Appendix C
Water Supply Assessment

ESA

FINAL REPORT | JUNE 2023

Santa Clara County Housing Element Update
Water Supply Assessment

PREPARED FOR

Environmental Science Associates

PREPARED BY

WEST YOST
Water. Engineered.

Santa Clara County Housing Element Update
Water Supply Assessment

Prepared for

Environmental Science Associates

Project No. 712-60-22-11

Project Manager: Rhodora Biagtan, P.E.	June 5, 2023 Date
QA/QC Review: Elizabeth Drayer, P.E.	June 5, 2023 Date

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FINAL REPORT | JUNE 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

AFY	Acre-Feet Per Year
AWSP	Alternative Water Supply Planning Program
BAWSCA	Bay Area Water Supply & Conservation Agency
CIMIS	California Irrigation Management Information System
County	County of Santa Clara
DU	Dwelling Unit
EIR	Environmental Impact Report

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ET	Evapotranspiration
°F	Degrees Fahrenheit
GMP	Groundwater Management Plan
gpd	Gallons Per Day
HEU	Housing Element Update
RWS	Regional Water System
SB	Senate Bill
SF	Square Feet
SFPUC	San Francisco Public Utilities Commission
SJW	San Jose Water
Stanford	Stanford University
UWMP	Urban Water Management Plan
Water Code	California Water Code
WRCC	Western Regional Climate Center
WSA	Water Supply Assessment

1.0 INTRODUCTION

1.1 Legal Requirement for Water Supply Assessment

California Senate Bill (SB) 610 amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 sought to promote more collaborative planning between local water suppliers and cities and counties. It requires detailed information regarding water supply availability to be provided to the city and county decision-makers prior to approval of specified large development projects. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands from approved projects and tentative maps, and the demands of proposed projects.

SB 610 amended California Water Code (Water Code) sections 10910 through 10915 (inclusive) to require land use lead agencies to:

- Identify any public water purveyor that may supply water for a proposed development project
- Request a Water Supply Assessment (WSA) from the identified water purveyor

The purpose of the WSA is to demonstrate the sufficiency of the purveyor's water supplies to satisfy the water demands of the proposed project, while still meeting the water purveyor's existing and planned future uses. Water Code sections 10910 through 10915 delineate the specific information that must be included in the WSA.

1.2 Need for and Purpose of Water Supply Assessment

The County of Santa Clara (County) has and maintains a General Plan that informs local decisions on land use and development. The County's current General Plan was adopted in 1994 and contains eight chapters known as "elements," including one about housing. The County is proposing to update its General Plan Housing Element for the 2023-2031 planning period via a Housing Element Update (HEU). The primary purpose of the HEU is to comply with the requirements of State law by analyzing existing and projected housing needs, and updating goals, policies, objectives, and implementation programs for the preservation, improvement, and development of housing. The purpose of this WSA is to evaluate the water supply availability in connection with the County HEU.

The HEU includes housing opportunity sites at Stanford University (Stanford) and on unincorporated lands within the County (unincorporated lands); this WSA covers the potential development of these sites (Proposed Project). Individual WSAs completed for the Proposed Project sites located at Stanford and on unincorporated lands located within the San Jose Water (SJW) service area are found in Appendix A and B, respectively, and are summarized in this WSA. As individual project sites identified the HEU move forward with development, the relevant water service agency serving each project site would be responsible for preparing a project-specific WSA, if applicable.

This WSA is not to reserve water, or to function as a "will serve" letter or any other form of commitment to supply water (see Water Code section 10914). The provision of water service will continue to be undertaken in a manner consistent with applicable policies and procedures, consistent with existing law.

1.3 Water Supply Assessment Preparation, Format and Organization

The format of this WSA is intended to follow Water Code Sections 10910 through 10915 to clearly delineate compliance with the specific requirements for a WSA. The WSA includes the following sections:

- Section 1: Introduction
- Section 2: Description of Proposed Project
- Section 3: Required Determinations
- Section 4: Water Service Area
- Section 5: Water Demands
- Section 6: Water Supplies
- Section 7: Determination of Water Supply Sufficiency Based on the Requirements of SB 610
- Section 8: Water Supply Assessment Approval Process
- Section 9: References

This WSA also contains the following supplier-specific WSAs, incorporated as appendices:

- Appendix A: Water Supply Assessment – Stanford University
- Appendix B: Water Supply Assessment – San Jose Water

Relevant citations of Water Code Sections 10910 through 10915 are included throughout this WSA in *italics* to demonstrate compliance with the specific requirements of SB 610.

2.0 DESCRIPTION OF PROPOSED PROJECT

The Proposed Project location, description, and projected water demands are discussed below.

2.1 Proposed Project Location

The Proposed Project is located within the County, including Project sites shown on Figure 2-1. The Proposed Project sites within the Stanford service area would be served by Stanford as described in Appendix A. The Proposed Project sites in unincorporated lands would be served by SJW as described in Appendix B.

2.2 Proposed Land Uses and Projected Water Demand

The Proposed Project includes a variety of land uses depending on the site location. Proposed Project land uses on sites served by Stanford include faculty/staff housing apartments and an elementary school, encompassing a total of 72 acres, further described in Appendix A. Proposed Project land uses on sites served by SJW include residential units and 43,560 square feet of commercial space, encompassing a total of 143 acres, further described in Appendix B. Table 2-1 summarizes the total projected water demand for the Proposed Project based on water supplier.

Table 2-1. Projected Water Demand for the Proposed Project

Water Supplier	Potential Units, Low, DU[(a)]	Potential Units High, DU[(a)]	Commercial Space, SF	Gross Area, acre[(a)]	Projected Water Demand, gpd	Projected Water Demand, AFY
Stanford University[(a)]	1,680	2,160	-	72	229,440	257
San Jose Water[(b)]	4,518	6,281	43,560	143	1,058,720	1,186
Totals	**6,198**	**8,441**	**43,560**	**215**	**1,288,160**	**1,443**

(a) From Table 1-1 in Appendix A.
(b) From Table 3-2 of Attachment 1 in Appendix B.
DU = Dwelling Units, gpd = gallons per day, AFY = acre-feet per year, SF = square-feet

2.3 Projected Water Supply

Water demands for the Proposed Project on Stanford lands will be served using Stanford's existing and future portfolio of water supplies discussed in Section 6 and Appendix A. The water demands for the Proposed Project on unincorporated lands will be served using SJW's existing and future portfolio of water supplies discussed in Section 6 and Appendix B. The inclusion of existing and planned future water supplies is specifically allowed by the Water Code:

> *Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

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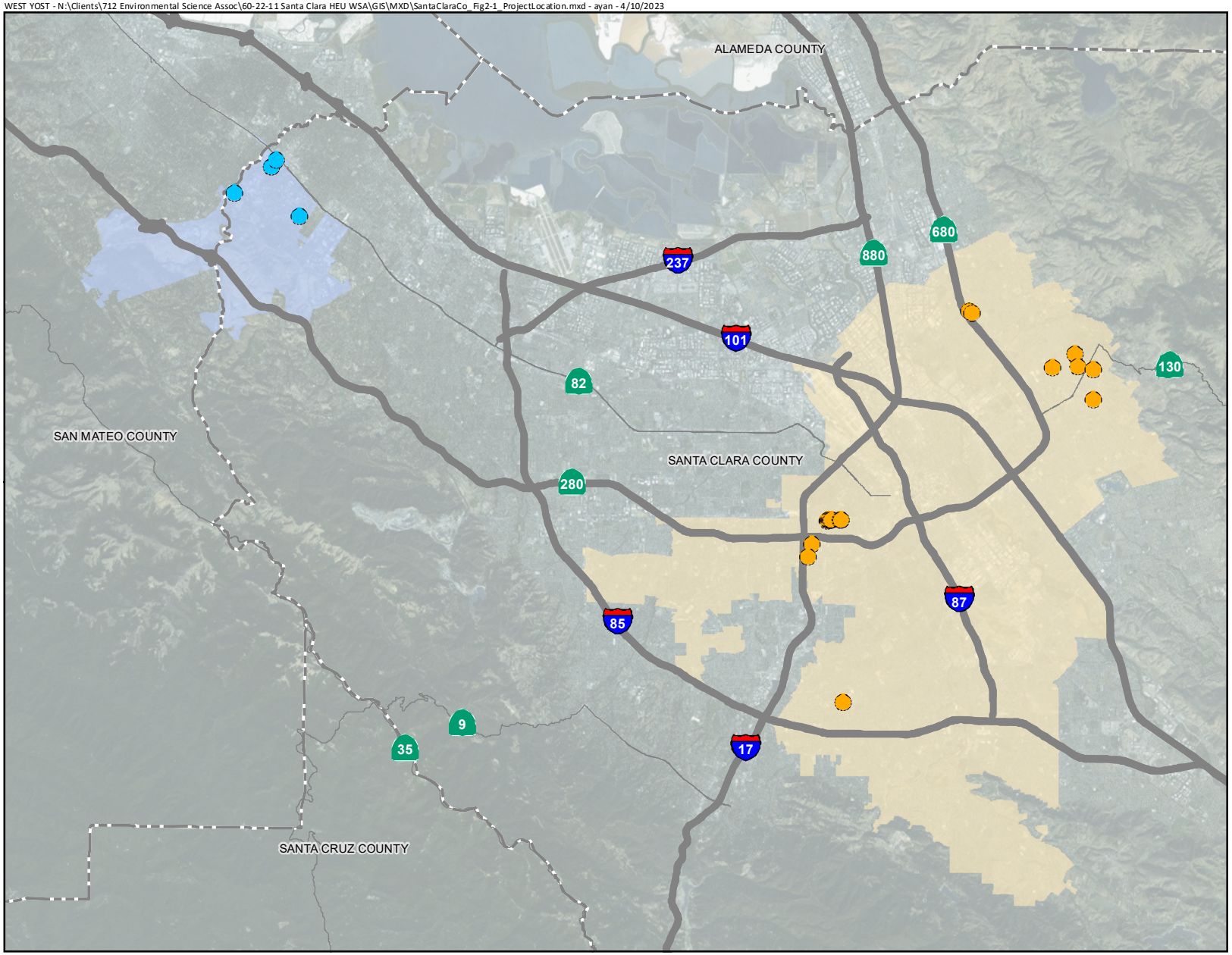

Proposed Project Sites

- Unincorporated Land
- Stanford University

Boundaries

- Stanford Service Area
- San Jose Water Company Service Area
- County Boundary

Notes:

1. Proposed Project centroids from Santa Clara County Housing Element Update Site Inventory (August 2022).

Prepared by:

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0 9,000 18,000 Feet

Prepared for:

Environmental Science Associates

Santa Clara County HEU

Water Supply Assessment

ESA

Proposed Project Location

Figure 2-1

3.0 REQUIRED DETERMINATIONS

3.1 Does SB 610 apply to the Proposed Project?

Water Code section 10910 (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

Water Code section 10912 (a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

Based on the following fact, SB 610 has the potential to apply to the individual project sites identified in the HEU.

- The County has determined that the HEU is subject to the California Environmental Quality Act and that an Environmental Impact Report (EIR) is required.
- The HEU identifies sites appropriate for the development of multi-family housing for up to a total of 8,441 dwelling units.

Although a WSA may not be required for each individual project site in the HEU, the County has decided to prepare a WSA for the Proposed Project. As mentioned in Section 1.2, the relevant water supply agency serving an individual project site will be responsible for preparing a WSA for that specific project site if SB 610 is determined to apply to that project. The Proposed Project sites served by Stanford and SJW have not been the subject of a previously adopted WSA and have not been included in an adopted WSA for a larger project.

3.2 Does SB 221 apply to the Proposed Project?

In 2001, SB 221 amended State law to require that approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply. Per California Government Code section 66473.7(a)(1), a subdivision means a proposed residential development of more than 500 dwelling units. The individual project sites in the HEU may be subject to the requirements of SB 221. However, applicability of SB 221 for each individual project site may not be determined until

further along in the planning process, typically during the preparation of the tentative site map. A verification of sufficient water supply (SB 221) report would be required prior to final approvals for individual projects.

3.3 Who is the identified public water system?

> *Water Code Section 10910(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined by Section 10912, that may supply water for the project.*
>
> *Water Code Section 10912 (c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections…*

Proposed Project sites on Stanford lands will be served by Stanford. However, Stanford is a private entity that does not serve the general public and therefore is not a public water system as defined in Water Code Section 10912(c). Stanford purchases the majority of its potable water supply from the San Francisco Public Utilities Commission (SFPUC) as a wholesale customer. However, the SFPUC does not act as a public water system when providing water to its wholesale customers.

The Proposed Project sites on unincorporated lands will be served by SJW. Therefore, SJW is the identified public water system for the Proposed Project sites on unincorporated lands.

3.4 Does the identified public water system have an adopted Urban Water Management Plan (UWMP) and does the UWMP include the projected water demand for the Proposed Project?

> *Water Code Section 10910(c)(1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*

Stanford is not required to prepare an UWMP, but it provides water usage statistics and demand projections to SFPUC and Valley Water, who incorporate this data into their respective 2020 UWMPs. The UWMPs do not specifically address the water demands for the Proposed Project that are analyzed in this WSA. The additional demands estimated to result from the Proposed Project are described in Section 3 of Appendix A. The ability of Stanford to meet the projected water demands, including demand from the Proposed Project, is summarized in Section 7 of this WSA and discussed in more detail in Appendix A.

The SJW 2020 UWMP was adopted by the SJW Board of Directors in June 2021 and is incorporated by reference into the SJW WSA found in Appendix B. The SJW WSA also references and incorporates the Valley Water 2020 UWMP adopted by Valley Water's Board of Directors in June 2021. The SJW 2020 UWMP includes the projected water demand for the Proposed Project as part of the total projected demand within the SJW service area.

4.0 WATER SERVICE AREA

4.1 Water Service Area

The County encompasses 1,300 square miles and is located at the southern end of San Francisco Bay. In 1994, the County outlined its long-term growth in its General Plan, which identified lands intended for future urbanization within the County.[1] While most of the urbanized areas in the County are under the jurisdiction of individual cities, the County maintains jurisdiction of 7,348 acres that are designated as Urban Service Areas and are planned for eventual annexation to a city's jurisdiction. Lands owned by Stanford within the County are slightly over 4,000 acres, and the remaining 596,070 acres in the unincorporated County area comprise rural parts of the County.

Water service is provided by different water service agencies within the County. As mentioned in Section 2.1, Stanford will serve the Proposed Project sites located on Stanford lands and SJW will serve the Proposed Project sites located on unincorporated lands. The water service areas for Stanford and SJW are shown on Figure 2-1 and described in Appendix A and Appendix B, respectively.

4.2 Population

The County population was 1.9 million at the time of the 2020 U.S. Census, the most populous of the nine Bay Area counties. Specific population data for Stanford and the SJW water service area is described in detail in Appendix A and B, respectively. Table 4-1 shows the County's projected population in five-year increments from 2020 to 2045.

Table 4-1. Projected Population for the County

Time Frame	Year	Population
Historical	2020	1,962,251
Projected	2025	2,030,957
	2030	2,105,066
	2035	2,175,951
	2040	2,241,634
	2045	2,298,147

Source: California Department of Finance, Report P-2A: Total Population Projections, California Counties, July 2021.

4.3 Climate

The County generally experiences warm, dry summers with daytime temperatures around 88 degrees Fahrenheit (°F). Winter temperatures can drop to 37°F but are generally mild. Rainfall generally falls from November through March with a total annual average of 20.1 inches of rain. The total average evapotranspiration is 52.9 inches. Table 4-2 summarizes the average temperature and rainfall data for the County.

[1] County of Santa Clara. December 1994. Santa Clara County General Plan, 1995-2010.

Table 4-2. Monthly Average Climate Data Summary

Month	Standard Monthly Average ET, inches[a]	Average Total Rainfall, inches[b]	Average Temperature, °F[b]	
			Minimum	Maximum
Gilroy (CIMIS Station No. 211[a], WRCC Station No. 043417[b])				
January	1.7	4.4	37.5	60.3
February	2.5	3.6	40.4	63.9
March	3.7	3.1	42.7	67.5
April	5.2	1.4	44.6	72.5
May	6.4	0.4	48.7	77.9
June	7.2	0.1	52.2	83.8
July	7.1	0.0	54.4	87.9
August	6.2	0.0	54.5	87.7
September	5.2	0.2	53.0	85.7
October	3.9	0.9	48.1	78.8
November	2.2	2.1	41.9	67.8
December	1.5	4.0	37.3	60.3
Total	**52.9**	**20.1**	**-**	**-**

(a) Source: California Irrigation Management Information System (CIMIS). Period of record is 2009 to 2022.

(b) Source: Western Regional Climate Center (WRCC). Period of record is 1906 to 2022.

ET = Evapotranspiration

5.0 WATER DEMANDS

> *Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

The descriptions provided below for Stanford and SJW water demands are summarized from their respective WSAs in Appendix A and B.

