 20%, and 25%, respectively, as based upon the Tier 1 Drought Allocation Plan described in the 2018 Amended and Restated Water Supply Agreement (WSA) (BAWSCA, 2021c). As described in the Draft Tier 2 Drought Response Implementation Plan (Tier 2 Plan), draft allocations for the District would result in cutbacks of up to 45% (Figure 1), which is the maximum cutback to any SFPUC permanent wholesale customer (average cutback plus 20%). The District's high cutbacks are primarily a result of the District's SFPUC purchases in FY 2019-20 exceeding its ISG and the District's relatively high seasonal (outdoor) use compared to other wholesale customers.

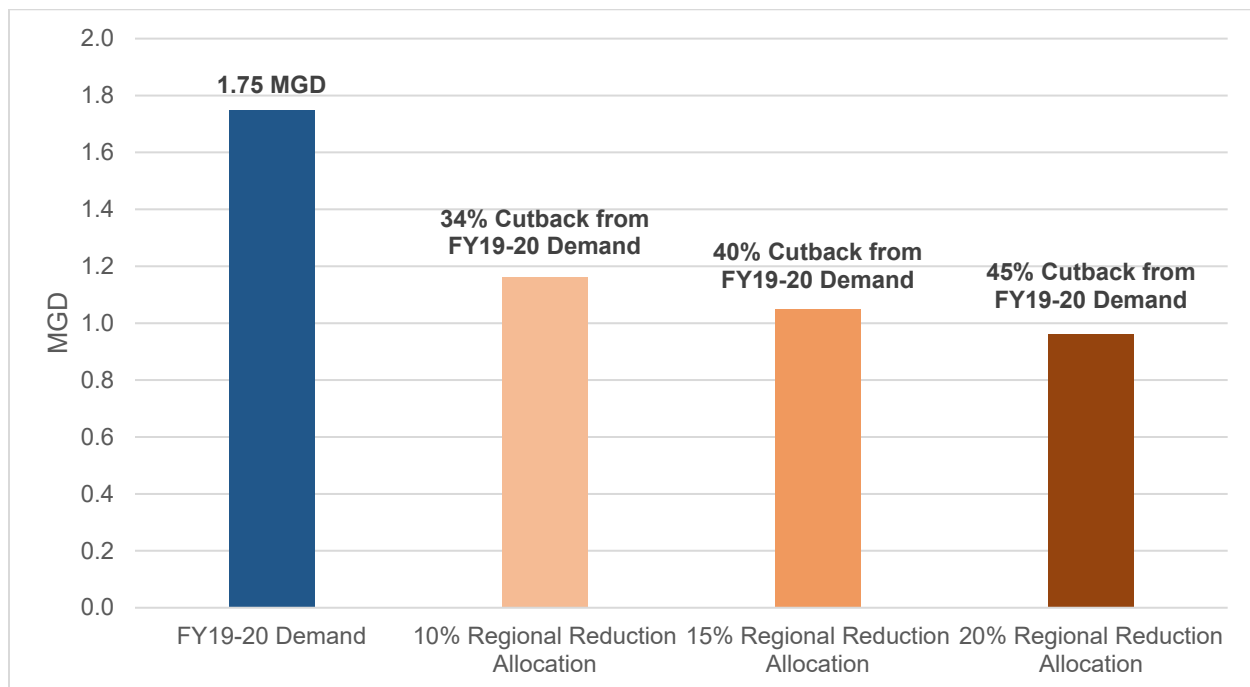


Figure 1: Supply and Demand without Bay-Delta Plan Implementation (FY19-20)

2.2 Drought (With Bay-Delta Plan Implementation)

In January 2021, BAWSCA received from SFPUC reliability projections that incorporate the implementation of the Bay-Delta Plan Amendment, assumed to begin in 2023 (BAWSCA, 2021). Under this scenario, supply allocated to BAWSCA agencies is projected to decrease to 82.8 MGD in a single dry year and 74.5 MGD in following multiple dry years, representing collective cutbacks of 47.1% to Wholesale RWS purchases. The current Tier 2 Plan only applies to regional shortages of up to 20%; therefore, for planning purposes, BAWSCA assumed equal cutbacks to each agency under the Bay-Delta Plan shortage scenarios for Urban Water Management Plan (UWMP) planning purposes. Under this assumption, the District would receive cutbacks of up to 47% in 2023 and 49% in 2025 (Figure 2). *However, in an actual shortage of that magnitude, it is likely that the District's RWS purchases would be cut back even more significantly than these projections indicate to provide sufficient health and safety supplies for other BAWSCA agencies.*

