APPENDIX E

SIERRA POINT PHASE 3 PROJECT SB 610 WATER SUPPLY ASSESSMENT

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Sierra Point Phase 3 Project
SB 610 Water Supply Assessment

City of Brisbane
October 2018

Sierra Point Phase 3 Project
SB 610 Water Supply Assessment

Prepared for
The City of Brisbane

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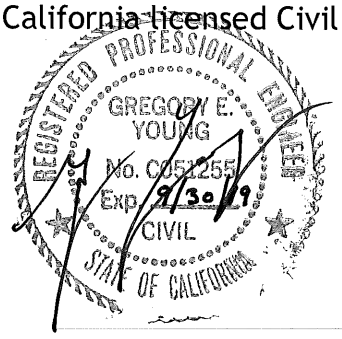
Prepared by:

Tully & Young
Comprehensive Water Planning

Prepared for:
The City of Brisbane

This Water Supply Assessment was prepared under the of a California licensed Civil Engineer.



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SECTION 1 – PROJECT INTRODUCTION

1.1 INTRODUCTION

As the lead agency under the California Environmental Quality Act (CEQA), the City of Brisbane is assessing the potential environmental impacts associated with the proposed development under the Sierra Point Phase 3 Project (proposed project). To support the CEQA analysis, a Water Supply Assessment (WSA) for the proposed project is necessary.

Statutory Background

Enacted in 2001, Senate Bill 610 added section 21151.9 to the Public Resources Code requiring that any proposed "project" as defined in section 10912 of the Water Code comply with Water Code section 10910, et seq. Commonly referred to as a "SB 610 Water Supply Assessment," Water Code section 10910 outlines the necessary information and analysis that must be included in an environmental analysis of the project to ensure that proposed land developments have a sufficient water supply to meet existing and planned water demands over a 20-year projection.

Proposed "projects" requiring the preparation of a SB 610 water supply assessment include, among others, residential developments of more than 500 dwelling units, shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space, commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space and projects that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.[1] The proposed project requires a WSA because it is a commercial office building of over 250,000 square feet.

The WSA will be incorporated into the CEQA document being prepared for the proposed project.[2]

Document Preparation and Approval

The WSA law requires that the lead agency – in this case, the City of Brisbane – identify a "public water system"[3] and further requires the lead agency to request that each identified public water system prepare a WSA for the project. If the lead agency is not able to identify a public water system that may supply water for the project, the lead agency must prepare the WSA itself after consulting with "any entity serving domestic water supplies whose service area includes the

[1] Water Code § 10912, subdivision (a).
[2] Water Code § 10911(b).
[3] A "public water system" is a system that provides water for human consumption that has 3,000 service connections.

project site, the local agency formation commission, and any public water system adjacent to the project site."[4]

In this case, the City of Brisbane has prepared the WSA because the City is the primary local water supplier and would serve the proposed project. The proposed project currently lies within the City of Brisbane water service area. This document provides the necessary information for the City to make its determinations and to comply with the assessment of water supply sufficiency as required by statute.

Document Organization

This WSA supports the proposed project's environmental review process and analyzes the sufficiency of water supplies to meet projected water demands of the proposed project through the required planning horizon. The WSA is organized according to the following sections:

Section 1: Project Introduction. This section provides an overview of WSA requirements, and a detailed description of the proposed project, especially the land-use elements that will require water service.

Section 2: Proposed Project Estimated Water Demands. This section describes the methodology used to estimate water demands of the proposed project and details the estimated water demands at build-out of the proposed project.

Section 3: Water Supply Characterization. This section characterizes the City's water supply portfolio that will serve the proposed project along with other current and future water demands. All options including existing water service contracts and potential future water rights, any available groundwater sources, and any supplemental water supply agreements are characterized for normal, single dry, and multiple dry year conditions.

Section 4: Sufficiency Analysis. This section assesses whether sufficient water will be available to meet the proposed project water demands, while recognizing existing and other potential planned water demands within the City service area. To provide the necessary conclusions required by statute, the analysis integrates the demand detailed in Section 2 with the characterization of the Company's water supply portfolio detailed in Section 3.

[4] Water Code § 10910(b).

1.2 PROPOSED PROJECT DESCRIPTION

The proposed project is a new laboratory related office and research facility to be constructed on 8.9 acres of Sierra Point within the City of Brisbane. The proposed project is located at 3000-3500 Marina Blvd in the Sierra Point development. The project site is bounded by Hwy 101 to the west, San Francisco Bay to the north, Marina Blvd to the south, and developed land to the east.