5.1 Historical and Existing Water Demand

Stanford's historical water demand for 2010 through 2019 ranges from 2,457 to 3,785 acre-feet per year (AFY). The existing (2020) water demand for Stanford is 1,766 AFY. Additional detail about Stanford's historical and existing water demand is described in Appendix A.

SJW's historical water demand for 2010 through 2019 ranges from approximately 113,000 to 135,000 AFY. The existing (2020) water demand for SJW is 121,504 AFY. Additional detail about SJW's historical and existing water demand is described in Appendix B.

5.2 Future Water Demand

Table 5-1 presents the projected normal year water demands for Stanford and SJW from 2025 through 2045, summarized from Appendices A and B. These projections are described in further detail in Appendices A and B.

Table 5-1. Projected Water Demands, AFY

Water Supplier	2025	2030	2035	2040	2045
Stanford University[(a)]	3,672	3,896	4,120	4,344	4,680
San Jose Water[(b)]	132,776	132,776	133,312	134,918	136,308
Total	**136,448**	**136,672**	**137,432**	**139,262**	**140,988**

(a) Refer to Appendix A, Table 3-2.
(b) Refer to Appendix B, Table 2.
AFY = acre-feet per year

5.3 Dry Year Water Demand

Under dry water year conditions, both Stanford and SJW anticipate implementing demand reduction measures as appropriate to reduce water demands to match any reduction in supply. However, for planning purposes and to be conservative, the WSAs for both Stanford and SJW assume no reduction in water demand during dry years even though additional water conservation is likely to occur, as detailed in Appendices A and B.

6.0 WATER SUPPLIES

Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).

Water Code Section 10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Water Code Section 10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

Water Code Section 10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

The Proposed Project sites on Stanford lands are anticipated to be served from Stanford's existing and future portfolio of water supplies, and the Proposed Project sites on unincorporated lands are anticipated to be served from SJW's existing and future portfolio of water supplies. The inclusion of existing and planned future water supplies is specifically allowed by the Water Code:

Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).

The water supply for the Proposed Project will have the same water supply reliability and water quality as the water supply available to other Stanford and SJW uses. The descriptions provided below about Stanford's and SJW's water supplies needed to serve the Proposed Project are summarized from Appendices A and B.

6.1 Existing Potable Water Supplies

6.1.1 Purchased Water

Stanford's primary source of potable water supply is purchased from the SFPUC under a wholesale contract. Additional details about Stanford's purchased water supply from the SFPUC are discussed in Appendix A.

On average, SJW purchases half of its potable water supply from Valley Water under a wholesale contract. This water originates from several sources, including Valley Water's local reservoirs, the State Water Project, and the Central Valley Project San Felipe Division. Additional details about SJW's purchased water supply from Valley Water are discussed in Appendix B.

6.1.2 Groundwater

Stanford has the capability to supplement its potable water supplies with groundwater pumped from the Santa Clara Subbasin. Stanford's groundwater supply is normally used for non-potable uses. Appendix A describes Stanford's groundwater supply and historic use in further detail.

SJW also draws groundwater from the Santa Clara Subbasin, which accounts for 30 to 40 percent of SJW's total potable water supplies. Appendix B describes SJW's groundwater supply and historic use in further detail.

Both Stanford and SJW overlie the Santa Clara Valley groundwater basin, specifically the Santa Clara Subbasin (Subbasin 2-009.002). The Santa Clara Subbasin consists of unconsolidated alluvial sediments and is located in the northern part of Santa Clara County. The subbasin is not adjudicated, nor is it in a condition of overdraft. Valley Water is the Groundwater Sustainability Agency for the subbasin and is responsible for maintaining the subbasin and ensuring the subbasin does not become overdrafted. Valley Water published a Groundwater Management Plan report in 2021 (2021 GMP) as an alternative to the Groundwater Sustainability Plan, which is a required planning document by DWR. The 2021 GMP delineates the role of Valley Water as groundwater managers within the County, as well as providing details of the basins to which the District maintains.

6.1.3 Surface Water

Surface water availability for both Stanford and SJW is highly variable depending on hydrologic conditions. Stanford diverts surface water from Los Trancos Creek and San Francisquito Creek for non-potable use. Stanford does not use surface water for potable water use, as described in Appendix A.

SJW has water rights to surface water from Saratoga Creek, Los Gatos Creek, and associated watershed which accounts for less than 10 percent of SJW's total potable water supplies, as described in Appendix B.

6.1.4 Recycled Water

SJW provides recycled water to a portion of its existing and new customers, under a Wholesaler-Retailer Agreement with the City of San Jose, in which the City of San Jose is the wholesaler and SJW is the retailer. Recycled water is used for non-potable water use to offset what would otherwise be potable water demands. Additional information on SJW's recycled water system is included in Appendix B.

6.2 Additional Planned Future Potable Water Supplies

Neither Stanford nor SJW have any additional planned future potable water supplies. Existing purchased water, groundwater, and surface water supplies are anticipated to meet existing and projected future water demands, including those associated with the Proposed Project, as detailed in Appendices A and B.

6.3 Summary of Existing and Additional Planned Future Water Supplies

Table 6-1 provides a summary of Stanford's and SJW's existing and projected future normal year supplies. Additional detail on each water provider's water supplies is found in Appendices A and B.

Table 6-1. Existing (2020) and Projected Water Supplies, AFY

Water Supplier	2020 (Actual)	2025	2030	2035	2040	2045
Stanford University[(a)]	1,766	5,200	5,400	5,600	5,800	6,000
San Jose Water[(b)]	123,952	135,648	135,875	136,961	138,579	139,957
Supply Total (rounded)	**125,718**	**140,800**	**141,300**	**142,600**	**144,400**	**146,000**

(a) Refer to Appendix A, Table 4-2.
(b) Refer to Appendix B, Table 5.
AFY = acre-feet per year

6.4 Water Supply Availability and Reliability

Water Code Section 10910(c)(4) requires that a WSA include a discussion regarding "whether total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses." Accordingly, this WSA addresses these three hydrologic conditions through the Year 2045.

The quantity of water available from Stanford's and SJW's water supplies vary annually depending on hydrologic conditions. Water supply reliability was evaluated under three conditions: (1) normal water year, (2) single-dry year, and (3) five-consecutive year drought.

The reliability of each of Stanford's and SJW's existing and projected water supplies and their projected availability during normal, single dry, and multiple dry years is described in this section and is summarized from Appendices A and B.

6.4.1 Purchased Water

6.4.1.1 Stanford Purchased Water From SFPUC

Information regarding the reliability of purchased water from SFPUC for Stanford was provided by the Bay Area Water Supply & Conservation Agency (BAWSCA) in coordination with SFPUC. In December 2018, the State Water Resources Control Board 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 2018 Bay-Delta Plan

Amendment would require the release of 30 to 50 percent of the "unimpaired flow"[2] from the Stanislaus, Merced, and Tuolumne Rivers, tributaries to the San Joaquin River, from February through June in every year type; thus, reducing available water supply for SFPUC. If implemented, the Bay-Delta Plan Amendment has the potential to have significant impacts on the reliability of water from SFPUC and on the availability of water during supply shortages. Because of the uncertainties surrounding the implementation of the Bay-Delta Plan Amendment, the SFPUC 2020 UWMP analyzed two supply scenarios, one with the Bay-Delta Plan Amendment assuming implementation starting in 2023, and one without the Bay-Delta Plan Amendment. Results of these analyses are summarized as follows:[3]

- If the Bay-Delta Plan Amendment is implemented, SFPUC will be able to meet its contractual obligations to its wholesale customers as presented in the SFPUC 2020 UWMP in normal years but would experience significant supply shortages in dry years. In single dry years, supply shortages for SFPUC's wholesale customers collectively would range from 36 to 46 percent. In multiple dry years for SFPUC's wholesale customers collectively, supply shortages would range from 36 to 54 percent. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry and multiple dry years through 2045.
- If the Bay-Delta Plan Amendment is not implemented, SFPUC would be able to meet 100 percent of the projected purchases of its wholesale customers during all year types through 2045 except during the fourth and fifth consecutive dry years for base year 2045 when 15 percent wholesale supply shortages are projected for SFPUC's total supply to all wholesale customers.

In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the Regional Water System (RWS), particularly in light of the possible implementation of the Bay-Delta Plan Amendment. In addition, in November 2022, the SFPUC, Modesto Irrigation District, and Turlock Irrigation District signed a memorandum of understanding with the State to advance a voluntary agreement for the Tuolumne River. The proposed eight-year program includes a combination of flow and non-flow measures sufficient to improve all life-stages of native fish populations in the lower Tuolumne River. The goal of the voluntary agreement is to strike the right balance between environmental stewardship and water reliability.

Additional details on the Bay-Delta Plan Amendment and alternatives being pursued by both SFPUC and BAWSCA are included in Appendix A. However, given the current level of uncertainty, projected availability of SFPUC water to Stanford was projected for conditions both with and without the Bay-Delta Plan Amendment.

6.4.1.2 SJW Purchased Water From Valley Water

SJW relies on Valley Water for purchased water supplies, which may be impacted by climate change, reductions in imported water supplies, and threats to infrastructure. Valley Water's water supply

[2] "Unimpaired flow represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds." (Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Dec. 12, 2018) p.17.

[3] BAWSCA. April 2021. BAWSCA Drought Allocation Tables by Agency (Table E: Percent Cutback to the Wholesale Customers With Bay-Delta Plan and Table N: Percent Cutback to the Wholesale Customers Without Bay-Delta Plan).

vulnerabilities to climate change include decreases in the quantity of Delta-conveyed imported water supplies, decreases in the ability to capture and use local surface water supplies due to shifts in the timing and intensity of rainfall and runoff, decreases in water quality, and increases in the severity and duration of droughts. Valley Water's State Water Project and Central Valley Project water supplies are also subject to a number of additional constraints, including conveyance limitations and regulatory requirements to protect fisheries and water quality in the Delta. Valley Water's imported supply infrastructure must travel large distances to reach turnouts. As California is a seismically active state, infrastructure could be damaged and the result would be a disruption to water supply availability.

Valley Water plans short- and long-term investments with the goal of requiring no more than a 20 percent water use reduction from the community during a multi-year drought as outlined in its 2040 Water Supply Master Plan. Valley Water has sources of backup supply outside the County and has always relied on multiple supply sources, such as imported water contracts, to supplement existing long-term resources when necessary. Additional information on the reliability of SJW's purchased water is available in Appendix B.

SJW has based its water supply reliability on Valley Water's Water Evaluation and Planning system model. According to Valley Water, this model simulates its water supply system comprised of facilities to recharge the county's groundwater basins, local water systems including the operation of reservoirs and creeks, treatment and distribution facilities, and raw water conveyance systems.

6.4.2 Groundwater

Stanford is assumed to be able to withdraw up to 1,700 AFY from its wells on a continuous basis without impacting water quality in the aquifer or causing unacceptable impacts such as excessive drawdown or land subsidence.[4] To be conservative, this WSA does not assume additional groundwater supply to be available to Stanford in dry years. Additional information on groundwater reliability for Stanford is available in Appendix A.

SJW is assumed to be able to withdraw up to 50,000 AFY of groundwater by 2045, as described in the SJW 2020 UWMP and in Appendix B. Excess groundwater supplies during dry years are stored by Valley Water in the groundwater basin, local reservoirs, San Luis Reservoir, and/or Semitropic Groundwater Bank, and these reserves are drawn upon during dry years to help meet demands. Additional information on groundwater reliability for SJW is available in Appendix B.

6.4.3 Surface Water

Local surface water availability for Stanford is reliant upon the presence of adequate natural flow within Los Trancos Creek and San Francisquito Creek. In drought years, low rainfall can significantly reduce creek levels, limiting the amount of water available for diversion. An availability of approximately 84 percent of Stanford's total water rights is anticipated in a single dry year or in the first year of a multiple dry year period, and an availability of only 5 percent of Stanford's water rights is anticipated in multiple dry years.[5]

[4] Luhdorff & Scalmanini. 2014. *Sustainable Groundwater Pumping for Stanford University.*

[5] Schaaf & Wheeler Consulting Civil Engineers. September 2019. *Water Supply Assessment for the Stanford 2018 General Use Permit.*

Despite year-to-year variability in the availability of local surface water sources, no long-term changes in Stanford's local surface water supply are anticipated.

Local surface water availability for SJW is highly variable depending on hydrologic conditions. In dry years, low rainfall can decrease surface water supplies, limiting the amount of water available for diversion. Bypass flow requirements at SJW's surface water reservoirs and intakes also establish flow rates that must be released past diversion points to preserve downstream habitat. During heavy rain events, the quantity of surface water that can be conveyed at treated may be limited by the raw water system hydraulics, high turbidity levels, and treatment plant capacity. Despite year-to-year variability in the availability of local surface water sources, no long-term changes in SJW's local surface water supply are anticipated.

6.4.4 Recycled Water

Wastewater supplies to produce recycled water supplies for SJW are sufficient to meet projected non-potable demands within the SJW service area. SJW continues to coordinate with the City of San Jose, Valley Water, and other recycled water retailers in the area to ensure that recycled water infrastructure is adequate to meet future recycled water demands.

6.4.5 Summary of Available Water Supplies Under Normal, Single Dry, and Multiple Dry Years

Projected normal year supplies are shown to be adequate to satisfy both Stanford and SJW's projected normal year demands. SJW's projected dry and multiple dry year supplies are anticipated to be adequate to satisfy demands. However, Stanford's purchased supplies from the SFPUC RWS may be impacted by dry year supply reductions as a result of the implementation of the Bay-Delta Plan Amendment, which would significantly reduce dry year allocations for SFPUC wholesale customers, including Stanford. Details are provided in Section 7 below and in Appendix A and B.

7.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON REQUIREMENTS OF SB 610

Water Code section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.*

Pursuant to Water Code section 10910(c)(4) and based on the technical analyses described in this WSA, the total projected water supplies determined to be available for the Proposed Project during normal years during a 20-year projection will meet the projected water demand associated with the Proposed Project, in addition to existing and near-term planned future uses. Additional details about the water supply sufficiency of the Proposed Project sites in Stanford's water service area and in SJW's water service area are described in Appendices A and B, respectively.

Because of the uncertainties surrounding the implementation of the Bay-Delta Plan Amendment and its impacts on the Stanford Water Supply, this WSA presents findings for Stanford under two scenarios, one assuming the Bay-Delta Plan Amendment is not implemented and one assuming that the Bay-Delta Plan Amendment is implemented.

Table 7-1 summarizes the scenario for Stanford where it is assumed the Bay-Delta Plan Amendment is not implemented. Under this scenario, the total projected water supplies determined to be available in single dry years and multiple dry years are only slightly lower than the projected water demand associated with Stanford's existing and planned future uses, including the Proposed Project, through 2045. As described in Section 6.4.1, based on SFPUC's analysis, a 15 percent supply shortfall is projected during the fourth and fifth consecutive dry years for base year 2045. For Stanford, the projected SFPUC multiple dry year supply availability, in combination with Stanford's groundwater and local surface water supply availability, results in projected multiple dry year demand shortfalls (7 percent). These shortfalls are significantly less than the projected demand shortfalls if the Bay-Delta Plan Amendment is implemented.

Table 7-1. Summary of Stanford Water Demand Versus Water Supply without Bay-Delta Plan Amendment During Various Hydrologic Conditions

Hydrologic Condition		Normal, Single Dry, and Multiple Dry Years, AFY				
		2025	2030	2035	2040	2045
Normal Year						
Available Water Supply[(a)]		5,200	5,400	5,600	5,800	6,000
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,528	1,504	1,480	1,456	1,320
Percent Shortfall of Demand		--	--	--	--	--
Single Dry Year						
Available Water Supply[(c)]		5,000	5,190	5,380	5,580	5,770
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,328	1,294	1,260	1,236	1,090
Percent Shortfall of Demand		--	--	--	--	--
Multiple Dry Years						
Multiple Dry Year 1	Available Water Supply[(d)]	5,003	5,193	5,383	5,583	5,773
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	1,331	1,297	1,263	1,239	1,093
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 2	Available Water Supply[(d)]	4,017	4,207	4,397	4,597	4,787
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	107
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 3	Available Water Supply[(d)]	4,017	4,207	4,397	4,597	4,787
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	107
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 4	Available Water Supply[(d)]	4,017	4,207	4,397	4,597	4,337
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	(343)
	Percent Shortfall of Demand	--	--	--	--	7
Multiple Dry Year 5	Available Water Supply[(d)]	4,017	4,207	4,397	4,597	4,337
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	(343)
	Percent Shortfall of Demand	--	--	--	--	7

(a) Refer to Appendix A, Table 6-1.
(b) Refer to Appendix A, Table 5-2.
(c) Refer to Appendix A, Table 6-6.
(d) Refer to Appendix A, Table 6-7.