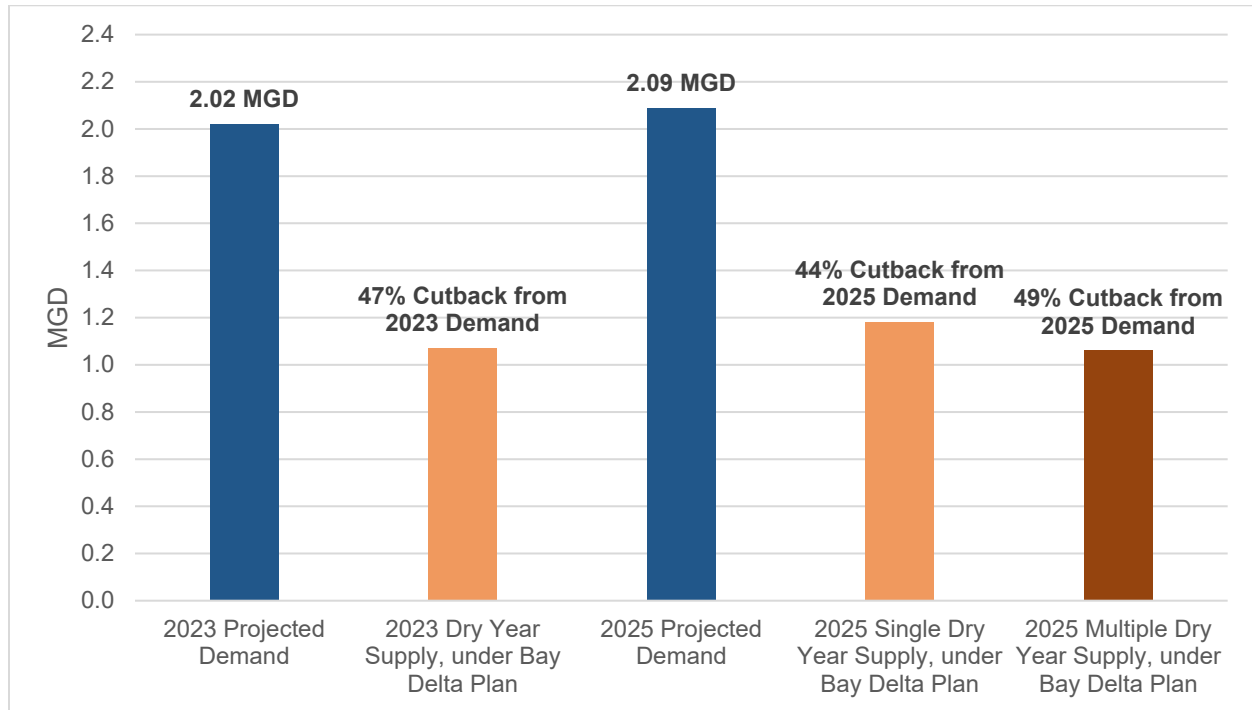


Figure 2: Supply and Demand with Bay-Delta Plan Implementation (2023 and 2025)

BAWSCA is initiating development of a new Tier 2 Plan beginning in January 2022. The Tier 2 Plan update process will consider whether to extend the Tier 2 Plan’s applicability to shortages greater than 20 percent. Participation in the Tier 2 Plan development process will be critical to supporting the District’s interests.

3. WATER SUPPLY AND DEMAND MANAGEMENT ACTIONS

3.1 Purchase of Additional Individual Supply Guarantee (ISG)

The purchase of additional ISG is allowed by the WSA and can provide the District with additional normal year water supply to meet its projected demands, while also improving its allocation under the Tier 2 Plan. Using the BAWSCA’s Tier 2 Excel Model (BAWSCA 2021b), allocations for the District under the three drought scenarios described in Section 2.1 were calculated using ISGs of up to twice the District’s current allowance (Figure 3). These scenarios are based upon the District’s current (FY 19-20) SFPUC purchases.