Project Background

The Project Site was entitled in 2008 as the "Opus Office Project," which at the time proposed traditional office space totaling nearly 450,000 square feet. In 2008, a water analysis was completed and discussions were started with the City to establish water service. In prior approved documents, the project would pay for conservation projects to reduce water demands elsewhere in the City to provide supply sufficiency in dry year scenarios. Since that time, the State suffered the worst drought since 1977 that establishes a new benchmark for dry year analysis. **Figure 1-1**, on the following page, depicts the proposed project location and land uses.

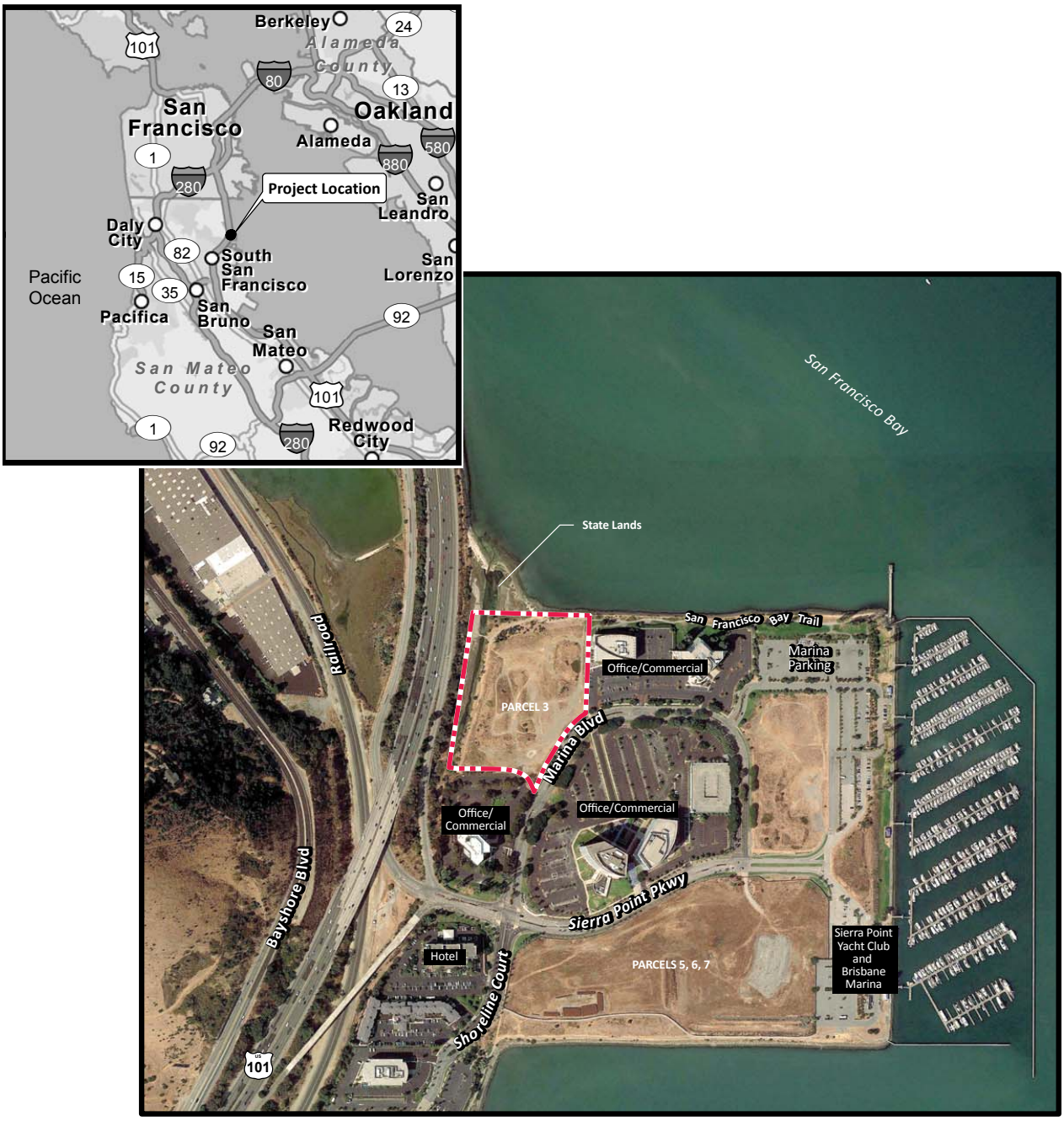
Project Description

The proposed project is designed for a combination of traditional office space and research and development laboratory space – including three separate buildings over a parking podium. The proposed project includes approximately 417,000 square-feet of office and research and development space, 89,000 square-feet of open space in the parking podium, and another 81,000 square-feet of open space at grade.