Table 7-2 summarizes the scenario where it is assumed the Bay-Delta Plan Amendment is implemented. Under this scenario, significant supply shortfalls are projected in dry years for all agencies that receive water supplies from the SFPUC RWS. For Stanford, the projected SFPUC dry year supply availability, in combination with Stanford's groundwater and local surface water supply availability, results in projected demand shortfalls are in a single dry year in 2045 (6 percent) and in multiple dry years (ranging from 6 to 33 percent) through 2045.

If demand shortfalls do occur (from any cause, such as droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.), Stanford expects to meet these demand shortfalls through water demand reductions and other shortage response actions.[6] The Proposed Project would be subject to the same water conservation and water use restrictions as other water users within Stanford's system. As described in Section 6.4.1.1 of this WSA, the SFPUC is implementing the AWSP to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS. In addition, the SFPUC, along with the Modesto Irrigation District and the Turlock Irrigation District, have entered into a memorandum of understanding with the State to develop a Voluntary Agreement for the Tuolumne River. The Tuolumne River Voluntary Agreement provides a combination of flow and non-flow measures sufficient to improve all life-stages of native fish populations in the lower Tuolumne River. The goal of the Voluntary Agreement is to strike the right balance between environmental stewardship and water reliability.

[6] Stanford. 2022. *Water Resources: Drought*. Accessed at https://suwater.stanford.edu/water-efficiency/drought on March 23, 2023.

Table 7-2. Summary of Stanford Water Demand Versus Water Supply with Bay-Delta Plan Amendment During Various Hydrologic Conditions

Hydrologic Condition		Normal, Single Dry, and Multiple Dry Years, AFY				
		2025	2030	2035	2040	2045
Normal Year						
Available Water Supply[a]		5,200	5,400	5,600	5,800	6,000
Total Water Demand[b]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,528	1,504	1,480	1,456	1,320
Percent Shortfall of Demand		--	--	--	--	--
Single Dry Year						
Available Water Supply[c]		4,190	4,310	4,430	4,540	4,380
Total Water Demand[b]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		518	414	310	196	(300)
Percent Shortfall of Demand		--	--	--	--	6%
Multiple Dry Years						
Multiple Dry Year 1	Available Water Supply[d]	4,193	4,313	4,433	4,543	4,383
	Total Water Demand[b]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	521	417	313	199	(297)
	Percent Shortfall of Demand	--	--	--	--	6
Multiple Dry Year 2	Available Water Supply[d]	3,007	3,107	3,187	3,297	3,397
	Total Water Demand[b]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,047)	(1,283)
	Percent Shortfall of Demand	18	20	23	24	27
Multiple Dry Year 3	Available Water Supply[d]	3,007	3,107	3,187	3,297	3,397
	Total Water Demand[b]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,047)	(1,283)
	Percent Shortfall of Demand	18	20	23	24	27
Multiple Dry Year 4	Available Water Supply[d]	3,007	3,107	3,187	3,127	3,157
	Total Water Demand[b]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,217)	(1,523)
	Percent Shortfall of Demand	18	20	23	28	33
Multiple Dry Year 5	Available Water Supply[d]	3,007	3,107	3,087	3,127	3,157
	Total Water Demand[b]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(1,033)	(1,217)	(1,523)
	Percent Shortfall of Demand	18	20	23	28	33

(a) Refer to Appendix A, Table 6-1.
(b) Refer to Appendix A, Table 5-2.
(c) Refer to Appendix A, Table 6-6.
(d) Refer to Appendix A, Table 6-7.

Table 7-3 summarizes SJW's total projected water supplies and demands in normal and dry conditions. The total projected water supplies, with the use of groundwater reserves, were determined by SJW to be able to meet demands in normal years, single dry years, and multiple dry years. This assumes reserves are at healthy levels at the start of the year. If reserves are low at the beginning of a year, Valley Water may call for water use reductions in combination with using reserves. SJW has water-waste provisions promoting conservation that would go into effect during a drought. These measures would result in a reduction in anticipated demand to meet the lower available water supplies.

Table 7-3. Summary of SJW Water Demand Versus Water Supply During Various Hydrologic Conditions

Hydrologic Condition		Normal, Single Dry, and Multiple Dry Years, AFY				
		2025	2030	2035	2040	2045
Normal Year[a]						
Available Water Supply		135,648	135,875	136,961	138,579	139,957
Total Water Demand		135,648	135,875	136,961	138,579	139,957
Potential Surplus (Deficit)		0	0	0	0	0
Percent Shortfall of Demand		--	--	--	--	--
Single Dry Year[b]						
Available Water Supply		135,648	135,875	136,961	138,579	139,957
Total Water Demand		135,648	135,875	136,961	138,579	139,957
Potential Surplus (Deficit)		0	0	0	0	0
Percent Shortfall of Demand		--	--	--	--	--
Multiple Dry Years[c]						
Multiple Dry Year 1	Available Water Supply	135,648	135,875	136,961	138,579	139,957
	Total Water Demand	135,648	135,875	136,961	138,579	139,957
	Potential Surplus (Deficit)	0	0	0	0	0
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 2	Available Water Supply	135,648	135,875	136,961	138,579	139,957
	Total Water Demand	135,648	135,875	136,961	138,579	139,957
	Potential Surplus (Deficit)	0	0	0	0	0
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 3	Available Water Supply	135,648	135,875	136,961	138,579	139,957
	Total Water Demand	135,648	135,875	136,961	138,579	139,957
	Potential Surplus (Deficit)	0	0	0	0	0
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 4	Available Water Supply	135,648	135,875	136,961	138,579	139,957
	Total Water Demand	135,648	135,875	136,961	138,579	139,957
	Potential Surplus (Deficit)	0	0	0	0	0
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 5	Available Water Supply	135,648	135,875	136,961	138,579	139,957
	Total Water Demand	135,648	135,875	136,961	138,579	139,957
	Potential Surplus (Deficit)	0	0	0	0	0
	Percent Shortfall of Demand	--	--	--	--	--

(a) Refer to Appendix B, Table 7.
(b) Refer to Appendix B, Table 8.
(c) Refer to Appendix B, Table 9.

8.0 WATER SUPPLY ASSESSMENT APPROVAL PROCESS

> *Water Code section 10910 (g)(1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.*
>
> *Water Code section 10911 (b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.*

Although Stanford will be the water supplier for the Proposed Project sites on the Stanford campus, because Stanford is not a public water system, it is not required to adopt the WSA for the portion of the Proposed Project on its campus (Appendix A). As the public water supplier for the unincorporated lands, SJW has adopted the WSA for that portion of the Proposed Project (Appendix B). As the approving agency for the Proposed Project, the County must include this WSA in the EIR that is being prepared for the Proposed Project.

9.0 REFERENCES

BAWSCA. April 2021. *BAWSCA Drought Allocation Tables by Agency (Table E: Percent Cutback to the Wholesale Customers With Bay-Delta Plan and Table N: Percent Cutback to the Wholesale Customers Without Bay-Delta Plan)*.

County of Santa Clara. December 1994. *Santa Clara County General Plan, 1995-2010*.

Luhdorff & Scalmanini. 2014. *Sustainable Groundwater Pumping for Stanford University*.

Schaaf & Wheeler Consulting Civil Engineers. September 2019. *Water Supply Assessment for the Stanford 2018 General Use Permit*.

Stanford University. 2022. *Water Resources: Drought*. Accessed at https://suwater.stanford.edu/water-efficiency/drought on March 23, 2023.

Appendix A

Water Supply Assessment – Stanford University

FINAL REPORT | MAY 2023

Santa Clara County Housing Element Update
Water Supply Assessment – Stanford University

PREPARED FOR

Environmental Science Associates

PREPARED BY

WEST YOST
Water. Engineered.

Santa Clara County Housing Element Update
Water Supply Assessment – Stanford University

Prepared for

Environmental Science Associates

Project No. 712-60-22-11

Project Manager: Rhodora Biagtan, P.E.	June 5, 2023 Date
QA/QC Review: Elizabeth Drayer, P.E.	June 5, 2023 Date

WEST YOST
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FINAL REPORT | JUNE 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

2000 Stanford GUP	2000 Santa Clara County Stanford General Use Permit
AFY	Acre-Feet Per Year
BAWSCA	Bay Area Water Supply & Conservation Agency
County	County of Santa Clara
DU	Dwelling Units
FY	Fiscal Year
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HEU	Housing Element Update
ISG	Individual Supply Guarantee

Table of Contents

mgd	Million Gallons Per Day
RWS	Regional Water System
SFPUC	San Francisco Public Utilities Commission
SGMA	Sustainable Groundwater Management Act
Stanford	Stanford University
SWRCB	State Water Resources Control Board
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

1.0 DESCRIPTION OF PROPOSED PROJECT

The following sections describe the Proposed Project location, description, and projected water demand.

1.1 Proposed Project Location and Overview

The County of Santa Clara (County) is proposing to update its General Plan Housing Element for the 2023-2031 planning period via a Housing Element Update (HEU). The primary purpose of the HEU is to comply with the requirements of State law by analyzing existing and projected housing needs, and updating goals, policies, objectives, and implementation programs for the preservation, improvement, and development of housing. The proposed HEU includes housing opportunity sites on Stanford University (Stanford) lands.

For the purposes of this Water Supply Assessment (WSA), the development of the sites on Stanford lands is defined as the Proposed Project. Additional development sites considered as part of the HEU outside of the Stanford campus are evaluated separately.

The Proposed Project is located in the northeastern area of the Stanford campus in an unincorporated portion of Santa Clara County, California, as shown on Figure 1-1. The Stanford campus occupies over 8,000 acres of land across the San Mateo – Santa Clara County line. Stanford's main campus is located in Santa Clara County.

The Proposed Project is proposed to include approximately 54 gross acres of land for faculty/staff housing with a range of 1,680 to 2,160 potential residential dwelling units (DU).[1] In addition to the residential units, the Proposed Project includes approximately 18 acres for the development of an elementary school, located on a portion of a larger 43-acre property. The Proposed Project sites are located in three separate areas around Stanford's main campus, as shown on Figure 1-1.

[1] Project area and potential units are based on the Santa Clara County Housing Element Update site inventory list, August 2022.

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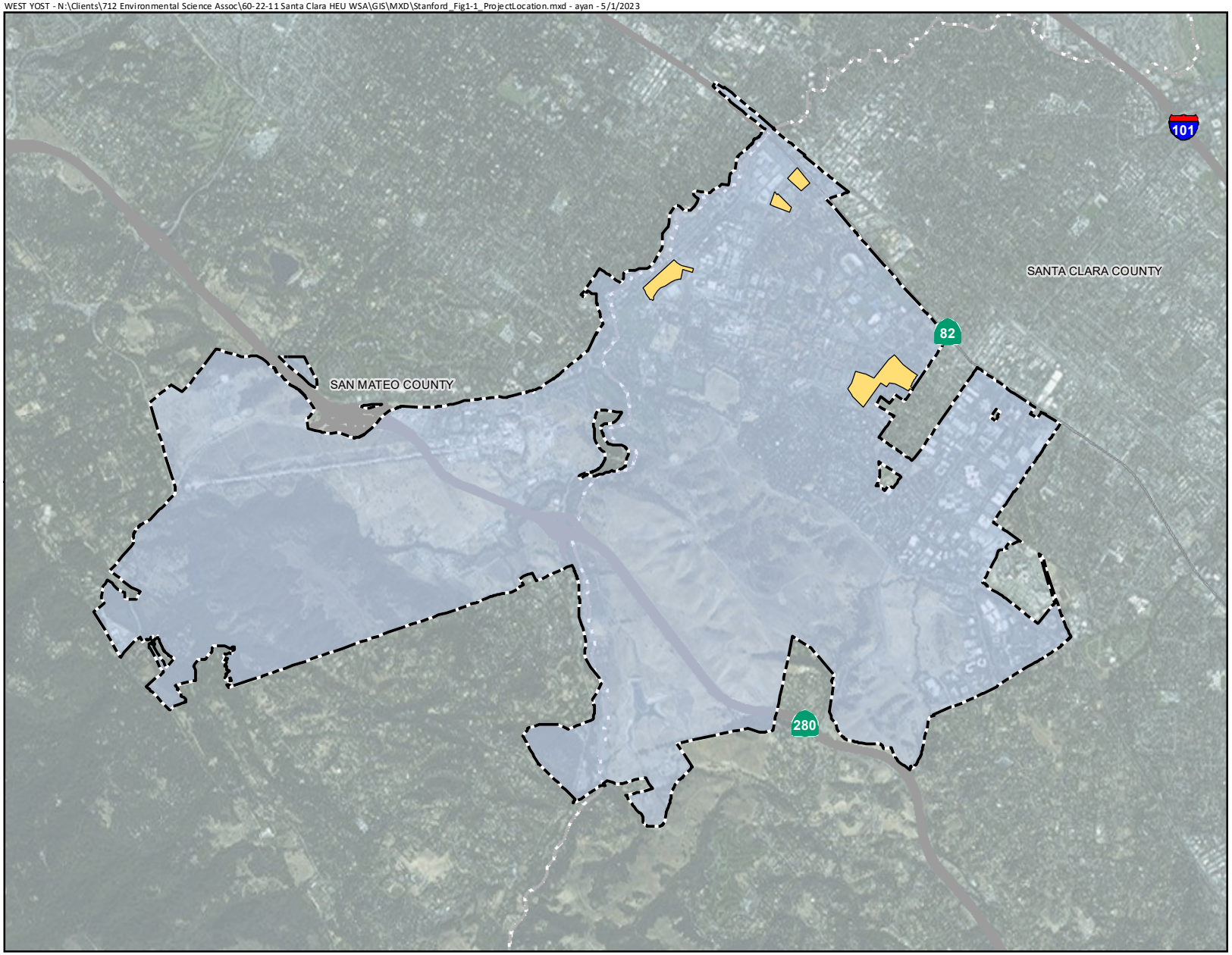

Proposed Project

Stanford Water Service Area

Stanford University Boundary

County Boundary

Notes:
1. Proposed Project boundary from Santa Clara County Housing Element Update Site Inventory (August 2022).

Prepared by:

WEST YOST

N

0 3,000 6,000 Feet

Prepared for:

Environmental Science Associates
Santa Clara County HEU
Water Supply Assessment

ESA

Proposed Project Location
Stanford University

Figure 1-1

1.2 Proposed Land Uses and Projected Water Demand

The Proposed Project sites have existing land use designations of Major Educational & Institutional Uses as classified by the 1995 Santa Clara County General Plan (1995 General Plan).[2] Table 1-1 presents the projected water demand for the Proposed Project as proposed in the HEU. Based on the potential density, the housing units were assumed to be apartment-type units for faculty/staff housing, which would also encompass similar housing types for graduate students and postgraduate fellows. The projected water demand for the housing units includes both indoor domestic uses as well as outdoor landscape irrigation. The proposed elementary school is assumed to have similar attendance to the two existing elementary schools on Stanford's campus. As shown in Table 1-1, the total projected water demand for the Proposed Project is 257 acre-feet per year (AFY).

Table 1-1. Projected Water Demand for the Proposed Project

Land Use	Potential Maximum Units, DU[(a)]	Number of Students	Gross Area, acres[(b)]	Water Use Factor[(c)]	Projected Water Demand	
					gpd	AFY
Faculty/Staff Housing - Apartments[(d)]	2,160	–	54	100 gpd /DU	216,000	242
Elementary School[(e)]	–	420	18	32 gpd /student	13,440	15
Total	**2,160**	**420**	**72**	**–**	**229,440**	**257**

(a) Number of units and parcel areas are from the HEU Site Inventory List (Site Inventory List 08042022_Corrected.xlsx) provided by the County on November 16, 2022.

(b) Gross area was provided via personal communication from Environmental Science Associates on May 1, 2023.

(c) The Faculty/Staff Housing water use factor is from the Water Supply Assessment for the Stanford 2018 General Use Permit, September 2019. The Elementary School water use factor is based on an average factors used by other San Francisco Bay Area agencies in their Master Plans.

(d) Water demands for faculty/staff housing have been calculated based on the maximum potential number of units.

(e) The proposed elementary school is assumed to be of similar size and enrollment as the existing Nixon and Escondido Elementary Schools at Stanford and will be located on a portion of a larger identified 43-acre site.

DU = Dwelling Units, gpd = gallons per day, AFY = acre-feet per year

Table 1-2 presents the projected water demand for the Proposed Project site based on the land uses previously identified in the 2000 Santa Clara County Stanford General Use Permit[3] (2000 Stanford GUP) and the associated 2000 Santa Clara County Community Plan.[4] In the 2000 Stanford GUP, the proposed elementary school site was identified as Academic Campus land use. However, it is expected that the development of academic buildings will be relocated within the Stanford campus instead of being replaced by the elementary school. Therefore, projected Academic Campus water demands have not been accounted for in this WSA. The projected water demand for the Proposed Project site based on the previously identified land use is 58 AFY. The current Proposed Project demands of 257 AFY represent an

[2] County of Santa Clara. October 2016. *General Plan Land Use Map.* Accessed at https://plandev.sccgov.org/ordinances-codes/general-plan on March 23, 2023.

