AFFINITY PROJECT

Water Supply Assessment

Prepared for
The Arroyo Parkway, LLC

January 2022

ESA

AFFINITY PROJECT

Water Supply Assessment

Prepared for
The Arroyo Parkway, LLC

January 2022

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
esassoc.com

ESA

Bend	Oakland	San Diego
Camarillo	Orlando	San Francisco
Delray Beach	Pasadena	Sarasota
Irvine	Petaluma	Seattle
Los Angeles	Portland	Tampa
Mobile	Sacramento	

D202100061.01

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

CONTENTS

Affinity Project Water Supply Assessment

Figures

Tables

SECTION 1
Introduction

In 2001, California adopted Senate Bill (SB) 610[1] and SB 221, thereby amending the California Water Code (Water Code). Under these new laws, certain types of development projects are now required to provide detailed water supply assessments to planning agencies. Any proposed project that is subject to CEQA and meets specific land use criteria or would generate new water demands equal to or greater than 500 dwelling units, is subject to SB 610 and is required to prepare a Water Supply Assessment (WSA).

The primary purpose of a WSA is to determine whether the identified water supply or water supplier will be able to meet projected demands for a proposed project, in addition to existing and planned future uses, over a 20-year planning period in normal, single-dry, and multiple-dry water years. Secondarily, a WSA provides decision-makers a regional framework on which to base a decision about the sufficiency of water supplies for a proposed project.

The proposed Project is subject to the California Environmental Quality Act (CEQA) and is a mixed-use development that includes one or more elements within a large-scale development that align with Water Code Section 10912(a) (refer to Section 3). However, upon review of the Project description, proposed land use and square footages (see section 1.1.2 below and potential water demand generated by the Project, it was determined that a WSA is not required. *Therefore, for conservative water supply planning purposes and to demonstrate water supply reliability, this WSA is provided for informational purposes and follows the SB 610 guidance with references to specific Water Code sections.*

This WSA assesses the availability of identified water supplies under normal-, single-dry-, and multiple-dry-year conditions, accounting for the projected water demand of the Proposed Project in addition to other existing and planned future uses of the identified water supply. This WSA examines the regional water providers and their supplies (Section 4.2), the reliability of these sources (Section 4.4), the projected short- and long-term water demand of the Project (Section 5), and the supply versus demand as required in a WSA (Section 6).

[1] An act to amend Public Resources Code Section 21151.9; to amend Water Code Sections 10631, 10656, 10910, 10911, 10912, and 10915; to repeal Water Code Section 10913; and to add and repeal Water Code Section 10657 relating to water.

1.1 Project Overview

1.1.1 Project Location

The Project site consists of an approximately 3.3-acre site located between 465 and 577 South Arroyo Parkway, City of Pasadena, within the County of Los Angeles, California. The Project site is bound by East Bellevue Drive on the north, South Arroyo Parkway on the east, East California Boulevard on the south, and the Metro L (Gold) Line on the west. Regional access to the site is provided by State Route (SR) 110 approximately 0.6-mile due south on Arroyo Parkway and SR 134 and I-210 approximately 1.0-mile north on Fair Oaks Avenue. The general vicinity and relationship of the Project site to surrounding streets is illustrated in **Figure 1-1**.

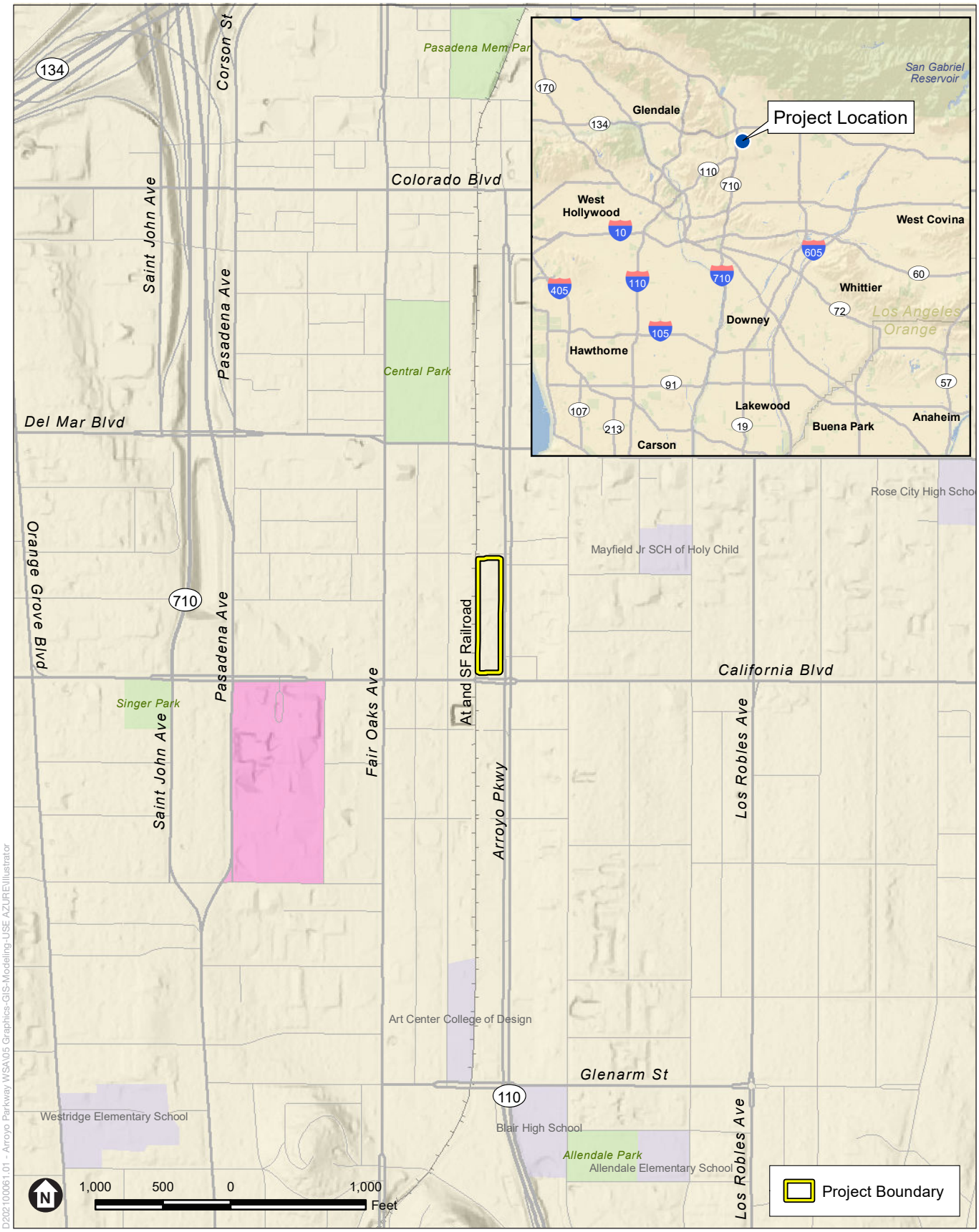
1.1.2 Project Description

The Project would rezone the Project site from CD-6 (Central District Specific Plan [CDSP], Arroyo Corridor/Fair Oaks subdistrict), to a Planned Development (PD) zone with a corresponding PD Plan. The Project involves demolition of six existing buildings totaling approximately 45,912 square feet (sf), located at 491, 495, 499, 503, 541, and 577 South Arroyo Parkway and construction of two new buildings: (1) a 154,000-square foot (sf), 7-story medical office building with ground-floor commercial uses (Building A); and (2) a 184,376-sf, 7-story assisted living building with 85,800 sf of assisted living uses and 98,576 sf of independent living uses including up to 95 one- and two-bedroom senior housing units (Building B). There would be up to five subterranean levels providing up to 850 parking spaces. Approximately 31,605 sf of open space, including public and private (for solely resident and staff use) space would be provided across the Project site. See **Table 1-1** below.

TABLE 1-1
PROPOSED PROJECT DEVELOPMENT PLANS

	Medical Office Building (A) sf	Assisted Living Facility (B) sf
Ground	14,635	25,377
2nd	23,028	31,269
3rd	26,671	29,107
4th	26,671	29,107
5th	26,671	29,107
6th	21,162	21,299
7th	21,162	19,110
Total Gross Square Footage	154,000	184,376
753,439 (Including five subterranean levels spanning both buildings)		
Parking	Up to 850 spaces	
Open Space	8,676	22,929
Total Aboveground Built Area (Existing + Proposed)	417,929	

Source: Affinity Development Plan



SOURCE: Psomas, 2021

Affinity Project WSA

Figure 1-1
Regional Location and Local Vicinity

ESA

Alternatively, the corresponding PD Plan would provide the flexibility to exchange the uses in Building A from medical office and ground floor commercial to the following:

- 3,000 sf of commercial and a sales/leasing management office on the ground floor;
- Up to 197 residential dwelling units; and
- Up to 650 parking spaces in four subterranean levels (one less than the Project as proposed).