1.3 PROPOSED PROJECT PHASING

The proposed project is anticipated to build out completely within a couple of years following the start of construction. As such, there is no phasing associated with the demand calculations for this project. This demand is included in the projected annual water demands presented in **Section 2**.

Figure 1-1 – Proposed Project Location and Land Uses
(Source: Project Description by LSA, July 2018)



SECTION 2 – PROPOSED PROJECT ESTIMATED WATER DEMANDS

2.1 INTRODUCTION

This section describes the methodology, and provides the supporting evidence used to derive the proposed project's estimated annual water demand.

2.2 DEMAND FACTOR DEVELOPMENT

As detailed in **Section 1**, the proposed project has specific office and research laboratory uses with defined characteristics. To understand the water needs of the entire proposed project, unique demand factors that correspond with each unique project element are necessary. This subsection presents the methodology for determining the unit water demand factors that become the basis of the proposed project water demand estimates. Values developed for each distinct water use function are based on several sources of information as detailed in the following subsections.

2.2.1 Current and Future Mandates

There are several considerations that affect the development of unit water demand factors, ranging from State landscape mandates to changes in the plumbing and building codes. The most important factors for this analysis are described below.

2.2.1.1 Water Conservation Objectives

On November 10, 2009, Governor Arnold Schwarzenegger signed Senate Bill No. 7 (SBX7-7), which established a statewide goal of achieving a 20% reduction in urban per capita water use by 2020 for urban retail water suppliers.[5] While the City is not formally an "urban retail water supplier" by definition (it serves less than 3,000 acre-feet and less than 3,000 connections), this objective only indirectly applies to the City through its relationships with SFPUC. The proposed project represents an increase of approximately 5% in the total water use for the City. The impact to City conservation objectives and implementation plans will need to be monitored and factored as the proposed project's demands become established.

The efforts undertaken by SFPUC (the primary wholesale water supplier to the City), the City, and throughout the State by other urban retail suppliers to comply with this statute, though not directly, will affect the proposed project's use of appliances, fixtures, landscapes and other water

[5] California Water Code § 10608.20

using features, through changes or additions to City ordinances as well as State law and/or through an emerging "conservation ethic" developing throughout the State.[6]

2.2.1.2 Indoor Infrastructure Requirements

Beginning in January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (hereafter the "CAL Green Code") requiring the installation of water-efficient indoor and outdoor infrastructure for all new projects after January 1, 2011. The CAL Green Code was incorporated as Part 11 into Title 24 of the California Code of Regulations, and was revised in 2013 and again in 2016 with the revisions taking effect on January 1 of the following year. The focus of the 2016 update was to address changes to the State's Model Water Efficient Landscape Ordinance ("MWELO") in response to emergency regulations adopted during the drought.[7]

The CAL Green Code applies to the planning, design, operation, construction, use of every newly constructed or remodeled building or structure. The proposed project must satisfy the indoor water use infrastructure standards necessary to meet the CAL Green Code as well as the outdoor requirements described by MWELO. The proposed project will satisfy these indoor requirements through the use of appliances and fixtures such as high-efficiency toilets, faucet aerators, on-demand water heaters, or other fixtures, as well as Energy Star and California Energy Commission-approved appliances. Outdoor requirements are discussed in the following subsection.

2.2.1.3 California Model Water Efficient Landscape Ordinance and City Ordinances

The Water Conservation in Landscaping Act was enacted in 2006, and has since been revised and expanded multiple times by Department of Water Resources (DWR) to result in today's Model Water Efficient Landscape Ordinance (MWELO).[8] In response to the Governor's executive order dated April 1, 2015, (EO B-29-15), DWR updated the MWELO and the California Water Commission approved the adoption and incorporation of the updated State standards for MWELO on July 15, 2015.[9] The changes included a reduction to 45% for the maximum amount of water that may be applied to a landscape for non-residential projects, which effectively reduces the landscape area that can be planted with high water use plants. The MWELO applies to all types of new construction with a landscape area greater than 500 square

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[6] In May 2016, Governor Brown issued Executive Order B-37-16 entitled "*Making Water Conservation a California Way of Life*." This further illustrates the growing water conservation ethic in the state. In May 2018, Governor Brown signed into law SB 606 and AB 1668 that effectively implement the direction in the May 2016 Executive Order.