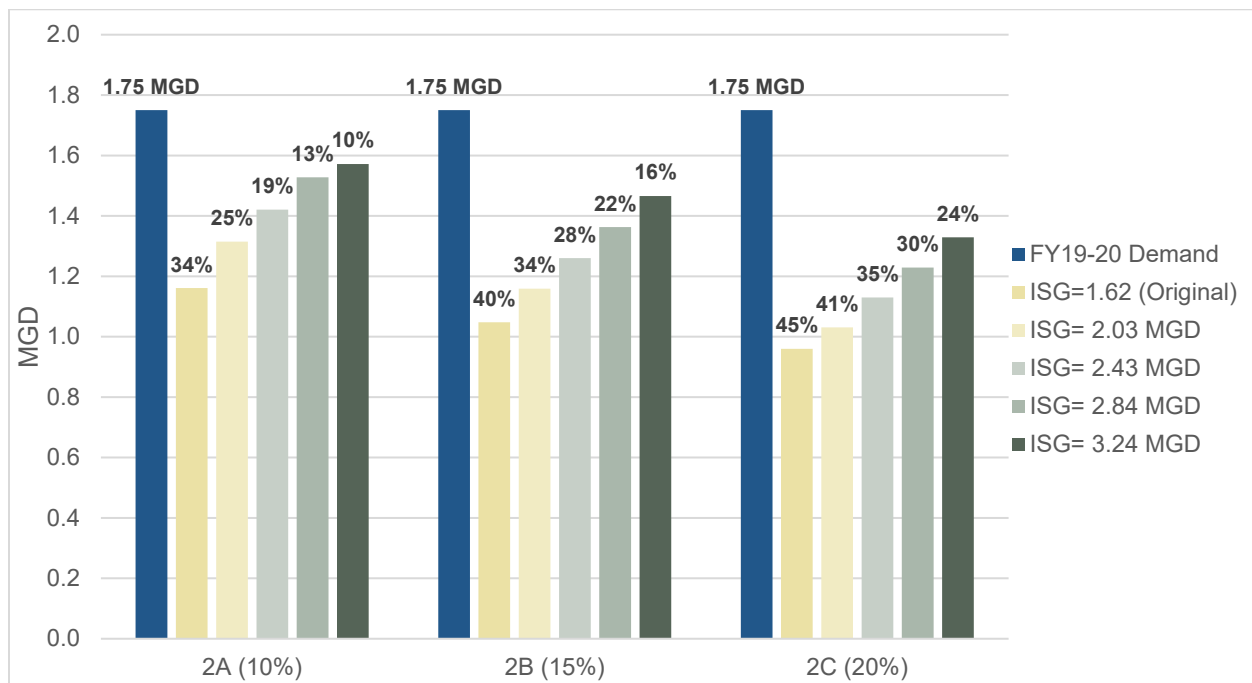


Figure 3: Result of Increased ISG on Cutbacks during Droughts (FY19-20 Demands)

3.2 Purchase or Development of non-SFPUC Water Supply Sources

The purchase or development of non-SFPUC water supply sources would decrease the District's reliance on SFPUC, thereby reducing the effect of Tier 2 allocations on reliability during drought. In particular, drought-resilient sources, such as recycled water or groundwater supplies, would not be subject to the same dry-year shortfalls as SFPUC supplies and would bolster reliability. Potential options for the District to further evaluate include:

- Emergency water supply from quarry in District's service area
- Excess water from Los Altos Golf & Country Club, e.g. wells or recycled water supply via exchange agreement
- Other groundwater supplies
- Valley Water wheeled through Cal Water Los Altos Hills
- Spot transfer or exchange

3.3 Comparing Dry-year Reliability Benefits of Water Supply Options

Figure 4 compares overall water supply availability to the District under the current Tier 2 allocation scenario (FY 2019-20 base year) to the following options:

- 1) The District's allocation with an additional 0.5 MGD of ISG, assumed to be purchased from another wholesale customer.
- 2) The District's overall supply availability with a 0.5 MGD normal year alternative supply. Under this scenario, the alternative supply is assumed to reduce the District's SFPUC purchases by 0.5 MGD; therefore, the District's SFPUC allocation is slightly lower but its overall reliability is slightly higher.
- 3) The District's overall supply availability with a 0.5 MGD emergency water supply. Under the scenario, the alternative supply is assumed to be used in drought years only (e.g. emergency use of quarry water or a dry-year spot transfer), and therefore does not impact the District's normal year SFPUC purchases or Tier 2 base year use.