The flexibility to exchange uses in Building A would enable the Project to respond to the economic needs and demands of the City at the time of Project implementation. The site layout and the aboveground height, mass, and other parameters of the Building A design would remain the same. The PD Plan would define all aspects of site design and provide limits on the types and amounts of allowable land uses, regardless of whether Building A is developed with medical office or residential dwelling units. It is noted that based on the development limit of 87 dwelling units per acre (du/acre), a total of 289 units could be constructed. Therefore, if a total of 197 units were constructed in Building A, only 92 independent living units could be constructed in Building B. Conversely, if 95 independent living units were constructed in Building B, only 194 units could be constructed in Building A. See **Table 1-2** below.

TABLE 1-2
BUILDING A RESIDENTIAL/COMMERCIAL DEVELOPMENT PLANS

	Residential/Commercial Building (A)	**Assisted Living Facility (B)**
Differences from Project Scenario	Up to 197 dwelling units 3,000 sf of ground-floor commercial	Same as Project
Total Square Footages	154,000	184,376
670,427 (Including four subterranean levels spanning both buildings)[a]		
Parking	Up to 650 spaces	
Open Space	8,676	22,929
Total Aboveground Built Area (Existing + Proposed)	417,929	

NOTES:

[a] Reflects one less subterranean parking level, all other floor area sizes are the same.
sf: square feet; N/A: not applicable; FAR: floor area ratio

Source: Affinity Project Development Plan

Throughout this WSA, these two planned development scenarios are referred to as:

- Project (development of Building A with medical office/commercial); and
- Project with Building A Residential/Commercial (development of Building A with residential/commercial).

Approximately 79,553 sf of the existing development would be retained and integrated into the Proposed Project, including the Whole Foods grocery store and associated 275-space subterranean parking structure at 465 South Arroyo Parkway and the two historic structures at 501 and 523 South Arroyo Parkway. Restaurant uses are anticipated to occupy the approximately 5,882 sf of space in the existing buildings to be retained at 501 and 523 South Arroyo Parkway.

A total of five levels of subterranean parking spanning both proposed buildings would also be constructed to serve the new development as well as the existing structures at 501 and 523 Arroyo Parkway under the Project. For the Project with Building A Residential/Commercial, a total of four levels of subterranean parking spanning both proposed buildings with up to 650 parking spaces would be constructed.

The Project site is situated within the Central District Specific Plan and zoned CD-6 (Central District Specific Plan, Arroyo Corridor/Fair Oaks subdistrict). The City General Plan land use designation for the Project site is High Mixed Use. As mentioned, the Project involves approval to rezone the site as a PD district. The Project includes a request for a zoning variance for historic resources related to building height. Specifically, the request involves an increase in allowable building height to offset the reduction in developable area due to preserving the two historic structures on the Project site.

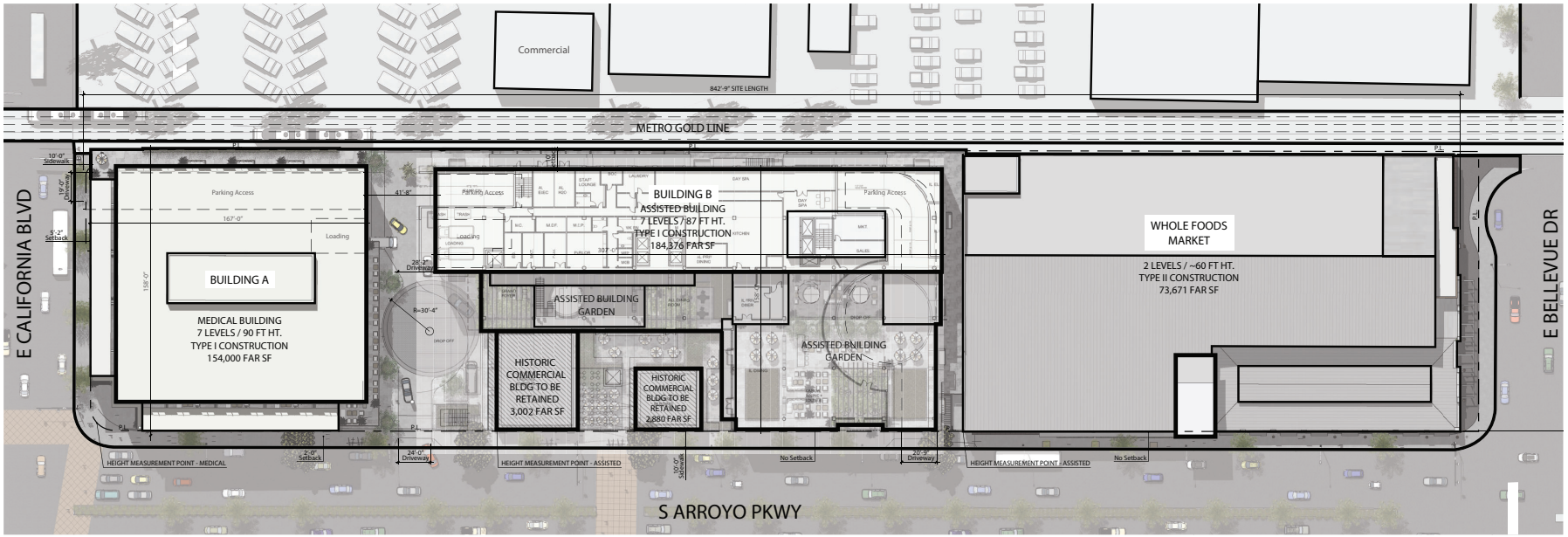
The Project is anticipated to be constructed beginning in 2023 and extending over a period of approximately 34 months. Project construction would occur from Monday through Saturday, without activity on Sundays or holidays, between the hours defined in Section 9.36.070 (Construction Projects) of the City of Pasadena Municipal Code (PMC) (7:00 AM to 7:00 PM Monday through Friday and 8:00 AM to 5:00 PM on Saturday). The Project is anticipated to be opened to the public in 2026.

Figure 1-2 shows the proposed layout of the Project site. As detailed in Table 1-1 and Table 1-2, the Project would develop a total of approximately 338,376 sf of new medical office, commercial, restaurant and residential uses across the Project site. As previously mentioned, 79,553 sf of the existing development will remain on site.

1.2 Document Structure

This WSA is organized following a basic hierarchy to describe each issue: regional context (PWP service area and the underlying groundwater basin); local context (City service area), Project-level analysis for the Proposed Project; and the WSA that includes a comparison of water supply and demand for the Project, and existing and future demand for all water year types. The report organization is as follows:

1. Introduction; project overview, location, and description; and document structure
2. City background information and land use planning
3. General information on water supply planning under SB 610
4. Water supply setting – including local climate, surface and groundwater supplies, capacities, and reliability
5. Regional, City, and project water demands – historical, projected, and projected dry-year demands
6. Supply-demand comparisons on a regional, City, and project-level basis
7. Conclusions