[7] The 2016 Triennial Code Adoption Cycle consisted primarily of the MWELO updates adopted in response to the drought. Indoor infrastructure changes were limited to some minor non-residential fixture changes and changes to the voluntary Tier1 and Tier2 requirements. Additionally, the Code was updated to match the new Title 20 Appliance Efficiency Regulations. *See 2015 Report to the Legislature, Status of the California Green Building Standards Code.*

[8] Gov. Code §§ 65591-65599

[9] These updated changes have been incorporated into California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 2.7, Sec. 490-495.

feet (the prior MWELO applied to landscapes greater than 2,500 sf).[10] For the purposes of this WSA it is assumed that the City will require landscaping plans to comply with MWELO as required by law.[11]

2.2.1.4 Metering, Volumetric Pricing, and Water Budgets

California Water Code §525 requires water purveyors to install meters on all new service connections after January 1, 1992. California Water Code §527 requires water purveyors to charge for water based upon the actual volume of water delivered if a meter has been installed. The City currently bills customers on a volumetric basis and, though this action alone does not necessarily reduce water use, water rates and City outreach have resulted in very efficient customer water use.

2.2.1.5 Project Characteristics Affecting Water Use

The proposed project plans for a number of land use features that will limit water demand. These include:

- *Limited landscape area:* The limitation of the size of landscape area will limit the potential for high water use outdoors.
- *LEED Gold Certification Requirement:* The City added the condition of at least LEED Gold certification to the project in 2017.[12] LEED certification is a "points and requirements" based system, whereby meeting the existing Cal Green standards is a "requirement" to be eligible for LEED certification, and water use efficiency measures beyond Cal Green can earn points towards those needed to achieve Gold.[13]

Collectively these minor restrictions add up to an effective irrigation and outdoor water use control system in addition to MWELO.

2.3 ESTIMATED PROJECT DEMAND

The proposed project includes four planned non-residential land uses with associated water demands: office space, research laboratory, gym, and landscaping. These are addressed below.

[10] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.
[11] The City's Landscaping Ordinance is found in Chapter 15.70 of the Brisbane Municipal Code and has been updated to conform with the State's MWELO.
[12] Marina Design Permit Modification Project Description
[13] LEED Certification is a points-based system where a project needs to meet minimum requirements to be eligible for certification and needs to exceed these minimums in some metric to earn points. Depending on the type of commercial certification applied for, the points needed for Gold and the points earned for a specific efficiency improvement vary. By cutting indoor water use by 50% over existing standards, the project could earn up to 12 points of the 60 needed for Gold status.

- *Office Space*: The proposed project anticipates 40% of the total floor area to be related to traditional office space – approximately 167,000 sf. Water use data for office space is readily available and well defined, however there is a wide range of use numbers due to a long service life for commercial buildings. As such, this WSA has used data from the more efficient side of the spectrum to reflect the impact of low and zero water use fixtures. Based upon national averages, office water demand for newer buildings is in the range of approximately 15 gpy/sf (gallons per year per square-foot).[14] However, this does not include the use of highly water efficient or zero water use fixtures – as would be required to achieve desired LEED certification. For the purposes of this WSA, this proposed project is assumed to use approximately 11 gpy/sf, achieved through the use of off-the-shelf low and zero water use bathroom fixtures.[15]

- *Research and Development Lab*: The proposed project anticipates 60% of the total floor area to be related to research lab – approximately 250,000 sf. Water use data for research lab space is not as readily available nor well defined. However there is a wide range of use numbers for commercial buildings with medical related activities and containing autoclaves. Based upon national averages, office water demand for newer buildings with medical related activities or having autoclaves is in the range of approximately 27.5 gpy/sf (gallons per year per square-foot).[16] However, this data lacked detail on the use of water efficient or zero water use fixtures, which the proposed project will incorporate to meet at least LEED Gold status. For the purposes of this WSA, the proposed project is assumed to use approximately 24.5 gpy/sf, achieved through the use of off the shelf low and zero water use bathroom fixtures.[17]

- *Gym Use*: The proposed project provides little detail on the employee gym, though it is a common feature of modern office spaces. Actual gym water use can vary significantly with patronage and gym features. Tully & Young has reviewed the previous analysis completed on the gym water use and found it to be sufficient for the purposes of this WSA. As such the gym water use is assumed to be 440,000 gallons per year.[18]

[14] US Energy Information Administration Commercial Buildings Energy Consumption Survey www.eia.gov/consumption/commercial/data
[15] This represents approximately 25% conservation over the national average and is consistent with the March 23, 2018 analysis from BFK Engineers prepared on behalf of the proposed project's applicant.
[16] US Energy Information Administration Commercial Buildings Energy Consumption Survey www.eia.gov/consumption/commercial/data
[17] This represents approximately 10% conservation over the national average and is consistent with the March 23, 2018 analysis from BFK Engineers prepared on behalf of the proposed project's applicant.
[18] This is consistent with the March 23, 2018 analysis from BFK Engineers prepared on behalf of the proposed project's applicant.