[3] County of Santa Clara. December 2000. *Stanford University 2000 General Use Permit*.

[4] County of Santa Clara. 2000. *2000 Stanford Community Plan.*

increase of 199 AFY from the previously proposed land uses for the Proposed Project site based on the 2000 Stanford GUP.

Table 1-2. Projected Water Demand for the Proposed Project Site based on Previous Proposed Land Uses

Land Use Type	Projected Units, DU	Gross Area, acres	Water Use Factor[a]	Projected Water Demand	
				gpd[b]	AFY[b]
Faculty/Staff Housing	517	54	100 gpd/DU	51,708	58
Academic Campus[c]	–	18	–	0	0
Total	**517**	**72**	**–**	**51,708**	**58**

(a) The Faculty/Staff Housing water use factor is from the Stanford 2018 GUP WSA, September 2019, assuming all future housing units are apartments.

(b) Water demands for faculty/staff housing are based on the maximum number of potential units proposed in the HEU.

(c) The elementary school site was previously designated as an Academic Campus land use, with water demand projected by building floor area. However, no buildings were specifically identified for this site, and it is expected that any planned academic buildings will be relocated within the Stanford campus instead of being replaced by the elementary school. Therefore, projected Academic Campus water demands are not accounted for in this WSA.

DU = Dwelling Units, gpd = gallons per day, AFY = acre-feet per year

2.0 STANFORD UNIVERSITY SERVICE AREA

2.1 Water Service Area

The Stanford campus is located on over 8,000 acres of land straddling the San Mateo-Santa Clara County line. Stanford's main campus is located in Santa Clara County, while other lands are located in the City of Palo Alto, unincorporated San Mateo County, and the Cities of Menlo Park, Portola Valley, and Woodside. Stanford also owns noncontiguous property in the City of Redwood City (Stanford University at Redwood City). Stanford is not served by an identified "public water system." The campus receives water supply from the San Francisco Public Utilities Commission (SFPUC), groundwater, and local surface supplies.

Land uses throughout Stanford's water service area consist primarily of academic buildings, student housing, faculty/staff housing, as well as irrigated landscape areas. Although some areas of the Stanford campus are irrigated with potable water, most of the irrigation demands on campus are met with non-potable water from local surface and groundwater supplies.

2.2 Population

The existing (2020) population for the Stanford water service area was estimated at 32,075, based on information provided by Stanford to the Bay Area Water Supply & Conservation Agency (BAWSCA). Table 2-1 shows Stanford's projected population in five-year increments from 2020 to 2045. The Stanford population projections were incorporated in the 2020 SFPUC UWMP population projections.

Table 2-1. Projected Population for the Stanford Water Service Area		
Time Frame	Year	Population
Historical	2020	32,075
Projected	2025	34,748
	2030	36,922
	2035	39,226
	2040	41,342
	2045	43,525
Source: BAWSCA Regional Water Demand and Conservation Projections, Table 5-3, June 2020; BAWSCA Service Area Populations, https://bawsca.org/members/populations		

3.0 WATER DEMANDS

> *Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

Stanford is not required to prepare an Urban Water Management Plan (UWMP), as it is not an "urban water supplier" under the criteria of the California Water Code. To support regional water planning efforts, Stanford is a member of the BAWSCA. Stanford provided input in BAWSCA's June 2020 Regional Water Demand and Conservation Projections Report (Demand Report)[5], which was prepared to support long-term reliable water strategies and support individual agency efforts for completion of UWMPs. The BAWSCA Demand Report includes demand projections for member agencies through 2045 based on historical data, population projections, demographics, and water conservation savings. The descriptions below for Stanford water demands have been primarily taken from the BAWSCA Demand Report, the SFPUC 2020 UWMP, and the Stanford 2018 GUP WSA.[6]

3.1 Historical and Existing Water Demand

Table 3-1 shows Stanford's historical and existing water demand (based on water production) for 2010 through 2020. During this period, annual average consumption has decreased from a high of 3,785 AFY in 2012 to 2,829 AFY in 2019. Much of this reduction is a result of implementation of the Stanford Energy Systems Innovations Project in fiscal years 2014-15 and 2015-16, as well as mandatory drought conservation measures during the drought of 2012 to 2016. Stanford's water demands have remained low post-drought due to permanent water conservation measures. Water demands in 2020 were significantly lower than normal (1,766 AFY) due to campus closures because of the COVID-19 pandemic and are not expected to be representative of future Stanford water demands.

[5] Maddaus Water Management, Inc. June 2020. *Bay Area Water Supply & Conservation Agency's Regional Water Demand and Conservation Projections.*

[6] Schaaf & Wheeler Consulting Civil Engineers. September 2019. *Water Supply Assessment for the Stanford 2018 General Use Permit.*

Table 3-1. Historical Water Demand	
Year	Water Demand, AFY
2010	3,650
2011	3,479
2012	3,785
2013	3,276
2014	3,622
2015	2,923
2016	2,963
2017	2,566
2018	2,457
2019	2,829
2020	1,766
Sources: Stanford 2018 GUP WSA, SFPUC 2020 UWMP, California Department of Water Resources eWRIMS online Water Rights Records Search database, BAWSCA Annual Surveys	

3.2 Future Water Demand

Table 3-2 presents the projected normal year water demands for Stanford to be used in the WSA through 2045, based on the projections included in the BAWSCA Demand Report. These projections are based on the BAWSCA projections with the additional demands from the Proposed Project as described in Section 1.2. A 27 percent increase is projected from 2025 to 2045.

Table 3-2. Stanford Projected Water Demands, AFY

Source	2025	2030	2035	2040	2045
2020 BAWSCA Projections[a]	3,473	3,697	3,921	4,145	4,481
Incremental Increase in Project[b]	199	199	199	199	199
Total	**3,672**	**3,896**	**4,120**	**4,344**	**4,680**

(a) Demands from BAWSCA's Regional Water Demand and Conservation Projections, June 2020, Table 5-5, assuming passive conservation.
(b) The incremental increase from the Proposed Project is the difference from projected water demands in Table 1-1 and Table 1-2.
AFY = acre-feet per year

3.3 Dry Year Water Demand

As shown in Table 3-1, Stanford was able to significantly decrease its water demands compared to prior years in response to the drought and mandated statewide reductions in potable water usage. Stanford has implemented permanent water conservation measures, and the projected future water demand presented in Table 3-2 includes continued implementation of these measures.

Under dry water year conditions, Stanford anticipates implementing further water demand reduction measures as appropriate to reduce water demands to match any projected reduction in supply. However, to be conservative, this WSA does not assume additional water conservation will occur in single dry or multiple dry years, as compared to normal years, even though additional water conservation is likely to occur.

4.0 WATER SUPPLIES

Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).

Water Code Section 10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Water Code Section 10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

Water Code Section 10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

The Proposed Project, if approved by the County and Stanford, is anticipated to be served from Stanford's existing and future portfolio of water supplies. The inclusion of existing and planned future water supplies is specifically allowed by the Water Code:

Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).

The water supply for the Proposed Project will have the same water supply reliability and water quality as the water supply available to the other Stanford uses. The descriptions provided below about Stanford's water supplies needed to serve the Proposed Project have been predominantly taken, for the most part, from the Stanford 2018 GUP WSA.

4.1 Water Supply Overview

Stanford's current primary source of potable water supply is from the San Francisco Regional Water System (RWS), which is operated by the SFPUC. This water is purchased by Stanford from SFPUC under a wholesale contract. Stanford has the capability to supplement potable supplies with groundwater if

needed. In addition, Stanford uses local surface supplies and groundwater for non-potable uses, primarily for landscape irrigation. The non-potable distribution system is referred to as the Lake Water System.

4.2 Water Supply from the SFPUC

The SFPUC supplies water to both retail and wholesale customers. Retail customers include residents, businesses, and industries located within the City and County of San Francisco's boundaries. Wholesale customers include 26 cities and water supply agencies in Alameda, San Mateo and Santa Clara counties, including Stanford.

Stanford is a member agency of BAWSCA, and purchases treated water from SFPUC in accordance with the November 2018 Amended and Restated Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda, San Mateo and Santa Clara Counties, which was adopted in 2019. The term of the agreement is 25 years, with a beginning date of July 1, 2009, and an expiration date of June 30, 2034. Per the agreement, Stanford has an Individual Supply Guarantee (ISG) of 3.03 million gallons per day (mgd), or 3,394 AFY, supplied by the SFPUC. Note that although expressed in units of mgd, the ISG is an overall annual average target. Daily or monthly usage may exceed this target, and this is not uncommon during the summer months. Over the last five years (2016-2020) Stanford has purchased between 46 percent and 49 percent of its ISG. Additional discussion of the SFPUC water supplies is provided in SFPUC's 2020 UWMP.

4.3 Groundwater

Groundwater pumped from five (5) Stanford-owned and operated wells over the Santa Clara Valley Groundwater Subbasin is currently used only for non-potable uses such as landscape irrigation and is relied upon most during dry years, although groundwater could be used to supplement potable water supply from SFPUC if needed. Groundwater is also pumped into Stanford's Felt Reservoir for rediversion into the Lake Water System.

4.3.1 Groundwater Basin Description

The Stanford service area overlies the Santa Clara Valley Basin's Santa Clara Valley Groundwater Subbasin (Basin number 2-009.02). The subbasin is not adjudicated, nor has it been found by the Department of Water Resources (DWR) to be in a condition of overdraft. As part of the implementation of the Sustainable Groundwater Management Act (SGMA), the subbasin was identified as a high priority basin under the California Statewide Groundwater Elevation Monitoring basin prioritization process.[7]

The Santa Clara Valley Subbasin underlying the Stanford service area contains sands and gravels deposited in alluvial fans at the foot of the Santa Cruz Mountains, covered in alluvium and Bay Mud. The subbasin contains both confined and unconfined aquifer units with water table surfaces generally sloping towards San Francisco Bay. Groundwater levels in the Santa Clara Valley Subbasin have been relatively stable over the last twenty-five years, after recovering from low levels in the 1960s caused by decades of groundwater pumping for growing agricultural use.[8] Many former groundwater users now rely on imported surface water deliveries.

[7] DWR. May 2020. *Sustainable Groundwater Management Act 2019 Basin Prioritization.*

[8] Valley Water. November 2021. *Groundwater Management Plan for the Santa Clara and Llagas Subbasins.*

4.3.2 Groundwater Basin Management

Valley Water is the Groundwater Sustainability Agency (GSA) for the Santa Clara Subbasin. Valley Water is an independent special district that provides wholesale water supply, groundwater management, flood protection and stream stewardship in Santa Clara County. Valley Water prepared a Groundwater Management Plan report published in 2021 (2021 GMP) as an alternative to the Groundwater Sustainability Plan (GSP), which is a required planning document by DWR. The 2021 GMP delineates the role of Valley Water as the groundwater manager within the County, as well as providing details of the basins which Valley Water manages.

To reduce the risk of groundwater basin overdraft, a recharge system has been developed by Valley Water. Valley Water manages facility recharge methods that account for over 60 percent of the total recharge in the basins they manage.

4.3.3 Groundwater Use

Stanford's wells have a combined total pumping capacity of approximately 4,450 AFY. In the highest recent reporting year (FY 2013-14), Stanford withdrew a total of 1,142 AF from these wells. This was a dry year, and on average, Stanford pumps significantly less than this amount.[9] A 2014 groundwater modeling study[10] indicated that Stanford could withdraw up to 1,700 AFY from its wells on a continuous basis without impacting water quality in the aquifer or causing unacceptable impacts such as excessive drawdown or land subsidence. The volume of groundwater pumped by Stanford over the past five years is summarized in Table 4-1.

Table 4-1. Historical Groundwater Volume Pumped by Stanford, AFY

2016	2017	2018	2019	2020
690	456	554	0	0

Source: BAWSCA Annual Surveys, 2016-2020.

4.4 Local Surface Water

Stanford holds a combination of riparian and pre-1914 appropriative rights reported under four Statements of Water Diversion and Use (S004660, S004661, S015695, and S015696) and one appropriative right licensed by the State Water Resources Control Board (SWRCB) (L001723). These water rights support Stanford's diversion from Los Trancos Creek and San Francisquito Creek, two streams that flow through Stanford lands, which supply Stanford's Lake Water System. The rights provide water for recreation, irrigation, stock watering, and fire protection purposes.

Water is impounded seasonally (during periods of high flow) in two reservoirs above campus: Searsville Reservoir on Corte Madera Creek (just above its confluence with Bear Gulch Creek) and Felt Reservoir east of Los Trancos Creek. Water is then drawn from these reservoirs as needed. Because of the way in which waters from multiple sources commingle during diversion and storage, total diversion and usage statistics are reported in aggregate monthly quantities to the SWRCB, on an annual basis. Together, the rights to diverted surface waters can yield 1,255 AFY to the Lake Water System. Lake water is not treated to meet

[9] BAWSCA. 2021. *Water Use by Source.* Accessed at https://bawsca.org/water/use/source on March 21, 2023.

[10] Luhdorff & Scalmanini. 2014. *Sustainable Groundwater Pumping for Stanford University.*

domestic water quality standards. It is conveyed to campus via a separate system and used for the purposes of irrigation and backup fire protection.

4.5 Summary of Existing and Additional Planned Future Water Supplies

Table 4-2 provides a summary of Stanford's existing and projected future normal year water supplies. Projections for water use from SFPUC are based on the projected wholesale purchase requests in the SFPUC 2020 UWMP. Groundwater projections are based on the identified safe yield described in Section 4.3.3, and local surface water is projected based on Stanford's total water rights. A discussion of the future anticipated availability of these existing and additional planned future water supplies during dry years is provided in Section 5.0 of this WSA.

Table 4-2. Existing (2020) and Projected Water Supplies – Normal Years, AFY

Supply	2020 (Actual)[a]	2025	2030	2035	2040	2045
SFPUC	1,602	2,250	2,440	2,630	2,830	3,020
Surface Water	164	1,255	1,255	1,255	1,255	1,255
Groundwater	0	1,700	1,700	1,700	1,700	1,700
Total	**1,766**	**5,200**	**5,400**	**5,600**	**5,800**	**6,000**

(a) Actual water use in 2020 was significantly lower than normal due to Stanford campus closures related to the COVID-19 pandemic.

5.0 WATER SUPPLY AVAILABILITY AND RELIABILITY

Water Code Section 10910 (c)(4) requires that a WSA include a discussion regarding "whether total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses." Accordingly, this WSA addresses these three hydrologic conditions through the year 2045.

The quantity of water available from Stanford's water supplies varies annually depending on hydrologic conditions. Water supply reliability was evaluated under three conditions: (1) normal water year, (2) single-dry year, and (3) five-consecutive year drought. The current reliability of Stanford's water supply is largely dependent upon its water supply contract with SFPUC and SFPUC's water supply reliability. Stanford's local surface water supply is also subject to reductions during single and multiple dry years (seasonal and climatic shortages) as discussed below.

The reliability of each of Stanford's existing and projected water supplies and their projected availability during normal, single dry, and multiple dry years is described in the following sections and is primarily based on the Valley Water 2020 UWMP (adopted in June 2021) and the SFPUC 2020 UWMP (also adopted in June 2021).

5.1 SFPUC RWS Reliability

Information regarding the reliability of the SFPUC RWS was provided by BAWSCA in coordination with SFPUC. The following sections describe the potential impacts of the 2018 Bay-Delta Plan Amendment on SFPUC RWS reliability, allocation of RWS supplies during supply shortages, as well as SFPUC's Alternative

Water Supply Planning Program (AWSP) designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS.

5.1.1 Potential Impacts of the 2018 Bay-Delta Plan Amendment on SFPUC RWS Reliability

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 40 percent of the "unimpaired flow" on the three tributaries from February through June in every year type, whether wet, normal, dry, or critically dry.

The SWRCB stated that it intended to implement the Bay-Delta Plan Amendment on the Tuolumne River by the Year 2022, assuming all required approvals were obtained by that time. But implementation of the Plan Amendment has not occurred to date and is uncertain for several reasons:

- Since adoption of the Bay-Delta Plan Amendment, over a dozen lawsuits have been filed in both state and federal court, challenging the SWRCB's adoption of the Bay-Delta Plan Amendment, including two legal challenges filed by the federal government, at the request of the U.S. Department of Interior, Bureau of Reclamation in state and federal courts. These cases are in the early stage and there have been no dispositive court rulings to date.
- The Bay-Delta Plan Amendment is not self-implementing and does not allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, the 401 certification process in the Federal Energy Regulatory Commission's (FERC) relicensing proceeding for Don Pedro Dam. This process and the other regulatory and/or adjudicatory proceedings would likely face legal challenges and have lengthy timelines, and quite possibly could result in a different assignment of flow responsibility (and therefore a different water supply impact on the SFPUC).
- In recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, 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, 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 SFPUC's participation in the Voluntary Agreement negotiation process.
- In November 2022, the SFPUC, Modesto Irrigation District, and Turlock Irrigation District signed a memorandum of understanding with the State to advance a voluntary agreement for the Tuolumne River. The proposed eight-year program includes a combination of flow and non-flow measures sufficient to improve all life-stages of native fish populations in the

lower Tuolumne River. The goal of the Voluntary Agreement is to strike the right balance between environmental stewardship and water reliability.