Not to scale

SOURCE: Psomas, 2021

Affinity Project WSA

Figure 1-2
Project Site Plan

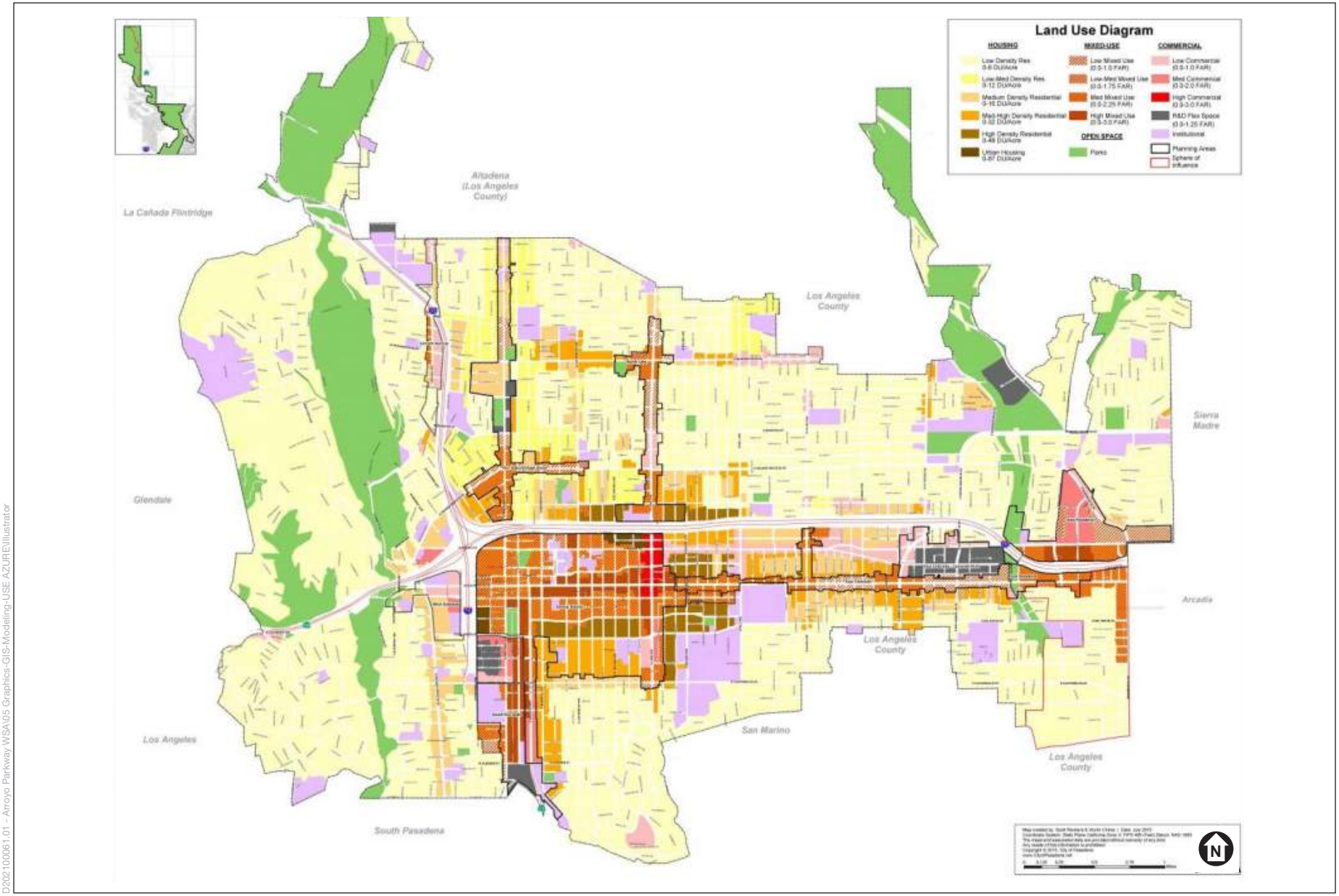
ESA

SECTION 2
City Information and Proposed Project Land Use Designation

2.1 Local Land Use Designations

This section describes background information and land use planning for the City of Pasadena (City). According to PWP's 2020 Urban Water Management Plan (UWMP), in 2020, PWP provided water service to a population of approximately 170,400 as well as non-residential customer in its service area. The population is roughly 15 percent or 20,000 more persons than the current population residing within the City's boundaries. PWP's water service area encompasses approximately 25 square miles (Figure 2-1) and includes the City and portions of the unincorporated areas of Altadena, East Pasadena, and San Gabriel. As shown in the Figure 2-1, PWP's service area is bordered on the north by the unincorporated community of Altadena and the Angeles National Forest, on the east by Arcadia and Sierra Madre, on the south by South Pasadena and San Marino, and the west by Los Angeles, Glendale, and La Cañada Flintridge.

Land use in the PWP service area is largely low and medium density residential, with single family and multi-family residential units. High-density residential, commercial and mixed land uses are generally located along major corridors, such as Fair Oaks Avenue and Washington Boulevard, and in Special Districts such as Central Pasadena, East Colorado and South Fair Oaks (Figure 3-1). Areas designated as parks in the General Plan are designated as government in the current land use database. The *2015 General Plan Update* explains that the long-term vision for growth in the City is to encourage development along major corridors. According to the *2015 General Plan Update*, future growth will occur through urban infill, which means increasing the number of residential units or mixed-use units per acre typically through the replacement of single-story structures with multi-story structures. The projected General Land Use diagram (Figure 3-4 of PWP 2020 UWMP) functions as a guide to the general public, planners, and decision-makers, depicting the ultimate pattern of development for Pasadena in 2035, consistent with the requirements of State planning law (Government Code §65302(a)). It depicts the distribution of various uses and intensity of development that shall be permitted as the physical representation of *2015 General Plan Update* goals and policies and updated in the most recent Housing Element. These are implemented through the Zoning Code, Zoning Map, and Specific Plan.



D202100061.01 - Arroyo Parkway WSA\05 Graphics-GIS-Modeling-USE AZURE\Illustrator

SOURCE: Pasadena Water & Power, 2021

Affinity Project WSA

Figure 2-1
General Plan Land Use

ESA

Population growth in the Pasadena area is not expected to increase significantly between 2020 and 2045. This assumes average growth of only approximately 0.5 percent per year, based on the PWP 2020 UWMP, which incorporates growth projections provided by the Southern California Association of Governments (SCAG) and California Department of Finance for current and projected regional demographics, including annual estimates of population, employment, and housing units for cities and counties in California.

2.1.1 Existing General Plan Land Use and Zoning Designations

The Project site is located within the Central District Specific Plan, is zoned CD-6, and has a General Plan Land Use Designation of High Mixed-Use. Figure 2-1 shows the City's General Plan Land Use with land use categories.

2.2 City Population and Community

Recent population growth for the PWP water service area has been slow but steady as PWP's service area, which also includes areas outside and adjoining the City, is largely built-out. According to PWP's 2020 UWMP, the service area population increased from 146,840 to 170,400 between 1990 and 2020, representing an annual average growth rate of 0.5 percent. According to the SCAG and population projections provided by the California Department of Finance, minimal population growth is expected through 2045 in PWP's service area. According to PWP's 2020 UWMP, service area population is forecast to increase by approximately 0.5 percent annually, consistent with the City's 2015 General Plan Update growth estimates. As shown in **Table 2-1**, the service area population is expected to increase through 2045. Primary developments of infill projects consisting of multi-family units is the current trend and will contribute to increasing population density within the City.

TABLE 2-1
POPULATION – CURRENT AND PROJECTED

Year	2020	2025	2030	2035	2040	2045 [a]
Population (SCAG)	170,400	173,508	181,466	185,702	189,927	194,723

NOTE:

[a] The 2045 service area population is projected based on an anticipated annual average growth rate of 0.5 percent as stated in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 service area population projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan.

Source: *PWP Final 2020 Urban Water Management Plan, pg. 3-6* and Southern California Association of Governments 2016; California Department of Finance for Los Angeles County 2018

This page intentionally left blank

SECTION 3
Water Supply Planning

California has different processes to plan for the development or maintenance of water supplies on a regional level. UWMPs, Groundwater Management Plans (GMPs), Integrated Regional Water Management Plans (IRWMPs), Municipal Service Reviews (MSRs) and water resources components of General Plans all integrate some degree of regional planning of water supply and demand.

To complement these large-scale planning processes, the Governor signed into law SB 610 and SB 221 in 2002, which emphasize the incorporation of water supply and demand analysis at the earliest possible stage in the planning process for projects undergoing more specific or detailed planning level analysis. These legislations primarily apply to the planning of water supplies and sources for individual subdivision projects, and are completed at the time the project is being proposed and permitted. SB 610 amended portions of the Water Code, including Section 10631, which contains the Urban Water Management Planning Act, and added Sections 10910, 10911, 10912, 10913, and 10915, which describe the required elements of a WSA. SB 221, which requires completion of a Water Supply Verification (WSV), amended Section 65867.5 and added Sections 66455.3 and 66473.7 to the Government Code.[2]

3.1 Water Supply Planning under SB 610 and SB 221

As the public water system that will supply water to the Project, PWP is required to prepare WSAs and WSVs, under the requirements of SB 610 and SB 221, codified in Government Code Sections 65867.5, 66455.3, and 66473.7 if a proposed project meets certain criteria. There are three primary areas to be addressed in a WSA: (1) a description of all relevant water supply entitlements, water rights, and water contracts; (2) a description of the available water supplies and the infrastructure, either existing or proposed, to deliver the water; and (3) an analysis of the demand placed on those supplies, by the project, and relevant existing and planned future uses in the area. In addition to these items, WSVs incorporate more detailed confirmation that the appropriate infrastructure planning and funding are in place to fully commit water supplies to a project. The Project does not include a "subdivision" as defined by Government Code Section 66473.7(a)(1);[3] therefore, a WSV is not required for the Project pursuant to Government Code 66473.7(b).