- *Public-Space Landscaping:* The proposed project includes about 3.9 acres of landscaping consisting of both at-grade landscaping surrounding the parking structure and landscape area above the parking podium. These public spaces will be landscaped with climate-appropriate plants and trees, and are expected to have nominal irrigation demands. For purposes of this memo, per-acre demands, using MWELO restrictions, are estimated to be 1.45 acre-feet per acre per year.[19]

2.4 OTHER WATER DEMANDS

In addition to the residential and non-residential project elements, the proposed project entails two other incidental water demands:

- *Construction Water*: Initiation of the proposed project will include site grading and infrastructure installation. These and other construction elements will require dust suppression and other incidental water uses. These are estimated to be nominal, and do not continue beyond the construction phases of the project. For purposes of identifying incremental water demands, construction water is assumed to be 1 acre-feet per year (this is about 350,000 gallons – or over 85 fill-ups of a 4,000-gallon water truck per year). The proposed project is anticipated to be operating at full capacity and fully built within one year of breaking ground. Therefore, construction water is only included in the initial year.

- *Non-revenue Water*: The proposed project demand represents the demand for water at the project location (e.g. at the customer's location). To fully represent the demand, water distribution system losses must also be included. Often, distribution system losses represent water that is lost due to system leaks, fire protection, unauthorized connections, and inaccurate meters. Essentially, this is the water that is obtained by the City that does not make it to its customers – either as a real loss or an apparent loss (e.g. such as may result when a customer meter underreports actual use). In most instances, the predominant source of distribution system losses is from leaks that inevitably exist throughout the many miles of pipes and fitting that bring water to end user customers.

  Wholesale losses between water sources and wholesale customers was analyzed as part of the San Francisco Public Utilities Commission (SFPUC) 2015 Urban Water Management Plan (UWMP) but the results were inconclusive.[20] To account for some losses, this WSA assumes a 7.5% loss factor, typical for newer delivery infrastructure. As shown in **Table 2-1**, non-revenue demand is estimated to be approximately 2.5 acre-feet per year.

[19] MAWA formula = 39.0 inches X 0.62 X 0.45 X 43,560 sf = 473,976 gallons = 1.45 acre-feet/acre-year. The value of 39 inches represents the average annual reference evapotranspiration for the Brisbane area.
[20] SFPUC Urban Water Management Plan, p. 4-11.

2.5 WATER DEMAND PROJECTION

Using the indoor and outdoor demands developed in the prior subsections, the overall proposed project potable water demand is represented in **Table 2-1** with a total forecast demand of 33.9 acre-feet per year at build-out, rounded to 34 acre-feet per year for purposes of this WSA.

Table 2-1 – Estimated Potable Water Demand

	Units	Demand Factor	Demand (af/yr)	
Category	Build-out	(gpy/unit)	Initial	Build-out
Non-Residential				
Office Space (sf)	166,778	10.95		5.6
Research Lab Space (sf)	250,167	24.46		18.8
Employee Gym	1	440,000		1.4
		Indoor Total		25.7
Other Project Demands				
Project Landscaping	3.9	1.45 af/yr		5.7
Construction Water (initial only)	1	1 af/yr	1	
		Outdoor Total	1	5.7
		Project Subtotal	1	31
		Non-revenue water (7.5%)	0	2.5
		Total Proposed Project Demand	**1**	**33.9**

SECTION 3 – WATER SUPPLY CHARACTERIZATION

The forecast water demands presented in the prior section are expected to be fully met by potable water supplies provided by the City acquired under its existing wholesale water contract with SFPUC. Therefore, to fully assess the reliability of the City's supplies to serve the proposed project, a review and assessment of City's overall supply and demand characterization as provided in the SFPUC UWMP is necessary. This section includes discussions of the City's forecast future water demands, the SFPUC UWMP forecast demands for wholesale water deliveries that include the City's, characterizations of SFPUC's supplies, and discussions of SFPUC water supply shortages under dry conditions.