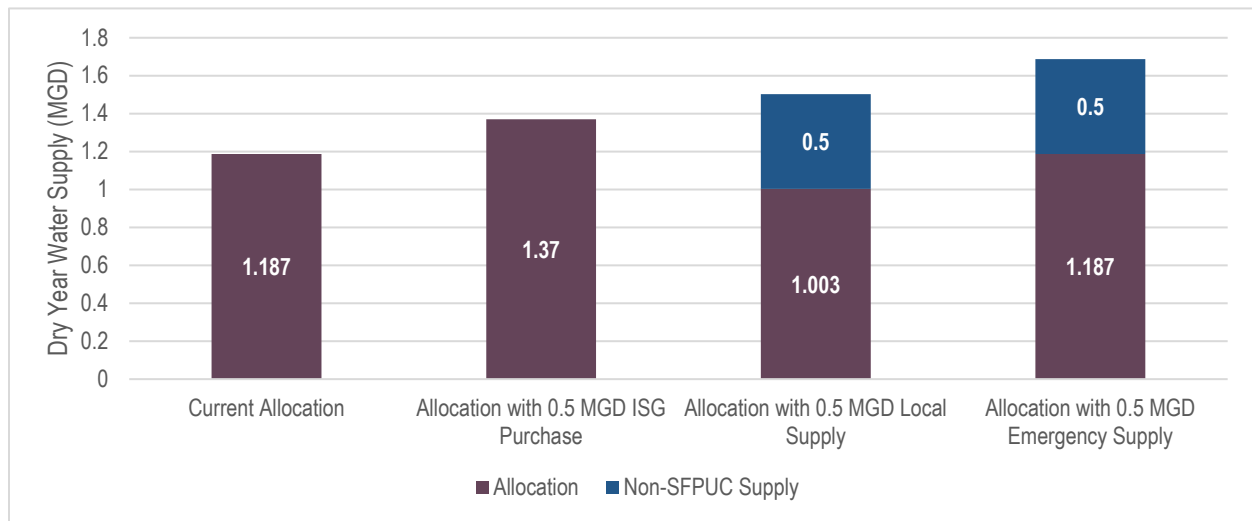


Figure 4: Dry Year Reliability Comparison for Potential Water Supply Options (Based on FY19-20 Demands)

Comparing dry year reliability benefits of alternative sources to an ISG purchase, the District would receive a greater overall reliability benefit from an alternative water supply compared to an ISG purchase of an equivalent volume.

3.4 Next Steps

Recommended next steps include:

- Evaluating feasibility and cost-effectiveness of potential water supply options.
- Assessing potential impacts of SB 9 on the District's population and demand projects to better understand long-term water supply needs.
- Participating in the Tier 2 Plan redevelopment process to ensure the District's interests are considered in the planning process.

4. REFERENCES

Bay Area Water Supply & Conservation Agency (BAWSCA). 2020. Bay Area Water Supply & Conservation Agency's Regional Water Demand and Conservation Projections. June 26.

Bay Area Water Supply & Conservation Agency (BAWSCA). 2021a. San Francisco Regional Water System Supply Reliability for 2020 Urban Water Management Plans. February 18.

Bay Area Water Supply & Conservation Agency (BAWSCA). 2021b. Tier 2 Excel Model.

Bay Area Water Supply & Conservation Agency (BAWSCA). 2021c. Updated Draft Tier 2 Drought Allocations Incorporating Proposed Change to Tier 2 Calculation. October 27.

APPENDIX B. PHWD WATER RATE STUDY

The **January 2022 Water Rate Study Report** is available on the District's website at:
<https://www.purissimawater.org/audits>