---

2 Department of Water Resources, *Guidebook for Implementation of SB 610 and SB 221 of 2001*, 2003.

3 Government Code Section 66473.7(a)(1) states: "'Subdivision' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, "subdivision" means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections." As noted in Section 1.1.2 above, the Project would not result in more than 500 dwelling units, and as noted in Section 3.1.3 below, PWP, which is the public water system that would supply the Project, has more than 5,000 service connections.

SB 610 is applicable to projects subject to the CEQA or considered a "project" under Water Code Section 10912(a) or (b), and builds on the information that is typically contained in a UWMP. The amendments to Water Code Section 10631 were designed to make WSAs and UWMPs consistent. A key difference between the WSAs and UWMPs is that UWMPs are required to be revised every five years, in years ending with either zero or five for those water systems that meet the specific connection criteria, while WSAs are required as part of the environmental review process for each individually qualifying project. As a result, the 20-year planning horizons for each qualifying project may cover slightly different planning periods than other WSAs or the current UWMP. Additionally, not all water providers who must prepare a WSA for a qualifying project under SB 610 are required to prepare an UWMP as defined in the Urban Water Management Planning Act.

Especially pertinent to this WSA for the Project, and all projects to be served by PWP, are the provisions under SB 610 that involve documentation of supply if groundwater is to be used as a source. A detailed discussion of the groundwater basin and groundwater production can be found in Sections 4.2 and 4.3.

The SB 610 WSA process involves answering the following questions:

- Is the project subject to CEQA?
- Is it a project under SB 610?
- Is there a public water system?
- Is there a current UWMP that accounts for the project demand?
- Is groundwater a component of the supplies for the project?
- Are there sufficient supplies available to serve the project over the next 20 years?

3.1.1 "Is the Project Subject to CEQA?"

The first step in the SB 610 process is determining whether the project is subject to CEQA. SB 610 amended Public Resources Code Section 21151.9 to read: "Whenever a city or county determines that a project, as defined in Section 10912 of the Water Code, is subject to this division [i.e., CEQA], it shall comply with part 2.10 (commencing with Section 10910) of Division 6 of the Water Code." The City has determined that the Project is subject to environmental review pursuant to the requirements of CEQA, and a Notice of Preparation for an Environmental Impact Report was published on August 5, 2021. The information contained in this assessment is intended to be used to inform the environmental analysis for the Project.

3.1.2 "Is It a Project under SB 610?"

The second step in the SB 610 process is to determine if a project meets the definition of a "Project" under Water Code Section 10912(a). Under this section, a "Project" is defined as meeting any of the following criteria:

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 (ft^2) of floor space;
3. A commercial building employing more than 1,000 persons or having more than 250,000 ft^2 of floor space;
4. A hotel or motel with 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 ft^2 of floor area;
6. A mixed-use project that includes one or more of these elements; or
7. A project creating the equivalent demand of 500 residential units.

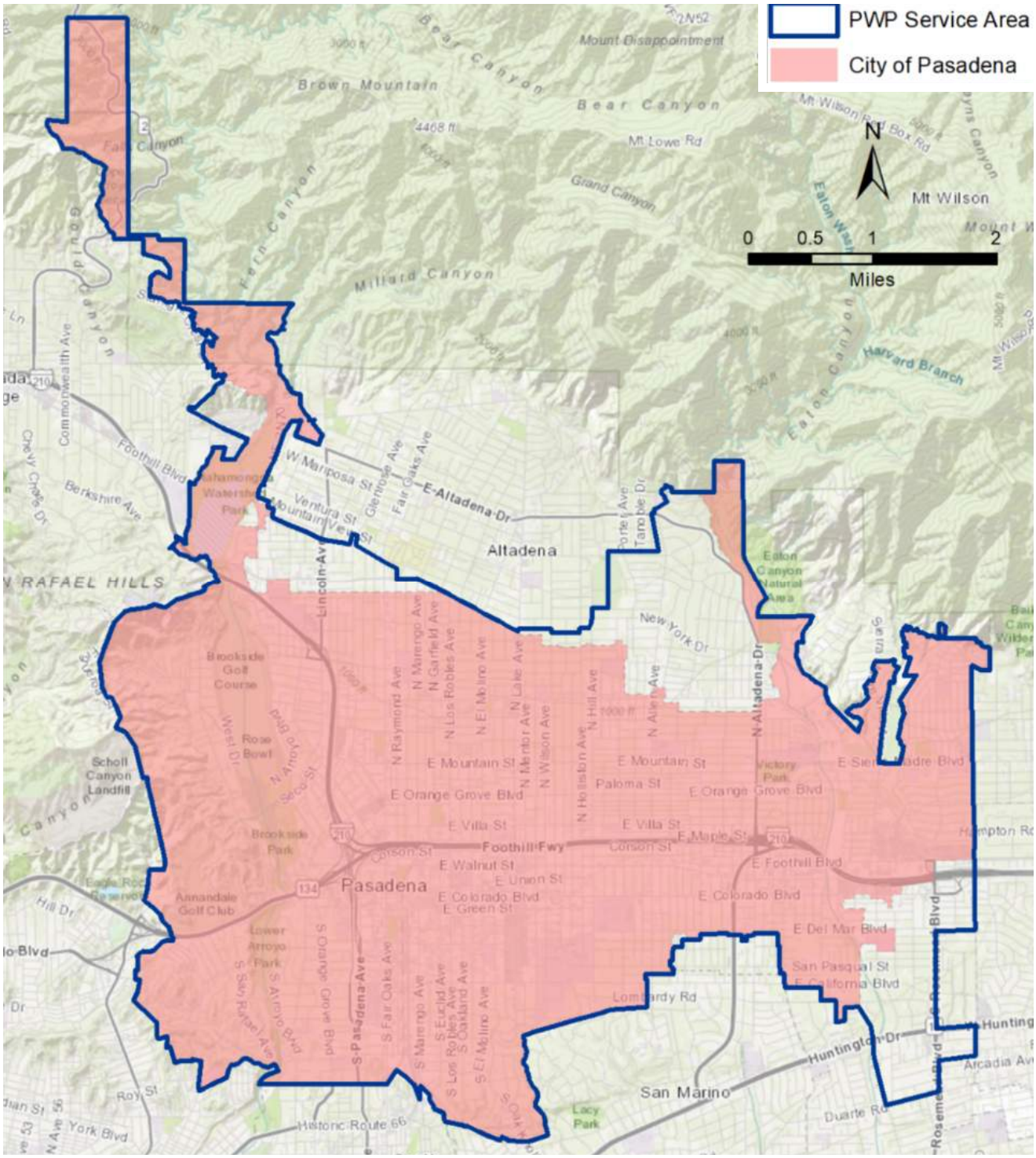
Alternately, if a public water system has less than 5,000 service connections, the definition of a "Project" also includes any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of service connections for the public water system. The Project does not qualify as a "Project" under Water Code Section 10912(a) according to any of the above criteria. However, this WSA has nonetheless been prepared for informational purposes to inform the environmental analysis and assess if PWP as the water provider has sufficient and reliable supplies to meet the projected water demand for the Project and PWP water service area in normal, single-dry and multiple-dry water years.

3.1.3 "Is There a Public Water System?"

The third step in the SB 610 process is determining if there is a "public water system" to serve the project. Water Code Section 10912(c) states: "[A] 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."

PWP is identified as the public water supplier for the Project site. The City is situated between the Arroyo Seco to the west and Eaton Wash to the east, overlaying the Raymond Groundwater Basin. This combination of surface water and groundwater provided the basis for Pasadena's establishment and early development. PWP's water service area encompasses approximately 25 square miles and is larger than the legal boundary of the City (**Figure 3-1**). It includes portions of the unincorporated areas of Altadena, East Pasadena, and San Gabriel. Approximately 15% of the total population served by PWP is located outside of the City's legal boundary. The service area is bordered on the north by the unincorporated community of Altadena and the Angeles National Forest, on the east by Arcadia and Sierra Madre, on the south by South Pasadena and San Marino, and the west by Los Angeles, Glendale, and La Cañada Flintridge.

PWP's water supply consisted solely of groundwater and some local surface water along with San Gabriel River water after the construction of Morris Dam that included a transmission line to Pasadena. However, after becoming one of the thirteen original members of Metropolitan Water District of Southern California (MWD), PWP began receiving imported water, and Pasadena was the first city to receive water supplies from the Colorado River through the Colorado River Aqueduct (CRA) in 1941.