3.1 CITY OF BRISBANE FORECAST WATER DEMAND

The overall water demand for the City is developed and presented within the SFPUC UWMP.[21] In that document, SFPUC discusses its customer types and determinations of overall demand based on historic trends and contract totals.[22] As indicated in the SFPUC UWMP, SFPUC relied on demand estimates prepared in 2014 by the Bay Area Water Supply and Conservation Agency (BAWSCA).

> "*In 2014, BAWSCA updated the demand projections of its member agencies using a combination of two different models: an econometric (or statistical) model developed particularly for each member agency and the Demand Side Management Least Cost Planning Decision Support System (a.k.a., DSS Model). Population projections were obtained from a combination of ABAG Projections 2013, individual agency 2010 UWMPs, California Department of Finance, the U.S. Census, and agency planning documents."* [SFPUC UWMP, p. 4-10]

The SFPUC UWMP also noted:

> *"For BAWSCA member agencies that are urban water suppliers and preparing an individual 2015 UWMP, some agencies are using the projections developed for the Strategy, while others are using their own set of projections."* [SFPUC UWMP, p. 4-10]

While the City did not meet the threshold to prepare its own 2015 UWMP, it has recently reviewed its customer demands and anticipated growth to develop an updated demand forecast.[23] The update presents a different result than the BAWSCA in their study. The primary reasons relate to more stable user demand data (as available through 2017), and more realistic

[21] It should be noted that the City of Brisbane and the Guadalupe Valley Municipal Improvement District are considered a single wholesale customer under SFPUC.
[22] SFPUC UWMP, Section 4.2.
[23] Updated demand was provided by the City to Tully & Young in an email from Julia Capasso Ayres (City of Brisbane) on August 20, 2018.

development projections for both residential and commercial development through 2045. The results are presented in **Table 3-1**. These demands also include the anticipated demand of 34 acre-feet annually for the proposed project.

Table 3-1: City's Updated Demand Forecast (acre-feet per year)

City Demand Projection (af/yr)						
2018	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
725	778	1,084	1,088	1,088	1,091	1,095

The demand projections derived from the BAWSCA report used in the SFPUC UMWP are presented **in Table 3-2**, along with the City's water supply assurances from SFPUC, defined as follows:

> "*Individual Supply Guarantee (ISG) refers to each Wholesale Customer's share of the Supply Assurance as defined in the 2009 Water Supply Agreement. The Supply Assurance is the 184 mgd maximum annual average metered supply of water dedicated by San Francisco to public use in the wholesale service area (not including the Cities of San Jose and Santa Clara). Individual Supply Allocation (ISA) refers to each Wholesale Customer's share of the 265 mgd Interim Supply Limitation through 2018."* [SFPUC UWMP, p. 4-12]

The "Supply Assurance" of 184 mgd (206,106 acre-feet annually) is perpetual and survives the expiration of the current wholesale contracts as defined between SFPUC and its wholesale customers in the Water Supply Agreement, a 25-year agreement that describes the current contractual relationship between the SFPUC and its Wholesale Customers entered into in 2009.

Table 3-2: Projected Demand from SFPUC's 2015 UWMP (acre-feet per year) [24]

Permanent Wholesale Customers	ISG	ISA	Actual 2015	Purchase Request				
				2020	2025	2030	2035	2040
City of Brisbane/GVMID	1,098	1,075	672	874	1,064	1,053	1,053	1,053
Other Permanent Wholesalers	205,009	205,031	135,761	167,148	172,670	176,378	179,626	183,659
Permanent Wholesale Demand	206,106	206,106	136,433	168,022	173,734	177,431	180,679	184,712

While the recently updated City demands are slightly higher than the BAWSCA estimates used by SFPUC, they are still within in the ISG value shown in **Table 3-2**.

[24] SFPUC uses a value of "million gallons per day" in its UWMP tables. These values were converted to acre-feet per year to allow comparison with the proposed project's estimated demands and overall reliability.

3.2 THE CITY OF BRISBANE'S WATER SUPPLY

The City has a single water source – its wholesale water supply contract with SFPUC. The City has an individual water supply contract, but is also part of the 2009 Water Supply Agreement with 25 other wholesale customers who all rely on SFPUC for 95% or more of their water supply, with the City relying 100% on SFPUC.