Because of the uncertainties surrounding the implementation of the Bay-Delta Plan Amendment, the SFPUC 2020 UWMP analyzed two supply scenarios, one with the Bay-Delta Plan Amendment assuming implementation starting in 2023, and one without the Bay-Delta Plan Amendment. Results of these analyses are summarized as follows:[12]

- If the Bay-Delta Plan Amendment is implemented, SFPUC will be able to meet its contractual obligations to its wholesale customers as presented in the SFPUC 2020 UWMP in normal years but would experience significant supply shortages in dry years. In single dry years, supply shortages for SFPUC's wholesale customers collectively would range from 36 to 46 percent. In multiple dry years for SFPUC's wholesale customers collectively, supply shortages would range from 36 to 54 percent. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry and multiple dry years through 2045.
- If the Bay-Delta Plan Amendment is not implemented, SFPUC would be able to meet 100 percent of the projected purchases of its wholesale customers during all year types through 2045 except during the fourth and fifth consecutive dry years for base year 2045 when 15 percent wholesale supply shortages are projected for SFPUC's total supply to all wholesale customers.

In June 2021, in response to various comments from wholesale customers regarding the reliability of the RWS as described in SFPUC's 2020 UWMP, the SFPUC provided a memorandum describing SFPUC's efforts to remedy the potential effects of the Bay-Delta Plan Amendment. As described in the memorandum (included in Attachment A of this WSA), SFPUC's efforts include the following:

- Pursuing a Tuolumne River Voluntary Agreement
- Evaluating the drought planning scenario in light of climate change
- Pursuing alternative water supplies
- In litigation with the State over the Bay-Delta Plan Amendment
- In litigation with the State over the proposed Don Pedro FERC Water Quality Certification

5.1.2 Allocation of RWS Supplies During Supply Shortages

The wholesale customers and SFPUC adopted the November 2018 Amended and Restated Water Supply Agreement in 2019, which included a Water Shortage Allocation Plan (WSAP) to allocate water from the RWS to retail and wholesale customers during system-wide shortages of 20 percent or less, including such shortages occurring as a result of implementation of the Bay-Delta Plan Amendment. The WSAP has two tiers which are described below.

- The Tier One Plan allocates water between SFPUC and the wholesale customers collectively based on the level of the shortage (up to 20 percent). This plan applies only when SFPUC determines that a system-wide water shortage exists and issues a declaration of a water

[12] BAWSCA. April 2021. BAWSCA Drought Allocation Tables by Agency (Table E: Percent Cutback to the Wholesale Customers With Bay-Delta Plan and Table N: Percent Cutback to the Wholesale Customers Without Bay-Delta Plan).

shortage emergency under California Water Code Section 350. The SFPUC may also opt to request voluntary cutbacks from San Francisco and the wholesale customers to achieve necessary water use reductions during drought periods. The allocations outlined in the Tier One Plan are provided in Table 5-1.

- The Tier Two Plan allocates the collective wholesale customer share among the wholesale customers based on a formula that accounts for each wholesale customer's ISG, seasonal use of all available water supplies, and residential per capita use. BAWSCA calculates each wholesale customer's Allocation Factors annually in preparation for a potential water shortage emergency.

Table 5-1. Tier One Plan Water Shortage Allocations

System-Wide Reduction Required, percent	Share of Available Water, percent	
	SFPUC	Wholesale Customers
≤ 5	35.5	64.5
6 to 10	36.0	64.0
11 to 15	37.0	63.0
16 to 20	37.5	62.5

BAWSCA recognizes that the Tier Two Plan was not designed for RWS shortages greater than 20 percent, and in a memorandum dated March 1, 2021, BAWSCA provided a refined methodology to allocate RWS supplies during projected future single dry and multiple dry years in the instance where supply shortfalls are greater than 20 percent for the purposes of the BAWSCA member agencies' 2020 UWMPs. The revised methodology developed by BAWSCA allocates the wholesale supplies as follows:

- When the average Wholesale Customers' RWS shortages are 10 percent or less, an equal percent reduction will be applied across all agencies. This is consistent with the existing Tier Two requirements in a Tier Two application scenario.
- When average Wholesale Customers' shortages are between 10 and 20 percent, the Tier Two Plan will be applied.
- When the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.

In another memorandum dated February 18, 2021, BAWSCA explains that in actual RWS shortages greater than 20 percent, BAWSCA Member Agencies would have the opportunity to negotiate and agree upon a more nuanced and equitable approach. This would likely consider basic health and safety needs, the water needs to support critical institutions, and minimizing economic impacts on individual communities and the region. As such, the allocation method described above is only intended to serve as the preliminary basis for the supply reliability analysis. The analysis provided in the SFPUC 2020 UWMP does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodology. BAWSCA member agencies are in discussions about jointly developing an allocation method that would consider additional equity factors in the event that SFPUC is not able to deliver its contractual supply volume, and its cutbacks to the RWS supply exceed 20 percent.

5.1.3 Alternative Water Supply Program

In early 2020, the SFPUC began implementation of the AWSP, a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities of the RWS particularly in light of the possible implementation of the Bay-Delta Plan Amendment.

Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent AWSP Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. The drivers for the program include:

1. the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years;
2. the net supply shortfall following the implementation of SFPUC's Water System Improvement Plan (WSIP)[13];
3. San Francisco's perpetual obligation to supply 184 mgd to the Wholesale Customers;
4. adopted Level of Service Goals to limit rationing to no more than 20 percent system-wide during droughts; and
5. the potential need to identify water supplies that would be required to offer permanent status to interruptible customers.

The SFPUC is considering several water supply options and opportunities to meet all foreseeable water supply needs, including surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. These efforts and their expected benefit to supply reliability are listed below, and described in further detail in the SFPUC 2020 UWMP:

- Daly City Recycled Water Expansion (Regional; Normal and Dry-Year Supply)
- Alameda County Water District – Union Sanitary District Purified Water Partnership (Regional; Normal and Dry-Year Supply)
- Crystal Springs Purified Water (Regional; Normal and Dry-Year Supply)
- Los Vaqueros Reservoir Expansion (Regional; Dry Year Supply)
- Bay Area Brackish Water Desalination (Regional; Normal and Dry-Year Supply)
- Calaveras Reservoir Expansion (Regional; Dry Year Supply)
- Groundwater Banking (Dry Year Supply)
- Inter-Basin Collaborations

[13] The Water System Improvement Program (WSIP) is a $4.8 billion-dollar, multi-year capital program to upgrade the SFPUC's regional and local water systems. The program repairs, replaces, and seismically upgrades crucial portions of the Hetch Hetchy Regional Water System. The program consists of 87 projects (35 local projects located within San Francisco and 52 regional projects) spread over seven counties from the Sierra foothills to San Francisco. The San Francisco portion of the program is 100 percent complete as of October 2020. The Regional portion is approximately 99 percent complete. The current forecasted date to complete the overall WSIP is May 2023.

Capital projects under consideration would be costly and are still in the early feasibility and conceptual planning stages. The exact yields from these projects are not quantified at this time, as these supply projects would take 10 to 30 years to implement and the exact amount of water that can be reasonably developed is currently unknown.

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, these projects will require a long lead time to develop and implement. SFPUC staff have developed an approach and timeline to substantially complete planning and initiate environmental review in 2023 for a majority of the alternative water supply projects under consideration.

5.1.4 Stanford SFPUC Reliability

The projected availability of water supplies to Stanford from the SFPUC RWS are presented in Table 5-2 and Table 5-3 below. Projections are based on the projected wholesale purchase requests in the SFPUC 2020 UWMP, as well as projected drought allocations provided by SFPUC for conditions with or without the Bay-Delta Plan Amendment.

Table 5-2. Projected Stanford SFPUC Water Supplies with Bay-Delta Plan Amendment

Hydrologic Condition	Projected Water Supply, AFY				
	2025	2030	2035	2040	2045
Normal Year	2,250	2,440	2,630	2,830	3,020
Single Dry Year	1,440	1,560	1,680	1,790	1,630
Multiple Dry Years - Year 1	1,440	1,560	1,680	1,790	1,630
Multiple Dry Years - Year 2	1,240	1,340	1,420	1,530	1,630
Multiple Dry Years - Year 3	1,240	1,340	1,420	1,530	1,630
Multiple Dry Years - Year 4	1,240	1,340	1,420	1,360	1,390
Multiple Dry Years - Year 5	1,240	1,340	1,320	1,360	1,390

Source: SFPUC 2020 UWMP Tables 4-3 and 8-3; BAWSCA Drought Allocation Tables by Agency

Table 5-3. Projected Stanford SFPUC Water Supplies without Bay-Delta Plan Amendment

Hydrologic Condition	Projected Water Supply, AFY				
	2025	2030	2035	2040	2045
Normal Year	2,250	2,440	2,630	2,830	3,020
Single Dry Year	2,250	2,440	2,630	2,830	3,020
Multiple Dry Years - Year 1	2,250	2,440	2,630	2,830	3,020
Multiple Dry Years - Year 2	2,250	2,440	2,630	2,830	3,020
Multiple Dry Years - Year 3	2,250	2,440	2,630	2,830	3,020
Multiple Dry Years - Year 4	2,250	2,440	2,630	2,830	2,570
Multiple Dry Years - Year 5	2,250	2,440	2,630	2,830	2,570

Source: SFPUC 2020 UWMP Tables 4-3 and 8-3; BAWSCA Drought Allocation Tables by Agency

5.2 Groundwater Reliability

As described in Section 4.3, Stanford is assumed to be able to withdraw up to 1,700 AFY from its wells on a continuous basis without impacting water quality in the aquifer or causing unacceptable impacts such as excessive drawdown or land subsidence. The 2014 groundwater study also indicated that during drought periods, withdrawals of up to 5,000 AFY may be made for a brief one-to-two-year period by Stanford or others in the basin, if followed by a low use period during which the aquifer may recover. However, to be conservative, this WSA does not assume the additional groundwater supply to be available to Stanford in dry years, as it is unclear how the additional 5,000 AFY may be distributed among groundwater users within the basin.

Table 5-4. Projected Stanford Groundwater Supplies

Hydrologic Condition	Projected Water Supply, AFY				
	2025	2030	2035	2040	2045
Normal Year	1,700	1,700	1,700	1,700	1,700
Single Dry Year	1,700	1,700	1,700	1,700	1,700
Multiple Dry Years - Year 1	1,700	1,700	1,700	1,700	1,700
Multiple Dry Years - Year 2	1,700	1,700	1,700	1,700	1,700
Multiple Dry Years - Year 3	1,700	1,700	1,700	1,700	1,700
Multiple Dry Years - Year 4	1,700	1,700	1,700	1,700	1,700
Multiple Dry Years - Year 5	1,700	1,700	1,700	1,700	1,700

Source: Stanford 2018 GUP WSA

5.3 Local Surface Water Reliability

Local surface water availability is reliant upon the presence of adequate natural flow within Los Trancos Creek and San Francisquito Creek. In drought years, low rainfall can significantly reduce creek levels, limiting the amount of water available for diversion. Based on the 2018 GUP WSA, an availability of approximately 84 percent of Stanford's total water rights is anticipated in a single dry year or in the first year of a multiple dry year period, and an availability of only 5 percent of Stanford's water rights is anticipated in multiple dry years. Despite year-to-year variability in the availability of local surface water sources, no long-term changes in Stanford's local surface water supply are anticipated.

Table 5-5. Projected Stanford Local Surface Water Supplies

Hydrologic Condition	Projected Water Supply, AFY				
	2025	2030	2035	2040	2045
Normal Year	1,255	1,255	1,255	1,255	1,255
Single Dry Year	1,053	1,053	1,053	1,053	1,053
Multiple Dry Years - Year 1	1,053	1,053	1,053	1,053	1,053
Multiple Dry Years - Year 2	67	67	67	67	67
Multiple Dry Years - Year 3	67	67	67	67	67
Multiple Dry Years - Year 4	67	67	67	67	67
Multiple Dry Years - Year 5	67	67	67	67	67

Source: Stanford 2018 GUP WSA

5.4 Summary of Available Water Supplies Under Normal, Single Dry, and Multiple Dry Years

Projected normal year supplies are shown to be adequate to satisfy Stanford's projected normal year demands. However, Stanford's purchased supplies from the SFPUC RWS assume dry year supply reductions as a result of the implementation of the Bay-Delta Plan Amendment, which significantly reduces dry year allocations for SFPUC wholesale customers.

Table 5-6 summarizes Stanford's projected supplies during normal, single dry and multiple dry years through 2045 based on the assumptions described in the sections above, which assume implementation of the Bay-Delta Plan Amendment.

Table 5-6. Projected Total Water Supplies with Bay-Delta Plan Amendment[a]

Hydrologic Condition	Normal, Single Dry, and Multiple Dry Years, AFY				
	2025	2030	2035	2040	2045
Normal Year	5,205	5,395	5,585	5,785	5,975
Single Dry Year	4,193	4,313	4,433	4,543	4,383
Multiple Dry Years - Year 1	4,193	4,313	4,433	4,543	4,383
Multiple Dry Years - Year 2	3,007	3,107	3,187	3,297	3,397
Multiple Dry Years - Year 3	3,007	3,107	3,187	3,297	3,397
Multiple Dry Years - Year 4	3,007	3,107	3,187	3,127	3,157
Multiple Dry Years - Year 5	3,007	3,107	3,087	3,127	3,157

(a) Refer to Table 5-2, Table 5-4, and Table 5-5.

Table 5-7 summarizes Stanford's projected supplies during normal, single dry and multiple dry years through 2045 based on the assumptions described in the sections above, assume the Bay-Delta Plan Amendment is not implemented.

Table 5-7. Projected Total Water Supplies without Bay-Delta Plan Amendment[a]

Hydrologic Condition	Normal, Single Dry, and Multiple Dry Years, AFY				
	2025	2030	2035	2040	2045
Normal Year	5,205	5,395	5,585	5,785	5,975
Single Dry Year	5,003	5,193	5,383	5,583	5,773
Multiple Dry Years - Year 1	5,003	5,193	5,383	5,583	5,773
Multiple Dry Years - Year 2	4,017	4,207	4,397	4,597	4,787
Multiple Dry Years - Year 3	4,017	4,207	4,397	4,597	4,787
Multiple Dry Years - Year 4	4,017	4,207	4,397	4,597	4,337
Multiple Dry Years - Year 5	4,017	4,207	4,397	4,597	4,337

(a) Refer to Table 5-3,Table 5-4, and Table 5-5.

6.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON REQUIREMENTS OF SB 610

Water Code section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.*

Because of the uncertainties surrounding the implementation of the Bay-Delta Plan Amendment, this WSA presents findings for two scenarios, one assuming the Bay-Delta Plan Amendment Is implemented and one assuming that the Bay-Delta Plan Amendment is not implemented.

Table 6-1 summarizes the scenario where it is assumed the Bay-Delta Plan Amendment is implemented. Under this scenario, significant supply shortfalls are projected in dry years for all agencies that receive water supplies from the SFPUC RWS. For Stanford, the projected SFPUC dry year supply availability, in combination with Stanford's groundwater and local surface water supply availability, results in projected demand shortfalls in a single dry year in 2045 (6 percent) and in multiple dry years (ranging from 6 to 33 percent) through 2045.

Table 6-1. Summary of Water Demand Versus Water Supply with Bay-Delta Plan Amendment During Various Hydrologic Conditions

Hydrologic Condition		Normal, Single Dry, and Multiple Dry Years, AFY				
		2025	2030	2035	2040	2045
Normal Year						
Available Water Supply[(a)]		5,200	5,400	5,600	5,800	6,000
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,528	1,504	1,480	1,456	1,320
Percent Shortfall of Demand		--	--	--	--	--
Single Dry Year						
Available Water Supply[(c)]		4,190	4,310	4,430	4,540	4,380
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		518	414	310	196	(300)
Percent Shortfall of Demand		--	--	--	--	6
Multiple Dry Years						
Multiple Dry Year 1	Available Water Supply[(c)]	4,193	4,313	4,433	4,543	4,383
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	521	417	313	199	(297)
	Percent Shortfall of Demand	--	--	--	--	6
Multiple Dry Year 2	Available Water Supply[(c)]	3,007	3,107	3,187	3,297	3,397
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,047)	(1,283)
	Percent Shortfall of Demand	18	20	23	24	27
Multiple Dry Year 3	Available Water Supply[(c)]	3,007	3,107	3,187	3,297	3,397
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,047)	(1,283)
	Percent Shortfall of Demand	18	20	23	24	27
Multiple Dry Year 4	Available Water Supply[(c)]	3,007	3,107	3,187	3,127	3,157
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(933)	(1,217)	(1,523)
	Percent Shortfall of Demand	18	20	23	28	33
Multiple Dry Year 5	Available Water Supply[(c)]	3,007	3,107	3,087	3,127	3,157
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	(665)	(789)	(1,033)	(1,217)	(1,523)
	Percent Shortfall of Demand	18	20	23	28	33

(a) Refer to Table 4-2.
(b) Refer to Table 3-2
(c) Refer to Table 5-6

If demand shortfalls do occur (from any cause, such as droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.), Stanford expects to meet these demand shortfalls through water demand reductions and other shortage response actions.[14] The Proposed Project would be subject to the same water conservation and water use restrictions as other water users within Stanford's system. As described in Section 5.1.3 of this WSA, the SFPUC is implementing the AWSP to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS. In addition, the SFPUC, along with the Modesto Irrigation District and the Turlock Irrigation District, have entered into a memorandum of understanding with the State to develop a Voluntary Agreement for the Tuolumne River. The Tuolumne River Voluntary Agreement provides a combination of flow and non-flow measures sufficient to improve all life-stages of native fish populations in the lower Tuolumne River. The goal of the Voluntary Agreement is to strike the right balance between environmental stewardship and water reliability.