D2021000061.01 - Arroyo Parkway WSA\05 Graphics-GIS-Modeling-USE AZURE\Illustrator

SOURCE: Pasadena Water & Power, 2021

Affinity Project WSA

Figure 3-1
PWP Service Area

ESA

Today, PWP's water supply consists of groundwater, surface water, and imported water that is purchased from MWD. PWP is continuing to diversify its water supply portfolio to increase water supply reliability and use non-potable supply sources. PWP serves approximately 38,000 water service connections through its potable water system that includes approximately 520 miles of pipelines ranging in size from 36 inches to 4 inches in diameter, 19 booster pump stations, 14 tanks and reservoirs, 18 wells, and five connections to the MWD system.[4] As such, PWP is a public water system pursuant to Water Code Section 10912(c), and would supply water to the Project.

3.1.4 "Is There a Current UWMP That Accounts for the Project Demand?"

Step four in the SB 610 process involves determining if there is a current UWMP that considers the projected water demand for the project area. The Water Code requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet (af) annually, must prepare an UWMP, and this plan must be updated at least every five years on or before December 31, in years ending in five and zero. Water Code Section 10910(c)(2) states, "If the projected water demand associated with the 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) [i.e., the WSA]."

In its 2020 UWMP (adopted June 2021),[5] PWP anticipates an increase in mixed-use developments along transportation corridors in the next several decades and consistent with the City's growth projections as reported in its adopted 2020 UWMP. Moreover, the Proposed Project is consistent with SCAG's growth forecasts, which were used to calculate service area water demands in PWP's 2020 UWMP and also MWD's 2020 UWMP[6] and its supporting documents. Accordingly, PWP's 2020 UWMP accounts for the water demand of the Proposed Project. Water supply availability and demand data relevant to this WSA is provided in PWP's 2020 UWMP and MWD's 2020 UWMP.

This WSA relied on data and information contained in PWP's 2020 UWMP as it includes the most recent and up-to-date water resources planning information, regional water supplies, service area information and potential water demands that would be generated by land uses associated with the Project. With that understanding, this WSA, per the requirements of SB 610 calculates the water demands of the current Project by assigning water demands factors associated with these proposed uses.

4 Tse, Michael, Associate Engineer, PWP. Email to Van Patten, Jason, Senior Planner, City of Pasadena, January 12, 2022.

5 PWP *Final 2020 Urban Water Management Plan*, adopted June 2021.

6 MWD *2020 Urban Water Management Plan*, June 2021.

3.1.5 "Is Groundwater a Component of the Supplies for the Project?"

The requirements of Water Code Section 10910(f), Parts 1 through 5, apply if groundwater is a source of supply for a Project. PWP extracts groundwater to supplement imported water supply sources. PWP pumps its groundwater from the Raymond Basin (RB), a large aquifer underlying the City and the surrounding areas. The RB Judgement (December 1944) resolved conflicts within the groundwater pumping entities overlying the RB. The RB Judgement provides groundwater management for the RB and is discussed in Section 4.2.4.

The large aquifer underlying the City and the surrounding areas is referred to as the RB. The alluvial gravel, sand, and silt are the main water-bearing materials in the RB. The RB can be highly productive some areas and less productive in others, as wells produce groundwater at rates ranging from a few hundred gallons per minute (gpm) to several thousand gpm. The alluvium resides upon impervious bedrock. The alluvial valley slopes to the south, ranging in elevation from 2,000 feet above mean sea level (MSL) near the mountains to between 500 and 700 feet MSL at the Raymond fault. The fault acts as groundwater barrier along the southern boundary of the Basin.

3.1.6 "Are There Sufficient Supplies to Serve the Project over the Next Twenty Years?"

The final step in the SB 610 process pursuant to Water Code Section 10910(c)(4) is to illustrate the available water supplies, including the availability of these supplies in all water-year conditions (normal, single-dry year and multiple-dry years) over a 20-year planning horizon, and an assessment of how these supplies relate to project-specific and cumulative demands over that same 20-year period. In this case, the period is projected to 2045. The water supply and demand comparisons are presented and discussed in Section 6. The sufficiency of water supply sources to serve the Project is assessed in the following sections, which address surface water as imported and delivered through MWD's water supply systems and local groundwater supplies underlying the City. The PWP 2020 UWMP relies on the City's General Plan 2035, within which the Project was included in overall growth in the City and water demand generated by anticipated mixed-use development along transportation corridors and/or similar commercial and residential developments. The Proposed Project does not include a General Plan Amendment and is consistent with SCAG's growth forecasts, which were used to calculate water demand forecasts in the PWP 2020 UWMP and MWD's 2020 UWMP. Therefore, through these processes the Proposed Project's water demand has been accounted for in the PWP 2020 UWMP.

Based on the information provided in this WSA, there are sufficient water supplies in the Project area to meet the needs of the Project over the next 20 years (the assessment period required per SB 610). As described in Section 7, Conclusions, there is sufficient available water supply to meet existing and Project demand in the near-term and over the next 20 years.

SECTION 4
Water Supply Setting

This section presents a discussion of PWP and its service area. PWP would serve the Proposed Project's domestic water needs. The City's water supplies are provided from two sources: local groundwater from the RB and water purchased from MWD. MWD is a regional wholesaler in Southern California. MWD provides the City with water imported from the Colorado River Aqueduct (CRA) and the State Water Project (SWP). PWP does not have ownership rights to the naturally occurring groundwater underlying the City's service area. However, PWP receives a right to pump additional groundwater through groundwater credits, which are described in detail under Section 4.2.5. under *Local Groundwater Supplies*.

4.1 Climate

Pasadena's weather is characterized as a Mediterranean climate. Temperatures are mild in the winter, spring and fall, and hot and dry during summer months. Water demand in the PWP service area increases in the summer months due to increased demands for outdoor irrigation. The average annual precipitation in Pasadena is about 20 inches per year. Between 1928 and 2019, precipitation varied between 5 and 48 inches per year. Approximately 75 percent of the average annual precipitation falls during the months of December through March. Typically, August is the hottest month of the year with an average daily maximum temperature of 90 degrees Fahrenheit. Evapotranspiration follows a similar trend as temperature, peaking in July and decreasing in December. A summary of monthly climate data is contained in **Table 4-1** and shows the average annual precipitation, evapotranspiration and irrigation demands in and around the Project area.

The historical annual average precipitation in the City is 19.9 inches. Winter months tend to be wetter than summer months. The wettest month of the year is February with an average rainfall of 4.5 inches. As described in PWP's 2020 UWMP, climate change adds uncertainties to the projection of water supply planning. The effects of higher temperatures and precipitation changes induced by climate change may impact water supplies in a number of ways including:

- Reduction in Sierra Nevada snowpack and consequent reductions in imported water sources for the MWD
- Changes in runoff pattern and amount
- Increased intensity and frequency of extreme weather events
- Prolonged drought periods
- Water quality issues associated with increase in wildfires
- Rising sea levels resulting in potential pumping cutbacks on the State Water Project

- Effects on the groundwater basin
- Changes in demand levels and patterns
- Increased evapotranspiration from higher temperatures

TABLE 4-1
AVERAGE ANNUAL PRECIPITATION, EVAPOTRANSPIRATION, AND IRRIGATION DEMANDS

Month	ETo (in)[a]	Average of Daily Maximum (F)	Average Total Precipitation (in)[a]
January	2.2	67.1	4.1
February	2.4	68.6	4.5
March	3.8	71	3.2
April	4.6	74.4	1.4
May	5.2	77	0.4
June	5.8	82.1	0.1
July	6.8	88.7	0
August	6.4	89.7	0.1
September	5	88	0.4
October	3.6	81.5	0.7
November	2.5	74.2	1.7
December	2	67.7	3.2
Annual			***19.9***

NOTE:
ETo = evapotranspiration

Source: *PWP Final 2020 Urban Water Management Plan, Table 3-1*

While it is unknown what the magnitude and timing of these impacts will be, the City is participating in regional planning efforts that incorporate climate change into long range supply planning.

4.2 Supply Sources

The City's water is provided through two sources: local groundwater from the RB and imported water purchased from MWD. MWD is a regional wholesaler in Southern California. MWD provides the City with water imported from the CRA and the SWP. **Table 4-2** summarizes water supply sources and estimated volumes available now and through 2045.

The following section discusses the PWP's water supply sources available to meet the needs of the Proposed Project.