3.2.1 SFPUC Supplies

SFPUC's primary supply is its Hetch Hetchy system on the Tuolumne River, but it also holds several water rights in local watersheds. About 85% of SFPUC's supply is from the Hetch Hetchy system, with all water supplies jointly considered the Regional Water Supplies (RWS). SFPUC has other local supplies including recycled water, raw water, and desalinated water, but these supplies are only made available to its retail customers. Only the RWS supplies are used for wholesale water service. The portion of total RWS supplies available to the wholesale customers is presented in **Table 3-3** based on projected availability under average water supply conditions. Further discussion regarding availability under varying hydrologic conditions is provided later.

Table 3-3: Total SFPUC Wholesale Supply Projections[25]

Source	Water Supply (af/yr)				
	2020	2025	2030	2035	2040
RWS	206,106	206,106	206,106	206,106	206,106

3.3 WATER SUPPLY SUFFICIENCY

To fully assess the City's water supply, the potential available supply must be considered under normal, single-dry year, and multiple dry year conditions. As presented in the SFPUC UWMP, SFPUC has adequate supply to meet its projected wholesale demands in average conditions – essentially when the Tuolumne supplies are unconstrained. However, during single-dry year conditions and multiple dry year conditions, SFPUC anticipates wholesale supply shortages, causing it to implement its Water Shortage Allocation Plan (WSAP)[26] to reduce demand in line with available supplies. Furthermore, as documented in the SFPUC UWMP, the availability of water to individual wholesale customers during shortage conditions is dictated by specific rules detailed in the WSAP, which includes two tiers: Tier 1 defines the distribution of shortage between wholesale and retail customers, and Tier 2 defines an allocation agreement entered into in 2009 by the wholesale customers, as follows:

> *The Tier 2 Drought Implementation Plan (DRIP) was adopted by the Wholesale Customers. The allocation included in the DRIP is based on a formula that takes two primary factors into account: (1) each BAWSCA Wholesale Customer's Supply*

[25] Equal to 184 mgd. SFPUC UWMP, Table 7-5, p. 7-13.
[26] SFPUC Appendix N

Assurance from SFPUC, with certain exceptions, and (2) each BAWSCA Wholesale Customer's purchases from SFPUC during the three years preceding adoption of the DRIP. (SFPUC UWMP, p. 8-10)

The SFPUC UWMP representations of supply sufficiency are represented in the following subsections, using the Water Shortage Allocation Plan to represent anticipated supplies to the City during single dry and multiple dry year conditions.

3.3.1 Normal Year

During an average water year, when SFPUC receives a normal supply from an un-constrained Hetch Hetchy system, it is anticipated to have sufficient water to meet demands. Therefore, under normal supply conditions, the proposed project's demand of approximately 34 acre-feet annually would be met and would not have any negative impacts on the availability of supply for all of the City's existing and other planned future customers. **Table 3-4** replicates the supply conditions presented in the SFPUC UWMP for the City, along with the updated City demands, indicating full water supply to meet the expected wholesale customer demands through 2045. This indicates that the City's demands during normal year conditions will be fully satisfied by SFPUC supplies under the existing contract between the City and SFPUC.

Table 3-4: Estimated City Normal Year Supply and Demand

	Normal Year Sufficiency Analysis (acre-feet/year)					
	2020	2025	2030	2035	2040	2045
Supply Totals	1,098	1,098	1,098	1,098	1,098	1,098
Demand Totals	778	1,084	1,088	1,088	1,091	1,095
Surplus	320	14	10	10	7	3

3.3.2 Single Dry Year

During single dry year conditions, SFPUC anticipates the system-wide RWS supplies to be short approximately 10%, where, based upon the WSAP, the total shortage is split between retail and wholesale customers such that the wholesale supply is reduced from 206,106 acre-feet (184 mgd) to about 170,934 acre-feet (152.6 mgd)[27]. Based upon the DRIP factors, the portion of this supply available to the City is projected to be 907 acre-feet through 2040 (see **Table 3-5**). This WSA assumes that the City would experience a 17% reduction in supply.

[27] As shown in Table 8-5 of the SFPUC UWMP (p. 8-11).