Table 6-2 summarizes the scenario where it is assumed the Bay-Delta Plan Amendment is not implemented. Under this scenario, supply shortfalls are only projected in the fourth and fifth consecutive dry years for base year 2045. As described in Section 5.1, based on SFPUC's analysis, a 15 percent supply shortfall is projected in these years. For Stanford, the projected SFPUC multiple dry year supply availability, in combination with Stanford's groundwater and local surface water supply availability, results in a projected multiple dry year demand shortfalls (7 percent). These shortfalls are significantly less than the projected demand shortfalls if the Bay-Delta Plan Amendment is implemented.

[14] Stanford. 2022. *Water Resources: Drought*. Accessed at https://suwater.stanford.edu/water-efficiency/drought on March 23, 2023.

Table 6-2. Summary of Water Demand Versus Water Supply without Bay-Delta Plan Amendment During Various Hydrologic Conditions

Hydrologic Condition		Normal, Single Dry, and Multiple Dry Years, AFY				
		2025	2030	2035	2040	2045
Normal Year						
Available Water Supply[(a)]		5,200	5,400	5,600	5,800	6,000
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,528	1,504	1,480	1,456	1,320
Percent Shortfall of Demand		--	--	--	--	--
Single Dry Year						
Available Water Supply[(c)]		5,000	5,190	5,380	5,580	5,770
Total Water Demand[(b)]		3,672	3,896	4,120	4,344	4,680
Potential Surplus (Deficit)		1,328	1,294	1,260	1,236	1,090
Percent Shortfall of Demand		--	--	--	--	--
Multiple Dry Years						
Multiple Dry Year 1	Available Water Supply[(c)]	5,003	5,193	5,383	5,583	5,773
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	1,331	1,297	1,263	1,239	1,093
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 2	Available Water Supply[(c)]	4,017	4,207	4,397	4,597	4,787
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	107
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 3	Available Water Supply[(c)]	4,017	4,207	4,397	4,597	4,787
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	107
	Percent Shortfall of Demand	--	--	--	--	--
Multiple Dry Year 4	Available Water Supply[(c)]	4,017	4,207	4,397	4,597	4,337
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	(343)
	Percent Shortfall of Demand	--	--	--	--	7
Multiple Dry Year 5	Available Water Supply[(c)]	4,017	4,207	4,397	4,597	4,337
	Total Water Demand[(b)]	3,672	3,896	4,120	4,344	4,680
	Potential Surplus (Deficit)	345	311	277	253	(343)
	Percent Shortfall of Demand	--	--	--	--	7

(a) Refer to Table 4-2.
(b)) Refer to Table 3-2
(c) Refer to Table 5-7

If supply shortfalls do occur, Stanford expects to meet these supply shortfalls through water demand reductions and other shortage response actions. The Proposed Project would be subject to the same water conservation and water use restrictions as other water users within Stanford's system.

As discussed in Section 5.1.3, SFPUC is investigating and planning for new water supplies through its AWSP. The AWSP includes several water supply options and projects that could meet foreseeable water supply needs. These projects would take 10 to 30 years to implement. Because these projects are anticipated to evolve from planning to implementation, exact yield amounts are not available at this time.

7.0 REFERENCES

BAWSCA. 2021. *Water Use by Source*. Accessed at https://bawsca.org/water/use/source on March 21, 2023.

BAWSCA. April 2021. *BAWSCA Drought Allocation Tables by Agency (Table E: Percent Cutback to the Wholesale Customers With Bay Delta Plan and Table N: Percent Cutback to the Wholesale Customers Without Bay Delta Plan)*.

County of Santa Clara. 2000. *2000 Stanford Community Plan*. 2000.

County of Santa Clara. December 2000. *Stanford University 2000 General Use Permit*.

County of Santa Clara. October 2016. *General Plan Land Use Map*. Accessed at https://plandev.sccgov.org/ordinances-codes/general-plan on March 23, 2023.

DWR. May 2020. *Sustainable Groundwater Management Act 2019 Basin Prioritization*.

Luhdorff & Scalmanini. 2014. *Sustainable Groundwater Pumping for Stanford University*.

Maddaus Water Management, Inc. June 2020. *Bay Area Water Supply & Conservation Agency's Regional Water Demand and Conservation Projections*.

Schaaf & Wheeler Consulting Civil Engineers. September 2019. *Water Supply Assessment for the Stanford 2018 General Use Permit*.

Stanford. 2022. *Water Resources: Drought*. Accessed at https://suwater.stanford.edu/water-efficiency/drought on March 23, 2023.

Valley Water. November 2021. *Groundwater Management Plan for the Santa Clara and Llagas Subbasins*.

Attachment A

SFPUC Memorandum, Regional Water System Supply Reliability and UWMP 2020 (June 2021)

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
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TO: SFPUC Wholesale Customers

FROM: Steven R. Ritchie, Assistant General Manager, Water

DATE: June 2, 2021

RE: Regional Water System Supply Reliability and UWMP 2020

This memo is in response to various comments from Wholesale Customers we have received regarding the reliability of the Regional Water System supply and San Francisco's 2020 Urban Water Management Plan (UWMP).

As you are all aware, the UWMP makes clear the potential effect of the amendments to the Bay-Delta Water Quality Control Plan adopted by the State Water Resources Control Board on December 12, 2018 should it be implemented. Regional Water System-wide water supply shortages of 40-50% could occur until alternative water supplies are developed to replace those shortfalls. Those shortages could increase dramatically if the State Water Board's proposed Water Quality Certification of the Don Pedro Federal Energy Regulatory Commission (FERC) relicensing were implemented.

We are pursuing several courses of action to remedy this situation as detailed below.

Pursuing a Tuolumne River Voluntary Agreement

The State Water Board included in its action of December 12, 2018 a provision allowing for the development of Voluntary Agreements as an alternative to the adopted Plan. Together with the Modesto and Turlock Irrigation Districts, we have been actively pursuing a Tuolumne River Voluntary Agreement (TRVA) since January 2017. We believe the TRVA is a superior approach to producing benefits for fish with a much more modest effect on our water supply. Unfortunately, it has been a challenge to work with the State on this, but we continue to persist, and of course we are still interested in early implementation of the TRVA.

Evaluating our Drought Planning Scenario in light of climate change

Ever since the drought of 1987-92, we have been using a Drought Planning Scenario with a duration of 8.5 years as a stress test of our Regional Water System supplies. Some stakeholders have criticized this methodology as being too conservative. This fall we anticipate our Commission convening a workshop

regarding our use of the 8.5-year Drought Planning Scenario, particularly in light of climate change resilience assessment work that we have funded through the Water Research Foundation. We look forward to a valuable discussion with our various stakeholders and the Commission.

Pursuing Alternative Water Supplies

The SFPUC continues to aggressively pursue Alternative Water Supplies to address whatever shortfall may ultimately occur pending the outcome of negotiation and/or litigation. The most extreme degree of Regional Water System supply shortfall is modeled to be 93 million gallons per day under implementation of the Bay-Delta Plan amendments. We are actively pursuing more than a dozen projects, including recycled water for irrigation, purified water for potable use, increased reservoir storage and conveyance, brackish water desalination, and partnerships with other agencies, particularly the Turlock and Modesto Irrigation Districts. Our goal is to have a suite of alternative water supply projects ready for CEQA review by July 1, 2023.

In litigation with the State over the Bay-Delta Plan Amendments

On January 10, 2019, we joined in litigation against the State over the adoption of the Bay-Delta Water Quality Control Plan Amendments on substantive and procedural grounds. The lawsuit was necessary because there is a statute of limitations on CEQA cases of 30 days, and we needed to preserve our legal options in the event that we are unsuccessful in reaching a voluntary agreement for the Tuolumne River. Even then, potential settlement of this litigation is a possibility in the future.

In litigation with the State over the proposed Don Pedro FERC Water Quality Certification

The State Water Board staff raised the stakes on these matters by issuing a Water Quality Certification for the Don Pedro FERC relicensing on January 15, 2021 that goes well beyond the Bay-Delta Plan amendments. The potential impact of the conditions included in the Certification appear to virtually double the water supply impact on our Regional Water System of the Bay-Delta Plan amendments. We requested that the State Water Board reconsider the Certification, including conducting hearings on it, but the State Water Board took no action. As a result, we were left with no choice but to once again file suit against the State. Again, the Certification includes a clause that it could be replaced by a Voluntary Agreement, but that is far from a certainty.

I hope this makes it clear that we are actively pursuing all options to resolve this difficult situation. We remain committed to creating benefits for the Tuolumne River while meeting our Water Supply Level of Service Goals and Objectives for our retail and wholesale customers.

cc.: SFPUC Commissioners
Nicole Sandkulla, CEO/General Manager, BAWSCA

Appendix B

Water Supply Assessment – San Jose Water

SAN JOSE WATER

WATER SUPPLY ASSESSMENT

COUNTY OF SANTA CLARA

6TH CYCLE HOUSING ELEMENT UPDATE

April 2023

Prepared By:

Chad Kumabe, P.E.
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Under the Direction of:

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Vice President of Engineering

SAN JOSE WATER

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SAN JOSE WATER

Established in 1866, San Jose Water (SJW) is one of the largest privately owned water systems in the United States, providing high-quality water and exceptional service to approximately one million residents of Santa Clara County.

Background & Purpose

This Water Supply Assessment (WSA) was requested on March 6, 2023 by County of Santa Clara (County) and is associated with the proposed 6th Cycle Housing Element Update, and associated amendments to the General Plan and Zoning Ordinance (Project). The County's RHNA assignment for the 6th Cycle Housing Element Update is 3,125 residential units. To comply with new "no-net loss" provisions of SB 166, which require an adequate inventory of land to always be available to accommodate a jurisdiction's RHNA assignment, the County is planning for more than twice the RHNA assignment, for an estimated 6,574 housing units on lands that are currently unincorporated during the 2023-2031 planning period. Of the estimated 6,574 units, 4,526 units are being planned for 18 sites in urban unincorporated "islands" within San José. These 18 sites are within the City of San José Urban Service Area (USA).

This WSA describes the relationship between existing and future water supplies and presents SJW's ability to provide a diverse water supply to match build-out water demands under both normal and dry years. This supply consists of treated surface water from Valley Water's local and imported supplies, groundwater, local surface water from Saratoga Creek and Los Gatos Creek watersheds, and non-potable recycled water. Based on water supply projections reported in Valley Water's 2020 Urban Water Management Plan,[1] conservation methods currently employed, and SJW's active commitment to these methods, SJW expects to be able to meet the needs of the service area through at least 2045 for average and single-dry years without a call for mandatory water use reductions.[2] This assumes reserves are at healthy levels at the beginning of the year and that projects and programs identified in Valley Water's Water Supply Master Plan 2040 (WSMP 2040)[3] are implemented.

In multiple-dry year periods, there may be up to a 20 percent mandatory call for conservation to meet supply deficits. Valley Water has established a level of service goal to provide 100 percent of annual water demand during non-drought years and 80 percent during drought years, to minimize shortages and mandatory water use reductions during droughts while preventing overinvestment in water supply projects. SJW is committed to actively working with Valley Water in the development of water supply projects and programs. Projects and programs may include additional long-term water conservation savings, water recycling, recharge capacity, stormwater runoff capture, reuse, out of area water banking, and storage.

[1] https://www.valleywater.org/your-water/water-supply-planning/urban-water-management-plan
[2] San Jose Water 2020 Urban Water Management Plan
[3] https://www.valleywater.org/your-water/water-supply-planning/water-supply-master-plan

This WSA is written in response to California Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221); legislation which requires water retailers to demonstrate whether their water supplies are sufficient for certain proposed subdivisions and large development projects subject to the California Environmental Quality Act. SB 610 includes the requirements for detailed water supply assessments and SB 221 includes the requirement for written verification of sufficient water supply based on substantial evidence. SB 610 requires that a WSA be prepared by the local water retailer and submitted within 90 days to the requesting agency. SJW's adoption and submittal of this assessment does not create a right or entitlement to water service or impose or expand SJW's obligation to provide water service. The City of San José has an independent obligation to assess the sufficiency of water supply for this project. SB 610 provides that the City of San José is to determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the proposed project, in addition to existing and planned future uses.

Service Area & Population

SJW's service area spans 139 square miles, including most of the cities of San José and Cupertino, the entire cities of Campbell, Monte Sereno, Saratoga, the Town of Los Gatos, and parts of unincorporated Santa Clara County.

The population of SJW's service area, including growth associated with this Plan Area, is shown in the following table. These projections are based on the Association of Bay Area Governments (ABAG) population projections and were included in SJW's 2020 Urban Water Management Plan.

Table 1. Current and Projected SJW Service Area Population

2020	2025	2030	2035	2040	2045
997,817	1,069,633	1,127,593	1,191,337	1,261,145	1,335,044

Climate

Santa Clara County experiences cool, wet winters and warm, dry summers. From 1950-2020, the county received an annual average precipitation total of 23.2 inches. Most precipitation in the region occurs between the months of November and April. Temperature is typically moderate. Maximum monthly average temperatures range from 55.7°F to 83.4°F. Minimum monthly average temperatures range from 37.9°F to 56.6°F. The annual average evapotranspiration rate is 49.6 inches.[4] Summarized temperature and precipitation data is presented in Chart 1.

[4] Rainfall and temperature data provided by National Oceanic and Atmospheric Administration. Evapotranspiration data comes from California Irrigation Management Information System (Archived San José Station).

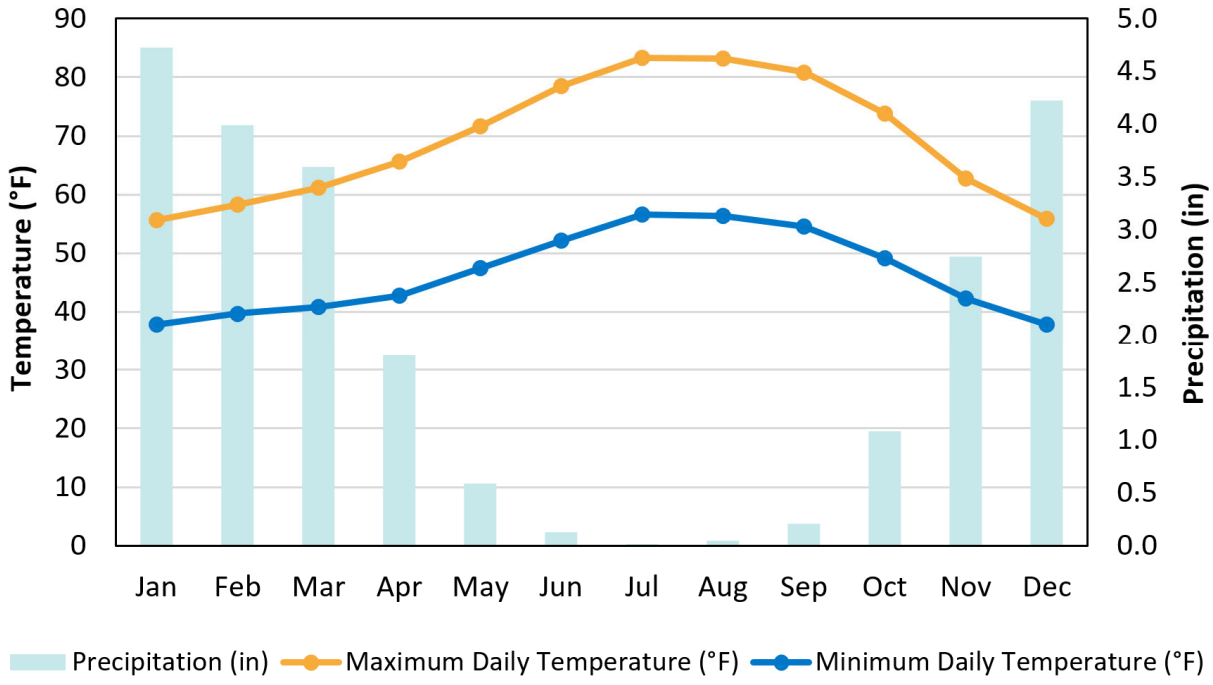

Chart 1. Historical Average Monthly Temperature and Precipitation (1950-2020)

Past, Current, and Future System Water Use

The majority of connections to SJW's distribution system are either residential or commercial. SJW also provides water to industrial, institutional, landscape, and governmental connections. Projections from ABAG analyzing the share of single-family versus multi-family development units within SJW's service were used to determine single- and multi-family demand split within the residential sector. The resale category represents the small mutual water companies, in which SJW provides a master water service and where the mutual water company is responsible for distributing the water.