TABLE 4-2
PASADENA WATER SUPPLY SOURCES AND QUANTITIES (AFY)

	2025	2030	2035	2040	2045 [a]
Imported Water	19,248	19,362	19,454	19,527	19,579
Groundwater	11,830	11,830	11,830	11,830	11,830
Total Supplies	**31,078**	**31,192**	**31,284**	**31,357**	**31,409**

NOTES:
afy = acre-feet per year
[a] The 2045 imported water is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 imported water projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

SOURCE: PWP FINAL *2020 URBAN WATER MANAGEMENT PLAN*, TABLE 6-5

4.2.1 Imported Water Supplies

The water supply for the City is imported from outside the region through the City's membership in MWD. MWD delivers both treated and untreated water to Southern California via two sources. Water from Northern California is imported by way of the SWP, and water from the Colorado River reaches the region through the CRA. MWD has five treatment plants, which supply most of Southern California with treated water through their regional distribution system. As shown in **Table 4-3**, the City obtains about 63 percent of its treated potable water from MWD. PWP receives treated water via five turnouts from MWD's Upper Feeder. Water served to PWP is treated at MWD's Weymouth Water Treatment Plant (WTP). During outages at the Weymouth WTP, PWP can receive treated water from MWD's Jensen WTP. Sufficient turnout capacity exists to meet existing and projected PWP demands. According to PWP 2020 UWMP, while connection capacity is sufficient, reliability of this supply is insufficient, as such, PWP would be unable to meet local demand in the event of a service disruption from MWD.

TABLE 4-3
IMPORTED WATER SUPPLIES (AFY)

Source	2020 (actual)	2025	2030	2035	2040	2045 [a]
MWD Treated Potable	17,940	19,248	19,362	19,454	19,527	19,579

NOTES:
af = acre-feet per year
[a] The 2045 imported water is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 imported water projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

SOURCE: PWP FINAL *2020 URBAN WATER MANAGEMENT PLAN*, TABLE 6-1 AND TABLE 6-2

4.2.2 Local Groundwater

Groundwater production is obtained from the Raymond Basin (RB). The RB is an adjudicated basin and PWP has groundwater pumping rights to extract groundwater based on the adjudication and decree. PWP is also credited with additional pumping rights for infiltrating surface water.

PWP can use the RB for long-term supply storage as an emergency supply. PWP manages its pumping rights, spreading credits, and long-term storage to maintain a reliable source.

4.2.3 Raymond Basin Description

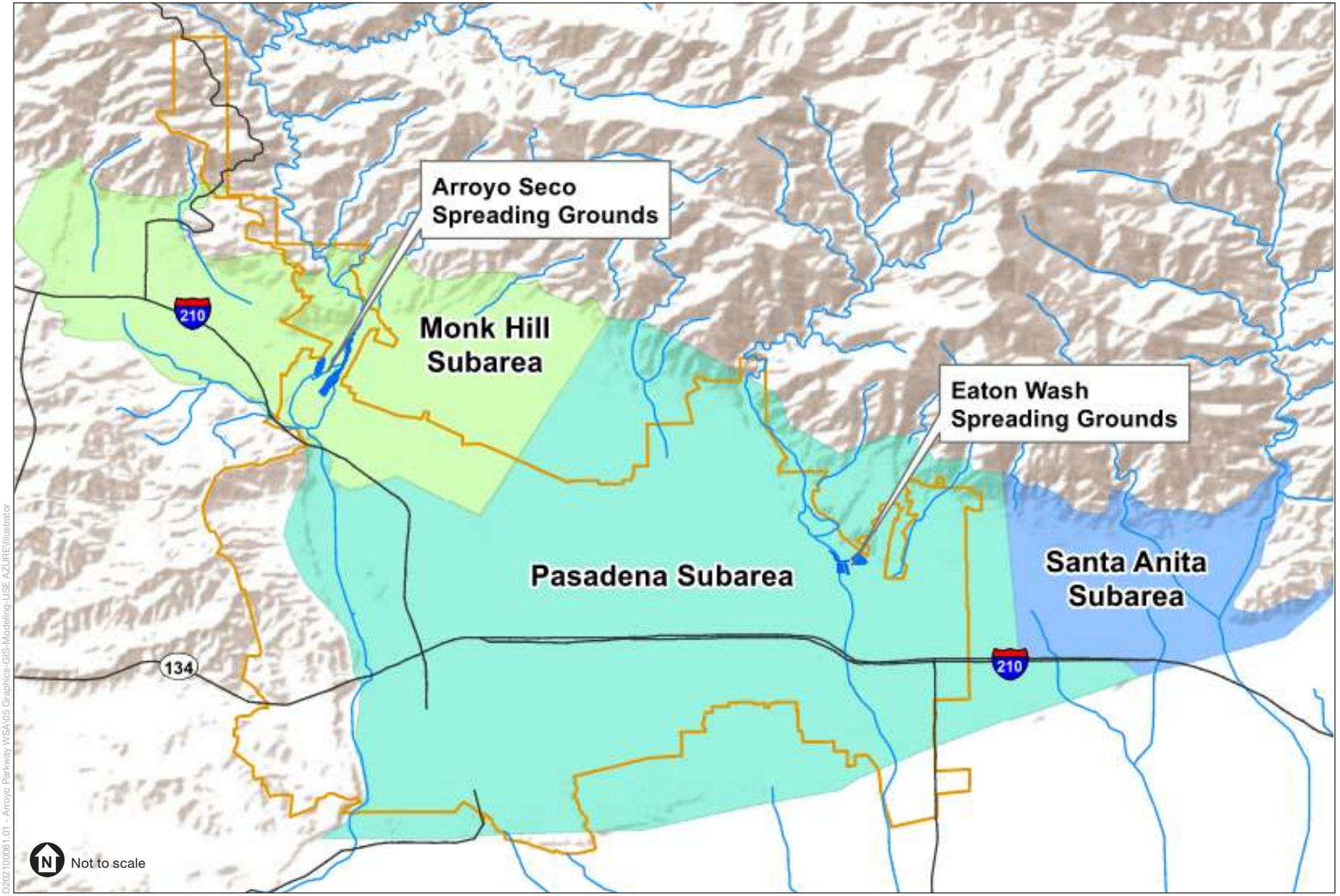
Pasadena overlies the RB. RB is an alluvial valley approximately 40 square miles in area underlain by deposits of gravel, sand, silt, and clay. The RB is located in the northwest portion of the San Gabriel Valley in Los Angeles County, California, and is bounded by the San Gabriel Mountains to the north, the San Rafael Hills to the west, and the Raymond Fault to the south/southeast. RB is divided into three subareas: the Monk Hill subarea in the northwest, the Pasadena subarea in the central portion of the basin, and the Santa Anita subarea in the east (**Figure 4-1**). PWP has water rights in the Monk Hill and Pasadena subareas of the RB.

The base of the water-bearing strata of the Raymond Basin is defined by bedrock material that is not considered to yield significant quantities of water. Overlying the bedrock are more than 1,200 feet of unconsolidated alluvial materials consisting of boulders, gravel, sand, silt, and clay. This alluvium is the principal water-bearing unit in the RB. Well yields in the alluvium range from a few hundred to several thousand gallons per minute (gpm). The alluvial aquifer system in the RB consists of many individual interconnected water-bearing zones.

Specific yield values in the RB are typical of alluvial sediments, and range from approximately 5 percent to 18 percent. Groundwater generally flows southerly from areas of recharge at the base of the San Gabriel Mountains to areas of discharge along Raymond Fault at hydraulic gradients ranging from approximately 0.040 feet to 0.090 feet.[7] The Raymond Fault acts as a leaky hydrologic barrier and defines the boundary between the RB and the main San Gabriel Valley Groundwater Basin to the south. Currently, RB groundwater levels are relatively higher in the northern half of the basin and lower in the southern half of the basin compared with historical trends. Current sources of groundwater recharge to the Raymond Basin include:

- Natural infiltration and percolation of rainfall and surface water
- Percolation of applied water from irrigation and other return flows
- Subsurface inflow from adjacent groundwater basins, bedrock areas, and the San Gabriel Mountains
- Artificial recharge through surface water infiltration
- Percolation of water from septic tanks

[7] Pasadena Water & Power. 2011. Water Integrated Resources Plan. January. Available: https://ww5.cityofpasadena.net/water-and-power/wpcontent/uploads/sites/54/2017/08/PasadenaWIRPFinal Approved013111.pdf.



D202100061.01 - Arroyo Parkway WSA\05 Graphics-GIS-Modeling-USE AZURE\Illustrator

SOURCE: Pasadena Water & Power, 2021

Affinity Project WSA

Figure 4-1
Raymond Groundwater Basin Subareas

ESA

4.2.4 Raymond Basin Judgement

In December 1944, the RB was the first groundwater basin adjudicated in California. The adjudication known as the Raymond Basin Judgement (RB Judgement) was needed to resolve conflicts between the groundwater pumping entities. Under the adjudication, it was determined that 16 parties had the right to extract water. The court allocated groundwater pumping rights to each party. The decision is based on RB Judgement of "safe yield". The safe yield was originally determined to be 21,900 afy but was modified in 1955 to 30,662 afy. These decreed rights were set in 1955 for recent wet weather conditions but were not reevaluated from time to time as then suggested. The authority to administer the RB Judgement and resolve future disputes and make binding judgments is vested in the RB Watermaster. The Watermaster is the Raymond Basin Management Board (RBMB), which is the representatives of the parties (pumping entities) of the RB Judgement.