Table 3-5: Estimated City Single Dry Year Supply and Demand

	Single Dry Year Sufficiency Analysis (acre-feet/year)					
	2020	2025	2030	2035	2040	2045
Supply Totals	643	907	907	907	907	907
Demand Totals	778	1,084	1,088	1,088	1,091	1,095
Difference	-135	-177	-181	-181	-184	-188
Shortage as a % of Demand	17%	16%	17%	17%	17%	17%

3.3.3 Multiple Dry Year

During multiple dry year conditions, SFPUC anticipates the system-wide RWS supplies to be short approximately 20%, where, based upon the WSAP, the total shortage is split between retail and wholesale customers such that the wholesale supply is reduced from 206,106 acre-feet (184 mgd) to about 148,419 acre-feet (132.5 mgd)[28]. Based upon the DRIP factors, the portion of this supply available to the City is projected to be 784 acre-feet through 2040 (see **Table 3-6**). This WSA assumes that the City would experience a 28% reduction in supply

Table 3-6: Estimated City Multi-Dry Year Supply and Demand Condition[29]

(following a single dry year)		Multi-Dry Year Sufficiency Analysis (acre-feet/year)					
		2020	2025	2030	2035	2040	2045
Year 2	Supply totals	555	784	784	784	784	784
	Demand totals	778	1,084	1,088	1,088	1,091	1,095
	Difference	-223	-300	-304	-304	-307	-311
Year 3	Supply totals	555	784	784	784	784	784
	Demand totals	778	1,084	1,088	1,088	1,091	1,095
	Difference	-223	-300	-304	-304	-307	-311
Year 4	Supply totals	555	784	784	784	784	784
	Demand totals	778	1,084	1,088	1,088	1,091	1,095
	Difference	-223	-300	-304	-304	-307	-311
Shortage as a % of Demand		29%	28%	28%	28%	28%	28%

[28] As shown in Table 8-5 of the SFPUC UWMP (p. 8-11).
[29] The 2045 supply is estimated using the similar percentage shortfall for the projected 2040 City demand.

SECTION 4 – SUFFICIENCY ANALYSIS

As detailed in **Section 2**, this WSA estimates the proposed project's water demand to be approximately 34 acre-feet per year at build-out during normal conditions (including non-revenue water demands). As presented in **Table 3-1**, the proposed project's demands are incorporated within the City's anticipated future customer demands of approximately 1,095 acre-feet, which is within the SFPUC contract ISG for the City of 1,098 acre-feet (see **Table 3-2**). The City's full ISG is recognized within the SFPUC UWMP projected wholesale demands, thus the proposed project's demand is also recognized within the SFPUC UWMP. Therefore, this WSA's sufficiency analysis relies upon the SFPUC UWMP representation of water supply reliability for SFPUC Wholesale Customers (as summarized in Section 3).

The analysis detailed in this section provides a basis for determining whether sufficient water supplies exist to meet the estimated water demand of the proposed project.[30] The WSA must provide a reasoned analysis of the likely availability of the identified supplies to serve the proposed project, while considering the demands of existing and other future planned-for demands on those supplies.[31]

4.1 PROPOSED PROJECT'S WATER SUFFICIENCY ANALYSIS

As detailed in this WSA, the City has adequate water supplies to meet the proposed project's demand as well as existing and future planned uses under most circumstances under its contract with SFPUC. As shown in **Table 3-5** and **Table 3-6**, shortages to meet City demands are already projected to occur during the assumed single-dry year condition – a shortfall of about 17%, and during multiple dry year conditions – a shortfall of about 28%.

To mitigate these shortages, the City anticipates requiring temporary demand reduction from its customers, as well as looking to permanent demand reduction achieved through changes to existing customers' appliances and fixtures (e.g. replacing toilets, dishwashers and washing machines). The City is also investigating opportunities to shift water supplies available from the SFPUC in normal years to years when supplies are reduced through innovated projects such as local water banking, unbalanced exchanges with other SFPUC wholesalers, and temporary water acquisitions.

[30] CWC § 10910 (c)(4) provides that "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."

[31] *Vineyard Area Citizens for Responsible Growth, Inc*. v. *City of Rancho Cordova* (2007) 40 Cal.4th 412, 430-32.

For purposes of this WSA, the anticipated shortages during single and multiple dry years manifest as a supply shortfall of up to 20 acre-feet to meet the proposed project's estimated demand, depending on the shortages imposed upon the City.

Absent alternative sources or reductions in water use at the office, laboratory and gym, sufficient water is only available to meet the project water demands during normal SFPUC RWS conditions. Without mitigation, there is not sufficient water supply available to the City in single-dry and multiple dry years to meet the proposed project's estimated water demands, as well as the City's existing and other planned future uses, and shortages up to 20 acre-feet per year should be expected for the proposed project.

4.2 WATER SYSTEM CAPACITY

Based on the planned City buildout water demands, sufficient capacity exists to serve the proposed project. Any constraints would be local in nature and negotiated as part of the development agreement between the City and the proposed project.

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