SJW has developed demand projections from 2025 to 2045 based on population and per capita usage projections. ABAG census tract population projections were used to estimate population growth. Daily per capita water usage for SJW's service area in 2020 was 108 gallons per capita per day (gpcd). It was assumed that all developments after 2020 would require high water efficiency fixtures. Therefore, a lower daily per capita water use of 75 gpcd across all water sectors was applied to new population growth after 2020. For the existing 2020 population, it was assumed that the 108 gpcd from 2020 to 2025 would increase slightly by 1 percent per year, based on the rebounds in demand that have been observed following the past drought. Following the start of compliance with State conservation mandates (SB 606 and Assembly Bill 1668) in 2025, per capita water use is expected to decrease. It was assumed that the per capita water use for the existing population would experience a decline of 0.8 percent per year from 2025 to 2045.

SJW's total demand includes water losses, which are separated into two categories: apparent losses and real losses. Apparent losses include all types of inaccuracies associated with customer metering as well as data handling errors. Real losses are physical water losses from the pressurized system and the utility's storage tanks, up to the customer meter. These can include lost water through leaks, breaks, and overflows.

Across the last five water loss audits that have been validated and submitted to Department of Water Resources (DWR), SJW water loss is, on average, 7.5 percent of potable water supplied. SJW's distribution system has had consistently low water losses due to SJW's proactive approach to reducing leaks, including investments in acoustic leak detection technology and a water main replacement program that prioritizes pipelines for replacement based on their propensity to leak.

Table 2. Demands for Potable and Non-Potable Water (excluding Recycled Water) (AF/yr)

Customer Type	2020	2025	2030	2035	2040	2045
Single Family	59,497	53,877	53,877	54,187	54,411	54,550
Multi Family	24,744	35,255	35,255	35,308	36,161	36,959
Commercial	14,255	18,073	18,073	18,146	18,364	18,551
Industrial	528	718	718	721	730	737
Institutional/ Governmental	5,183	6,607	6,607	6,635	6,715	6,785
Landscape	7,353	7,964	7,964	7,994	8,093	8,176
Sales / Transfers / Exchanges	522	568	568	571	580	586
Other Potable[(a)]	344	417	417	417	420	424
Water Losses	9,078	9,296	9,296	9,332	9,443	9,541
Total	**121,504**	**132,776**	**132,776**	**133,312**	**134,918**	**136,308**

[(a)]Other potable includes portable meter and unbilled unmetered use. Unbilled unmetered use includes use for construction activities, tank/reservoir cleaning, irrigation at SJW stations, hydrant testing, meter testing, etc.

Estimated Project Water Use

Total water usage for the Project is estimated at 1,069,867 gallons per day (gpd), which is equivalent to an annual usage of about 1,198 acre-feet of water. The sites have an existing water usage of 12.3 acre-feet per year. Therefore, the annual net demand increase in water usage associated with this project is 1,186 acre-feet and represents a 0.98 percent increase over the system wide 2020 water production of 121,504 acre-feet. The projected water demand for the Project is within normal growth projections for water demand in SJW's system.

Table 3. Total Water Demand Estimated for the Project

Residential Units[a]	Commercial/Retail Space (SF)[b]	Total Project Demand (gpd)	Existing Site Demand (gpd)[c]	Net Project Demand (AF/yr)
6,281	43,560	1,069,867	10,978	1,186

[a]Residential units assume a demand factor or 60 gallons per capita per day, with 2.81 people per residential unit in Santa Clara County based on estimates from the California Department of Finance - https://dof.ca.gov/forecasting/demographics/estimates/estimates-e5-2010-2021/.

[b]Commercial/retail space assumes a water demand factor of 0.25 gpd per SF.

[c] Existing daily demand based on usage for the last full calendar year facilities appeared to be in service.

System Supplies

This section describes and quantifies the current and projected sources of water available to SJW. A description and quantification of recycled water supplies is also included.

Imported Treated Surface Water – On average, purchased water from Valley Water makes up over half of SJW's total water supply. This water originates from several sources including Valley Water's local reservoirs, the State Water Project and the federally funded Central Valley Project San Felipe Division. Water is piped into SJW's system at various turnouts after it is treated at one of three Valley Water-operated water treatment plants. In 1981, SJW entered into a 70-year master contract with Valley Water for the purchase of treated water. The contract provides f or rolling three-year delivery schedules establishing fixed quantities of treated water to be delivered during each period. SJW and Valley Water currently have a three-year treated water contract for fiscal years 2020/2021 – 2022/2023, with contract supplies of 70,723 AF in 2020/2021, 70,723 AF in 2021/2022, and 71,858 AF in 2022/2023. The actual amount of water delivered depends on considerations including hydrologic variability, interruptions in Valley Water facility operations, and water quality.

Groundwater – SJW draws water from the Santa Clara Subbasin, which is part of the larger Santa Clara Valley Basin. The Santa Clara Subbasin consists of unconsolidated alluvial sediments and covers a surface area of 297 square miles in the northern part of Santa Clara County. The subbasin is not adjudicated. Valley Water is responsible for maintaining the subbasin and ensuring the subbasin does not become overdrafted. Aquifers in the subbasin are recharged naturally by rainfall and streams and artificially mainly by recharge ponds operated by Valley Water. Due to different land use and management characteristics, Valley Water further delineates the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and Coyote Valley. SJW draws groundwater from the Santa Clara Plain portion, which covers a surface area of 280 square miles and has an operational storage capacity estimated to be 350,000 AF.

Chart 2 shows groundwater elevation in the Santa Clara Plain since the mid 1930's using well surface elevation as the datum. Although groundwater levels declined during the recent 2012-2016 drought, groundwater levels in the Santa Clara Subbasin quickly recovered after the drought due largely to Valley Water's proactive response and comprehensive water management activities.

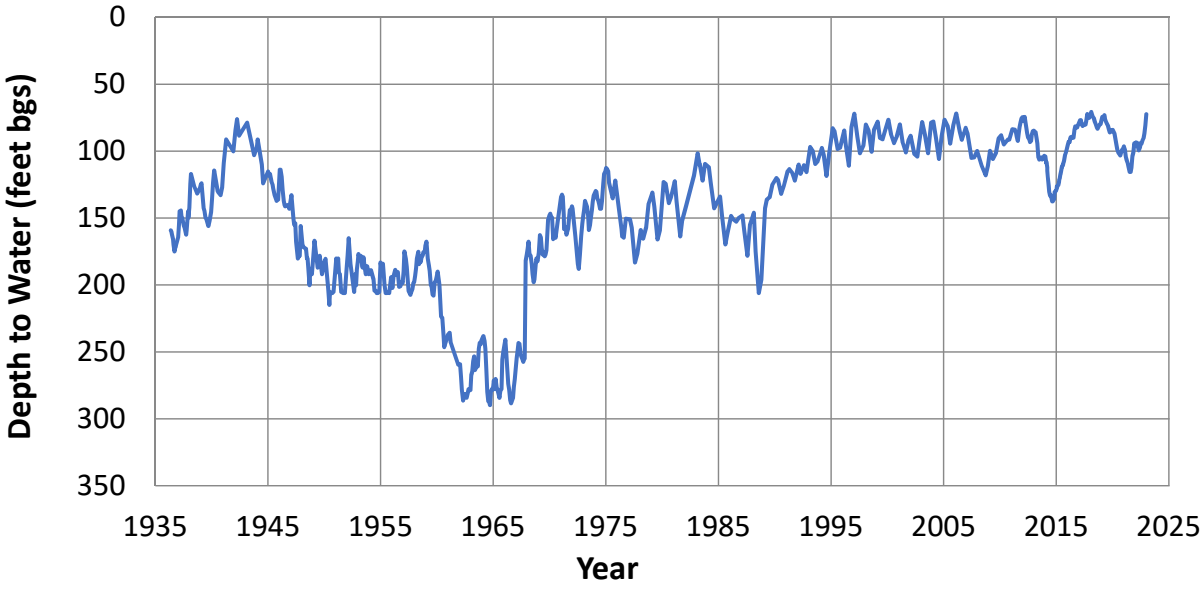

Chart 2. Groundwater Elevation in Santa Clara Subbasin (Well ID: 07S01W25L001)

On average, groundwater from the subbasin accounts for 30 to 40 percent of SJW's total water supply. The following table shows the groundwater SJW pumped from 2016 to 2020.

Table 4. Amount of Groundwater Pumped by SJW (AF/yr)

Basin Name	2016	2017	2018	2019	2020
Santa Clara Subbasin	32,644	42,194	36,075	32,825	53,276
Groundwater as a percent of total potable water supply	31%	37%	31%	28%	43%

Surface Water – SJW has "pre-1914 water rights" to surface water in Saratoga Creek, Los Gatos Creek, and associated watersheds, totaling approximately 72 million gallons per day, based on capacity of diversion works from Initial Statements of Water Diversion and Use. SJW also filed for licenses in 1947

and was granted license number 4247 in 1956 by SWRCB to draw 1419 AF/year (462 MG/year) from Saratoga Creek, and license number 10933 in 1979 to draw 6,240 AF/year (2,033 MG/year) from Los Gatos Creek.

Recycled Water – South Bay Water Recycling (SBWR) has been serving Silicon Valley communities since 1993 with a sustainable, high-quality recycled water supply. SBWR was created to reduce the environmental impact of freshwater effluent discharge into the salt marshes located at the south end of the San Francisco Bay, and to help protect the California clapper rail and the salt marsh harvest mouse.

In 1997, SJW entered into a Wholesaler-Retailer Agreement with the City of San José to provide recycled water to SJW's existing and new customers nearby SBWR recycled water distribution facilities; whereas, the City of San José is the wholesaler and SJW is the retailer. At the time, the involvement of SJW was largely to assist the City in meeting its wastewater regulatory obligations. In accordance with the terms of this agreement, SJW allowed SBWR to construct recycled water pipelines in its service area, SJW would only own the recycled water meters, while SBWR would own, operate, and maintain the recycled water distribution system.

In 2010, this Wholesaler-Retailer Agreement was amended to allow SJW to construct recycled water infrastructure that would be owned, operated, and maintained by SJW. Then in 2012, this Wholesaler-Retailer Agreement was again amended to allow SJW to construct additional recycled water infrastructure.

Summary of Existing and Planned Sources of Water – SJW and Valley Water have worked to develop a variety of local and imported water supplies to meet demands. As demands increase with the region's growth, and imported water supplies potentially become more restricted, these planned supplies will increase in importance. In particular, groundwater, which has historically been a vital source of supply for SJW, was all the more critical during the recent drought. The following table shows the actual amount of water supplied to SJW's distribution system from each source in 2020 as well as projected amounts until 2045.

Table 5. Current and Projected Water Supplies[(a)] (AF/yr)

	2020	2025	2030	2035	2040	2045
Valley Water Treated Water	64,290	76,799	76,713	77,041	78,023	78,877
SJW Groundwater	53,276	48,623	48,568	48,777	49,400	49,937
SJW Surface Water	3,937	7,494	7,494	7,494	7,494	7,494
Recycled Water	2,449	2,731	3,100	3,649	3,661	3,649
Total System Supply	**123,952**	**135,648**	**135,875**	**136,961**	**138,579**	**139,957**

[(a)]Projected surface water supply volume held constant at the 10-year production average (2011-2020). Remaining potable demands made up by purchased water and groundwater, based on the 10-year historical average (2011-2020) of distribution between these two sources of supply. Projected recycled water supplies are based on projected recycled water demands.

Water Supply Vulnerability

SJW has identified multiple sources of water for the Project, which would provide a high quality, diverse and redundant source of supply. For added backup, SJW incorporates diesel-fueled generators into its facilities system, which will operate wells and pumps in the event of power outages. Since Valley Water influences on average about 90 percent of SJW's annual water supply, SJW will continue to work with Valley Water to ensure its water supply is reliable, while the impact to the existing Santa Clara Subbasin is minimal.

Transfer and Exchange Opportunities

SJW's distribution system has interties with the following retailers: California Water Service Company (Los Altos District), City of San José Municipal Water, City of Santa Clara, City of Sunnyvale, City of Milpitas, and Great Oaks Water. SJW currently has no plans to use these interties for normal system operation as they are exclusively used for potential emergencies.

Water Supply Reliability

SJW has three sources of potable water supply: purchased water, groundwater, and local surface water. These three sources of supply are constrained in one or more ways, driven by legal, environmental, water quality, climatic, and mechanical conditions. Additionally, there is a potential for interruption of supply caused by catastrophic events.

Purchased Water Supply Reliability – SJW relies on Valley Water for purchased water supplies, which make up over half of SJW's total water supplies. Constraints to purchased water supplies from Valley Water include climate change impacts, reductions in imported water supplies, and threats to infrastructure, as detailed below.

- *Climate Change* – Climate change is anticipated to result in warming temperatures, shrinking snowpack, increasing weather extremes, and prolonged droughts. Valley Water's water supply vulnerabilities to climate change include decreases in the quantity of Delta-conveyed imported water supplies, decreases in the ability to capture and use local surface water supplies due to shifts in the timing and intensity of rainfall and runoff, increases in irrigation and cooling water demands, decreases in water quality, and increases in the severity and duration of droughts.
- *Reductions in Imported Water Supplies* – Valley Water's State Water Project and Central Valley Project water supplies are also subject to a number of additional constraints, including conveyance limitations and regulatory requirements to protect fisheries and water quality in the Delta. Delta-conveyed supplies are also at risk from Delta levee failures due to seismic threats and flooding, sea level rise and climate change, declining populations of protected fish species, and water quality variations (including algal blooms). Many water quality variations are addressed by blending sources and/or switching sources to Valley Water's three water treatment plants. Algae and disinfection byproduct precursors have been especially challenging during recent drought conditions.
- *Threats to Infrastructure* – Valley Water's imported supply infrastructure must travel large distances to reach turnouts. As California is a seismically active state, infrastructure could be damaged and the result would be a disruption to water supply availability. California's water supply infrastructure is also potentially a target for acts of terrorism.

SJW actively worked with Valley Water during the development of their WSMP 2040 to ensure the following principles were considered:

- Promotion of additional sources of local water supply, such as indirect potable reuse, direct potable reuse, desalination, additional conservation, and an expanded recycled water distribution system
- Coordination of operations with all retailers and municipalities to ensure as much surplus water as possible is available for use in dry years
- Pursuit of innovative transfer and banking programs to secure more imported water for use in dry years

Valley Water's previous call for a 30 percent reduction during the 2012-2016 drought highlights that more investments in local water sources are necessary to ensure a reliable source of supply during multiple-dry water years. Valley Water plans short- and long-term investments with the goal of requiring no more than a 20 percent water use reduction from the community during a multi-year drought as outlined in its 2040

Water Supply Master Plan. Valley Water has sources of backup supply outside the County and has always relied on multiple supply sources, such as imported water contracts, to supplement existing long-term resources when necessary.

Groundwater Supply Reliability – Groundwater supplies are often a reliable supply during normal and short-term drought conditions because supplies are local and large aquifer storage capacity means that groundwater supplies will still be available when surface flows become limited. However, groundwater supply availability can become threatened when overdraft occurs and when recharge and inflow decrease. Water quality is another potential constraint of this source of supply. Threats to groundwater supplies are detailed below.