PWP's decreed groundwater pumping right was set at 12,807 afy; this is divided between the two underlying subareas: Monk Hill (4,464 afy) and Pasadena (8,343 afy).

As suggested in the decree to reevaluate the RB groundwater conditions, the RBMB implemented a resolution on July 1, 2009 that voluntarily reduced pumping from the Pasadena subarea to address declining water levels. As a result, PWP's water pumping from the RB was decreased by 2,503 afy to 10,304 afy.

4.2.5 Surface Runoff Spreading Credits

PWP has pre-1914 rights to divert up to 25 cubic feet per second (cfs) of surface water from the Arroyo Seco and Millard Canyon streams and up to 8.9 cfs from the Eaton Wash. This surface water is currently used to recharge the Raymond Basin. The RB Judgment allows each pumper to take the surface water directly to meet demand, or use surface water to recharge the RB and then pump out a portion of the recharged volume in addition to their decreed groundwater pumping rights. PWP receives a pumping credit of 60 to 80 percent of the surface water recharged at the Arroyo Seco Spreading Grounds, and a credit of 80 percent of the surface water recharged at the Eaton Wash Spreading Grounds. From 2001 to 2020, groundwater pumping credits from the infiltration of surface water provided PWP an average of 1,675 afy. In dry years this was as low as 300 acre-feet (AF) to 5,115 AF in wet years.

4.2.6 Groundwater Production

For the past five years (2015 – 2020), PWP's annual groundwater production has averaged approximately 11,000 afy, which includes decreed rights (10,304 afy) and annual surface water spreading credits. Currently PWP has 12 active wells and six wells are inactive due to contamination and other factors. Most of the operational wells are approaching 100 years old, which reduce the capacity or reliability. Because of contamination issues, groundwater requires treatment or a sequence of blending with imported water to dilute contamination levels low enough to comply with State and federal drinking water requirements. **Table 4-4** provides the pumping history for all PWP wells that produced groundwater between 2016 and 2020.

TABLE 4-4
GROUNDWATER VOLUME PUMPED (AF)

Groundwater	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	Raymond Basin (Monk Hill and Pasadena subareas)	10,650	11,150	10,690	7,481	11,230
	Total	**10,650**	**11,150**	**10,690**	**7,481**	**11,230**

NOTE:
af = acre-feet per year

SOURCE: PWP Final *2020 Urban Water Management Plan*, Table 6-2

4.3 Summary of Existing and Planned Sources of Water

The total water supplies produced or purchased by the City in 2020 are shown in **Table 4-5**. As indicated in Table 4-5, the water supply types available for use by the City are projected to remain unchanged between now and 2045, and increases in demands are largely expected to be met using treated, imported water.

TABLE 4-5
TOTAL WATER SUPPLIES PRODUCED OR PURCHASED BY PASADENA IN 2020

Water Supplies (acre-feet)	2020	2025	2030	2035	2040	2045 [b]
MWD imported	18,120	19,248	19,362	19,454	19,527	19,579
Supplier-Produced Groundwater	11,230	11,830	11,830	11,830	11,830	11,830
Totals	**29,290** [a]	**31,078**	**31,192**	**31,284**	**31,357**	**31,409**

NOTES:

[a] total is less 60 afy as sold to other water local supplier.

[b] The 2045 imported water is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 imported water projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

SOURCE: *PWP FINAL 2020 URBAN WATER MANAGEMENT PLAN*, TABLE 6-5

4.3.1 Water Management Plans and Programs

The Metropolitan Water District of Southern California Urban Water Management Plan

The Water Code requires any municipal water supplier serving over 3,000 connections or 3,000 afy to prepare an UWMP. MWD is a regional wholesaler with no retail customers; it provides treated and untreated water directly to its 26 member agencies. Member agencies include 14 cities, 11 municipal water districts, and one county water authority. MWD's service area covers the Southern California coastal plain, including the City (MWD 2020).

Each of MWD's qualifying member agencies is also responsible for submitting its own UWMP. MWD's 2015 UWMP therefore does not explicitly discuss specific activities undertaken by its member agencies unless they relate to one of MWD's programs. MWD's 2020 UWMP describes and evaluates sources of supply, efficient uses, water recycling, and conservation activities across the Southern California region (MWD 2020).

Pasadena Water and Power 2020 Urban Water Management Plan

The UWMP for PWP forecasts future water demands within the service area under average and dry year conditions, identifies future water supply projects, and evaluates future supply reliability. The UWMP discusses the provider's supply portfolio, including current and planned water conservation and recycling activities (PWP UWMP 2020).

The Greater Los Angeles County Region Integrated Regional Water Management Plan

The mission of the Greater Los Angeles County Integrated Regional Water Management Plan (IRWMP) is to address the water needs of the Region in an integrated and collaborative manner. The first IRWMP for the Greater Los Angeles County Region was published in 2006, following a multi-year collaborative effort between water retailers, wastewater agencies, stormwater and flood managers, watershed groups, businesses, tribes, the agriculture community, and non-profits. It provided a mechanism for improving water resources planning in the Los Angeles Basin. In 2014, the Integrated Regional Water Management (IRWM) group updated the IRWMP to comply with new State integrated planning requirements and update the content. (Leadership Committee of the GLAC IRWMP 2014)

MWD's Integrated Water Resources Plan

MWD's Integrated Water Resources Plan (IRP) was first developed in 1996 to establish targets for a diversified portfolio of supply investments. The 2015 Update planned for water supplies under a wide range of potential future conditions and risks. In the 2015 IRP update, MWD describes unprecedented challenges on both the SWP and the CRA imported water supplies. It identified supply actions including recycled water, seawater desalination, stormwater capture, conservation, and groundwater cleanup to ensure local water supply reliability. The 2015 Update was adopted by MWD's board of directors in January 2016 (MWD 2016b). The proposed 2020 IRP, which is still in process, will incorporate scenario planning components to capture a broader range of possible futures, both on the demand and supply side, than those included in MWD 2020 UWMP, but will share a common set of foundational data.[8]

4.4 Water Supply Reliability

Sustainable water supply is the aggregated quantities of the aforementioned sources; briefly, these include: imported water purchased from MWD and groundwater from the RB. Water reliability is impacted by numerous factors, including population, economic activity, land use, hydrologic

[8] MWD 2021. *2020 Urban Water Management Plan*, adopted June 2021, page 2-5.

fluctuations, water quality, climate change, constraints on distribution facilities, aging water systems, more stringent policies and regulations, natural disasters, and emergencies.

Imported water supply availability was modeled from MWD's databases and simulation models. MWD also uses a method of multiple hydrology simulation in their reliability analysis and provided a matrix of reliability under each historical year applied to each future planning year.

To determine local supply availability, PWP employed a model that simulated local hydrology using historical data from the Arroyo Seco and Eaton Wash and accounted for diversion rights, spreading credits and adjudicated pumping rights as well as capacity constraints on existing facilities in the region. This analysis was used to quantify the reliability of groundwater and surface water and determine the ability of the existing water supply portfolio to meet future water demands.

The water supply reliability analysis evaluates local demands, local supply and imported supply under variable conditions of hydrology and demand to determine reliability.

4.4.1 MWD Supply Reliability

The City's location in MWD's distribution system allows it to be supplied by two separate MWD treatment plants, Weymouth and Jensen. The Weymouth plant can treat water from the CRA and the SWP. The Jensen plant can only treat water from the SWP. MWD's multiple supplies allow operational flexibility in case of a treatment plant shutdown or temporary problem within the distribution system.

MWD discusses regional water supply reliability in its final 2020 UWMP.[9] The MWD UWMP uses lessons learned from their previous planning efforts to inform how uncertainty and reliability are evaluated. These plans include the previous 2015 IRP Update and proposed 2020 IRP, the 1999 Water Surplus and Drought Management (WSDM) Plan, and Water Supply Allocation Plan (WSAP). The 2020 IRP is different than previous IRPs in that scenario planning components are being implemented to capture a broader range of possible futures both on the demand and supply side. The reliability assessments included in MWD's UWMP, including the Water Shortage Contingency Planning and Drought Risk Assessments, mirror a similar approach. The assumptions in their UWMP fall within the plausible future scenarios analyzed in the 2020 IRP to ensure the two efforts complement each other. To develop average year supply and demand estimates, MWD used the historic hydrology for 1922 through 2017. This 96-year period was selected based on the historical hydrology period reported in the 2019 SWP Delivery Capability Report, which represents MWD's largest and most variable supply. During that period, the driest one-year period occurred in 1977. A five-consecutive year (1988–1992) dry period was additionally used for MWD's water service reliability and drought risk assessments, representing the driest five-year consecutive period during that time frame.