- *Overdraft* – Under extended supply pressures, groundwater basins can enter overdraft conditions, which can have a series of consequences including land subsidence. Threat of overdraft conditions were witnessed in the recent 2012-2016 drought when groundwater levels declined. However, groundwater levels in the Santa Clara Subbasin quickly recovered after the drought due to Valley Water's proactive response.
- *Climate Change* – Climate change could increase the potential for overdraft by increasing demand, reducing other sources of supply, and reducing natural recharge and inflows from surface water and precipitation.
- *Regional Growth* – Population growth could increase demands on groundwater supplies, potentially creating risk of overdraft. Regional growth could also increase the amount of contaminants entering groundwater basins as a result of increased urban runoff or industrial or other activities. Growth can also impact recharge areas by expanding impervious surfaces into areas that would otherwise represent entry points for surface water recharging local aquifers.
- *Aging Infrastructure and High Land Costs* – In 2020, SJW prepared a Groundwater Well Asset Management Plan. Findings from the plan showed that SJW's groundwater well system is vulnerable due to the age of the well infrastructure. Two-thirds of the wells are 50 years or older and were installed with low carbon steel casing using a cable tool drilling method. A low carbon steel casing is susceptible to corrosion and damage in the event of an earthquake. Furthermore, many of SJW's older cable tool drilled wells were installed without sanitary seals as newer wells are, and as such, are more vulnerable to acting as conduits for downward migration of surface contaminants into the aquifer. Space for replacement wells at SJW's existing groundwater stations is limited, and thus, the majority of future wells will need to be located on new properties. However, favorable sites are limited, as they must meet certain production yield and water quality requirements. Furthermore, land prices in the Bay Area are high and present another challenge for SJW to address its aging well infrastructure.
- *Water Quality* – The presence of per- and polyfluoroalkyl substances (PFAS) in groundwater supplies is prompting interest and concern nationwide. Out of an abundance of caution, SJW has been proactively notifying customers and, when possible, removing wells from service where

PFAS has been detected above the State-defined Notification Levels. SJW recently completed a study to evaluate PFAS treatment at one of its largest wellfields. This project has now moved into the detailed design phase. In addition, because SJW depends on multiple sources of supply that use different disinfectants, maintaining a stable disinfectant residual is problematic when system operations require the blending of chlorinated water with chloraminated water to meet demands. Blending sources, depending on each source's volume and residual concentration, can result in the loss or significant decrease in disinfectant residual levels.

The Santa Clara Subbasin is able to store the largest amount of local reserves and Valley Water, as the groundwater management agency for Santa Clara County, is tasked with maintaining adequate storage in this basin to optimize reliability during extended dry periods. As groundwater is pumped by SJW and other retailers and municipalities in Santa Clara County, Valley Water influences groundwater pumping reductions and thus reliability through financial and management practices to protect groundwater storage and minimize the risk of land subsidence.

Local Surface Water Supply Reliability – Local surface supplies are highly variable depending on hydrologic conditions. In years of limited local surface water supplies, SJW relies more heavily on groundwater. Threats to local surface water supplies are detailed below.

- *Climate Change* – SJW's local surface water supplies are subject to the same climate change impacts as Delta-conveyed supplies and Valley Water's local surface water supplies, which can result in decreased surface water supplies. During heavy rain events, the quantity of surface water that can be conveyed and treated may be limited by the raw water system hydraulics, high turbidity levels, and WTP capacity. Increased weather extremes and changing precipitation patterns as a result of climate change may prevent surface water supplies from being fully utilized during heavy rain events, and may result in lower surface water supplies during other times of the year.
- *Environmental Regulations* – SJW has bypass flow requirements at its surface water reservoirs and intakes. These requirements establish flow rates that must be released past diversion points to preserve downstream habitat. SJW also maintains minimum levels in reservoirs for habitat preservation. These environmental regulations limit the amount of surface water that SJW is able to divert for water supply.
- *Water Quality* – SJW owns approximately 6,000 acres of land in the watersheds and manages these watershed lands to protect water supplies**.** Contamination of surface water supplies from upstream activities (animal grazing, residential septic systems, stormwater runoff) is a potential threat, although a low one as there is limited development in the watershed.
- *Aging Infrastructure* – Some of SJW's raw water infrastructure was constructed in the late 1800s or early 1900s and is in need of renewal to ensure reliability of surface water supplies.

Supply Reliability by Type of Water Year – Valley Water's Urban Water Management Plan identified average, single-dry, and multiple-dry years for water supply reliability planning. According to Valley Water, these years correspond to:

- Average Year (1922-2015): Average supply over the 94 years of 1922-2015.
- Single-Dry Year (1977): Within the historic hydrological record, this was the single driest year.
- Multiple-Dry Years (1988-1992): The 2012-2016 drought was the most recent multiple dry year period that put severe strain on Valley Water's supplies. However, because imported water allocations are not currently available for the 2012-2016 drought from DWR's modeling, Valley Water used the 1988-1992 drought, another severe multiple year drought in the historic hydrological record.

Water supplies presented below are based on Valley Water's Water Evaluation and Planning system model. According to Valley Water, this model simulates their water supply system comprised of facilities to recharge the county's groundwater basins, local water systems including the operation of reservoirs and creeks, treatment and distribution facilities, and raw water conveyance systems. The model also accounts for non-Valley Water sources and distribution of water in Santa Clara County such as imported water from San Francisco Public Utilities Commission, recycled water, and local water developed by other agencies.

Table 6. Basis of Water Year Data

Year Type	Base Year	% of Average Supply
Average Year	1922-2015	100%
Single-Dry Year	1977	80%
Multiple-Dry Years 1st Year	1988	78%
Multiple-Dry Years 2nd Year	1989	83%
Multiple-Dry Years 3rd Year	1990	77%
Multiple-Dry Years 4th Year	1991	78%
Multiple-Dry Years 5th Year	1992	77%

Average Water Year – The average water year represents average supply over the hydrologic sequence of 1922 through 2015. SJW anticipates adequate supplies for years 2025 to 2045 to meet system demand under average year conditions.

Table 7. Supply and Demand Comparison – Average Water Year (AF/yr) [a]

	2025	2030	2035	2040	2045
Demand	135,648	135,875	136,961	138,579	139,957
Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
Demand Met by Conservation	0	0	0	0	0

[a] Includes demands associated with the Project.

Single-Dry Water Year – The single-dry year was the year with the lowest amount of total supply. Table 10 shows that supplies, with the use of reserves, can meet demands during a single-dry year through 2045, assuming reserves are at healthy levels at the start of a year and projects and programs identified in Valley Water's WSMP 2040 are implemented. If reserves are low at the beginning of a single-dry year, Valley Water may call for water use reductions in combination with using reserves. As later discussed within the Water Demand Management Measures section, SJW has filed with the California Public Utilities Commission (CPUC) water-waste provisions promoting conservation that would go into effect during a drought. These provisions would result in a reduction in anticipated demand due to conservation such that demand equals available water supplies.

Table 8. Supply and Demand Comparison – Single-Dry Water Year (AF/yr) [a]

	2025	2030	2035	2040	2045
Demand	135,648	135,875	136,961	138,579	139,957
Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
Demand Met by Conservation	0	0	0	0	0

[a] Includes demands associated with the Project.

Multiple-Dry Water Years – The multiple-dry year period used in this analysis assumes a repetition of the hydrology that occurred in 1988 to 1992. During multiple-dry year droughts, a call for up to mandatory 20 percent conservation may be needed. Valley Water will continue to work on reducing multiple-dry year deficits by securing more reliable and/or diverse water supplies.

Valley Water has established a level of service goal of 100 percent during non-drought years and 80 percent during drought years to minimize water rates, and thus there can be up to a 20 percent call for mandatory conservation to meet this deficit (or more short-term conservation until additional water supplies are secured). Over the next 20 – 30 years, Valley Water is pursuing over $1 billion in water supply projects to meet the 80 percent level of service goal for all drought years.

Table 9: Supply and Demand Comparison – Multiple-Dry Water Years (AF/yr)[a][b]

		2025	2030	2035	2040	2045
First Year	Demand	135,648	135,875	136,961	138,579	139,957
	Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
	Demand Met by Conservation	0	0	0	0	0
Second Year	Demand	135,648	135,875	136,961	138,579	139,957
	Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
	Demand Met by Conservation	0	0	0	0	0
Third Year	Demand	135,648	135,875	136,961	138,579	139,957
	Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
	Demand Met by Conservation	0	0	0	0	0
Fourth Year	Demand	135,648	135,875	136,961	138,579	139,957
	Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
	Demand Met by Conservation	0	0	0	0	0
Fifth Year	Demand	135,648	135,875	136,961	138,579	139,957
	Demand Met by Water Supply	135,648	135,875	136,961	138,579	139,957
	Demand Met by Conservation	0	0	0	0	0

[a]Includes demands associated with the Project.

[b]Table 9 is solely based on SJW's Urban Water Management Plan, which follows State requirements and utilizes Valley Water estimates, which may not reflect actual water supply and demand conditions.

Regional Supply Reliability – Valley Water's Ensure Sustainability water supply strategy has three key elements:

1. Secure existing supplies and facilities
2. Optimize the use of existing supplies and facilities
3. Expand water use efficiency efforts

As part of this strategy, Valley Water's WSMP 2040 includes developing at least 24,000 AF/yr of additional recycled water (above and beyond the current target of 33,000 AF/yr of non-potable reuse) by 2040. Developing these local sources and managing demands reduces reliance on imported water supplies. In addition, Valley Water is working with multiple water agencies to investigate regional opportunities for collaboration to enhance water supply reliability, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. Projects to be considered will include interagency interties and pipelines; treatment plant improvements and expansion; groundwater management and recharge; potable reuse; desalination; and water transfers. This program may result in the addition of future supplies for Valley Water.

Water Demand Management Measures

SJW is a signatory of the California Urban Water Conservation Council (CUWCC) and signed the CUWCC Memorandum of Understanding (MOU) in February 2006. The CUWCC is a partnership of water suppliers, environmental groups, and others interested in California water supply who have come together to agree on a set of Best Management Practices (BMPs) for water conservation in the state. Additionally, SJW has its own water-waste provisions that come into effect when there is a water shortage. The CPUC has set forth the rules regarding water waste and water shortages governing investor owned utilities such as SJW. The CPUC rule relating to this is Rule 14.1.[5] This rule states that when there is a low-level water shortage that prompts a call for voluntary conservation by customers, a list of water-waste provisions goes into effect. Rule 14.1 also has provisions for high-level water shortages when mandatory conservation measures are deemed necessary.

SJW provides a full range of water conservation services to customers. The cornerstone of SJW's conservation programs is the CATCH program. The CATCH program empowers customers to understand and optimize their water use. With this free program, a water efficiency expert will check for customer leaks and recommend critical water and money-saving improvements.

Valley Water offers conservation programs, such as rebates for high efficiency toilets and washing machines. SJW takes advantage of all regional rebate programs and all of Valley Water's rebate programs are offered to SJW customers. Typically, customers are directed to specific rebate programs during the

[5] https://www.sjwater.com/customer-care/help-information/tariff-book

course of a water audit based on a customer's need. Customers can also access rebates directly from retail outlets when purchasing equipment such as high efficiency washing machines. SJW collaborates with Valley Water on public outreach and education including such items as customer bill inserts and conservation campaign advertising.

SJW has also increased the outreach and educational programs on outdoor water use. SJW constructed a water-smart demonstration garden that is open to the public. Customers can visit the garden in person or take a virtual tour on SJW's website. SJW also developed a dedicated water wise landscaping website where customers can access a plant information database that includes hundreds of low water use plants as well as a photographic database of water wise gardens in the San José-Santa Clara County area. The landscaping website and demonstration garden tour is accessible from SJW's homepage.

In addition to these programs, SJW engages in other activities that contribute to the overall goal of reducing water waste, but are not specifically designated as conservation or water management programs. These include SJW's meter calibration and replacement program, corrosion control program, valve exercising program and metering all service connections.

Summary

This Water Supply Assessment represents a comprehensive water supply outlook for the County of Santa Clara 6th Cycle Housing Element Update Project. In summary:

1. Total net potable water demand for the Project is estimated at 1,186 acre-feet per year and represents a 0.98 percent increase in total system usage when compared to SJW's 2020 potable water production. The increased demand is consistent with forecasted demands represented in SJW's 2020 Urban Water Management Plan, which projected a 12.2 percent increase in total system demand between 2020 demand and projected 2045 demand.
2. SJW currently has contracts or owns rights to receive water from the following sources:
    a. Groundwater – from the Santa Clara Subbasin
    b. Imported and local surface water – from Valley Water
    c. Local surface water – from Los Gatos Creek, Saratoga Creek, and local watersheds
    d. Recycled water – from South Bay Water Recycling
3. SJW works closely with Valley Water to manage its demands and imported water needs. The projected water demand for this development is within previously determined growth projections for water demand in SJW's system.

As described in this WSA and based on Valley Water's water supply plans and Urban Water Management Plan projections, SJW expects to be able to meet the needs of the service area through at least 2045 for average and single-dry years without a call for water use reductions. The impact of this project is not consequential and SJW has the capacity to serve this project through buildout based on current water supply capacity and Valley Water's proposed water supply projects. Valley Water is pursuing water supply solutions to meet the established level of service goal to provide 80 percent of annual water demand for drought years. SJW is committed to working with Valley Water to meet future demands and mitigate shortages. After comparing estimated demand associated with this project to water supplies, based on both the SJW and Valley Water Urban Water Management Plans, SJW has determined that the water quantity needed is within normal growth projections and expects for there to be sufficient water available to serve the Project. However, due to factors that affect water supply and demand projections including climate change, there is no guarantee that the projections provided in Valley Water's Urban Water Management Plan will be met, nor is there a guarantee that the water supply projects and programs identified by Valley Water will be implemented.

Attachment 1 - Housing Element Update Site Inventory

Table 3-2

Housing Opportunity Sites Inventory

APN	Size (acres)	Urban/Rural	Potential Density (du/ac)		Potential Units		Existing Zoning	Existing General Plan	Site/Area Name
			Low	High	Low	High			
245-01-003	13	Urban (San Jose)	80	100	**1,040.0**	1,300.0	A - Agricultural	Neighborhood/Community Commercial (San Jose)	Hostetter Station
245-01-004	2.3	Urban (San Jose)	80	100	**186.0**	232.0	A - Agricultural	Neighborhood/Community Commercial (San Jose) Unplanned Urban Village	Hostetter Station
277-06-025	0.4	Urban (San Jose)	60	100	**22.0**	36.0	R1-n2 – Residential (Burbank)	Mixed Use Commercial/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-07-027	0.1	Urban (San Jose)	40	80	**4.0**	7.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-07-028	0.1	Urban (San Jose)	40	80	**4.0**	7.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-07-029	0.2	Urban (San Jose)	40	80	**7.0**	14.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-08-029	0.1	Urban (San Jose)	40	80	**4.0**	7.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-08-030	0.1	Urban (San Jose)	40	80	**4.0**	7.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-08-031	0.2	Urban (San Jose)	40	80	**7.0**	14.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-12-027	0.3	Urban (San Jose)	40	80	**12.0**	25.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
277-12-029	0.3	Urban (San Jose)	40	80	**12.0**	25.0	CG - General Commercial	Urban Village/West San Carlos Urban Village	Parkmoor/Burbank Neighborhood
282-02-037	2.5	Urban (San Jose)	60	100	**90.0**	150.0	CN - Neighborhood Commercial	Neighborhood/Community Commercial (San Jose)	Fruitdale/Santa Clara Valley Medical Center
282-03-016	3.5	Urban (San Jose)	60	100	**210.0**	350.0	R1-8 - SF Housing	Public Quasi-Public (San Jose)	Fruitdale/Santa Clara Valley Medical Center
419-12-044	0.8	Urban (San Jose)	10	20	**8.0**	16.0	CN - Neighborhood Commercial	Neighborhood/Community Commercial (San Jose) Unplanned Urban Village	Cambrian Park
599-01-064	0.7	Urban (San Jose)	20	30	**15.0**	22.0	CN - Neighborhood Commercial	Neighborhood/Community Commercial (San Jose) Unplanned Urban Village	Alum Rock/East Foothills
599-39-047	0.6	Urban (San Jose)	40	80	**22.0**	45.0	CN - Neighborhood Commercial	Neighborhood/Community Commercial (San Jose) Unplanned Urban Village	Alum Rock/East Foothills
601-07-066	1.5	Urban (San Jose)	5	8	**7.0**	12.0	R1 - SF Housing	Residential Neighborhood (San Jose)	Alum Rock/East Foothills
601-25-119	1.9	Urban (San Jose)	5	8	**10.0**	15.0	R1 - SF Housing	Public Quasi-Public (San Jose)	Alum Rock/East Foothills
612-21-004	0.8	Urban (San Jose)	5	8	**4.0**	7.0	R1-6 - SF Housing	Residential Neighborhood (San Jose)	Alum Rock/East Foothills
649-24-013	43.5	Urban (San Jose)	25	35	**1,088.0**	1,523.0	A – Agricultural	Private Recreation and Open Space	Pleasant Hills
649-23-001	70.5	Urban (San Jose)	25	35	**1,762.0**	2,467.0	A – Agricultural	Private Recreation and Open Space	Pleasant Hills
142-04-036	17	Urban (Stanford)	Varies		700.0	900.0	A1 - General Use Special Purpose Base District	Major Educational & Institutional Uses (County)	Escondido Village
142-04-036a	8	Urban (Stanford)	70	90	560.0	720.0	A1 - General Use Special Purpose Base District	Major Educational & Institutional Uses (County)	Quarry Site A
142-04-036b	6	Urban (Stanford)	70	90	420.0	540.0	A1 - General Use Special Purpose Base District	Major Educational & Institutional Uses (County)	Quarry Site B
TOTAL UNITS					**6,198.0**	**8,441.0**			
RHNA Allocation					3,125				
San Jose Sites					4,518	6,281			
Stanford University Sites					1,680	2,160			