MWD strives for a "diverse water portfolio" that allows it to meet demands even in years when its primary supplies would not be enough. Part of MWD's 2020 UWMP is to have water storage

9 MWD 2021 2020 Urban Water Management Plan, adopted June 2021, page 2-5.

capacity to draw on when supplies are short. Using surplus water from normal and wet years, MWD's large storage portfolio contains both dry-year storage and emergency storage that can be used to meet demand in case of a shortage. MWD has completed extensive modeling to create management options that will handle future variations in supply and demand.

As discussed in PWP's 2020 UWMP, if MWD has a sufficient water supply, then through existing agreements and delivery systems PWP has sufficient supplies as well. In the 2015 IRP update, MWD describes unprecedented challenges on both the SWP and the CRA imported water supplies. The 2020 IRP will look beyond these previous challenges and expand the range of planning scenarios that MWD considers in their supply and demand modeling, which will increase the reliability of this resource for PWP. MWD does not anticipate any reductions in water supply availability from SWP and CRA supplies due to water quality concerns over the study period.

4.4.2 Groundwater Supply Reliability

PWP uses groundwater to meet up to 40 percent of demand in its service area. The capacity and reliability of PWP's groundwater supply requires consideration of many issues including:

- Water rights
- Aquifer storage capacity
- Physical well and pump capacity
- Treatment capacity
- Water quality issues

In the Monk Hill and Pasadena subareas, pursuant to the decree PWP has adjudicated groundwater rights, additional groundwater pumping credits from infiltration of surface water, and long-term storage credits. PWP's total adjudicated groundwater rights in the RB are 12,807 afy: 8,343 afy in the Pasadena subarea and 4,464 afy in the Monk Hill subarea (prior to the voluntary reduction of 2,503 afy).

Currently, groundwater pumping is constrained by the limited pumping capacity of the active wells. For water supply planning purposes, this assumes that only the currently operational wells will be operable in the future. Currently, the Monk Hill subarea has a pumping capacity of approximately 2,800 afy. The Pasadena subarea pumping capacity is approximately 9,030 afy.

PWP uses historical flow data for Eaton Wash, PWP's surface water diversion right of 8.9 cfs, and the existing structural diversion capacity of 200 cfs to simulate the water available for recharge in the Eaton Wash Spreading Grounds into the Pasadena subarea and includes a local evaporation rate.[10]

A 20 percent administrative loss is applied to the volume of water recharged in Eaton Wash Spreading Grounds to calculate the spreading credits available to PWP. PWP used historical flow data for Arroyo Seco stream, PWP's surface water diversion right of 25 cfs, and the existing

[10] California Irrigation Management Information System (CIMIS); station data.

structural diversion capacity of 18 cfs to simulate the water available for recharge in the Arroyo Seco Spreading Grounds into the Monk Hill subarea. PWP receives spreading credits of 60 to 80 percent of the diverted water spread in the basins in the Monk Hill subarea. To calculate this, a 30 percent administrative loss was used for spreading credits available to PWP in the Monk Hill subarea. In addition to the groundwater rights and spreading credits, PWP has long-term storage of groundwater in the Monk Hill and Pasadena sub-areas. PWP's current long-term storage is approximately 30,000 af.

4.4.3 Reliability Results

To meet water demand in PWP's service area, for water supply planning purposes PWP in its modelling prioritizes the use of groundwater rights, followed by spreading credits from surface water in the Arroyo Seco and Eaton Canyon, and finally imported water from MWD.

Groundwater was assessed as a resource by comparing its current production to potential production based on water rights. The limiting factor in groundwater production is the total capacity of the wells currently in operation. Current capacity is approximately 11,830 afy assuming year-round consistent pumping, while the adjudicated rights under voluntary reduction are 10,304 afy. At this capacity, only about 1,500 afy of spreading credits (or long-term storage) could be pumped in any year above the adjudicated rights.

Groundwater (including spreading credits from surface water diversions) and imported water compared to demand (scaled by weather) revealed the reliability under non-emergency conditions. Furthermore, model results indicate Pasadena will experience no supply deficits in normal or non-drought years. As discussed in section 7.1.5.1 of PWP's final 2020 UWMP its water supply and demand forecasting model projected that beginning in 2020 and extending to 2045, PWP can meet its service area water demand approximately 91 percent of the time (**Table 4-6**); while in the remaining 9 percent of this time period the projected water supply shortage could range from approximately 1,000 to 1,500 afy.

TABLE 4-6
BASIS OF WATER YEAR DATA (RELIABILITY ASSESSMENT)

	Year	afy	Percent Reliability
Average Year	2012	36,700	100%
Single-Dry Year	2018	33,700	92%
Consecutive Dry Years 1st Year	2014	34,100	93%
Consecutive Dry Years 2nd Year	2015	35,000	95%
Consecutive Dry Years 3rd Year	2016	33,700	92%
Consecutive Dry Years 4th Year	2017	34,200	93%
Consecutive Dry Years 5th Year	2018	33,700	92%

NOTE:
In 2012 pumped groundwater was 13,700 afy, available imported water was 23,000 afy. In 2018, pumped groundwater was about 10,700 afy, available imported water was 23,000 afy. For the 5 consecutive historic dry years pumped groundwater was from about 10,700 to 12,000 afy, the available imported water from MWD was 23,000 afy.

Source: *PWP Final 2020 Urban Water Management Plan*

PWP and similar water providers are able to manage supply shortages of 10 percent with temporary conservation measures as discussed below. According to PWP's final 2020 UWMP, this reliability analysis assumes existing wells are maintained and that investment in replacement production capacity is sustained over the planning period. It should be noted that additional investment needed to pursue additional supply and production solutions based on these forecasted deficits would be accomplished through new water supply projects as discussed in Chapter 6, *Water Supply Characterization*, specifically sections 6.3 through 6.7 that discusses new or additional water supplies that could be available to meet non-potable demand within PWP's service area.

Chapter 8, Water Shortage Contingency Plan (WSCP), of the PWP 2020 UWMP, explains how PWP intends to act in the case of an actual water shortage condition. The WSCP anticipates a water supply shortage and provides pre-planned guidance for managing and mitigating a shortage. Prior to invoking the WSCP, PWP can implement voluntary or mandatory demand management measures (DMMs) as described in detail in Chapter 9 of its final 2020 UWMP. PWP has continuously implemented a water conservation program since 1991. Voluntary and mandatory DMMs can reduce demand by 10, 15, 20 and as much as 25 percent in some years.

PWP's available water resources, in combination with the DMMs described in the WSCP included with the PWP 2020 UWMP, will ensure reliable water supplies to service area users within the 20-year planning timeframe.

SECTION 5
Water Demands

Analysis of water demand, both historical and projected, is based on the same regional, local, areas as the analysis for supplies. The regional demand analysis addresses the greater regional demand which includes MWD demands; the local demand analysis addresses the City's water system specifically, and the Project-specific analysis demand calculations are based on the most recent land-use map and information from the Project Applicant.

5.1 Recent, Historical, and Projected Demands

5.1.1 City 2020 Demand

PWP provides potable and non-potable water for a mix of urban uses that includes residential, commercial, and governmental uses. There are no agricultural water services in the PWP's service area; however, a portion of water delivered is provided exclusively for landscape irrigation purposes.

The total water demands are based on water use sectors by starting with 2020 records of water sales by customer class, then using projected growth numbers for housing units and employment. Demands incorporate passive conservation (code-based and price-effect savings) and active conservation (for installed active devices through 2020). Losses are assumed to be equal to the five-year average of losses from 2015 to 2019, which is approximately 6 to 9 percent of potable direct use demand. It is assumed that existing codes and ordinances will remain in place, which include those codes related to water conservation. In calendar year 2020 as shown in **Table 5-1**, water deliveries were comprised of residential and commercial, volume of water deliveries to customers are shown in Table 5-1.

Water losses in calendar year 2020 are estimated as approximately 6 to 9 percent of water delivered and is based on data regarding unaccounted-for water from 2015 to 2019. Unaccounted-for water is calculated as the difference between water delivered to the system and metered sales to customers, accounting for changes in reservoir storage. Unaccounted-for water is lost through unmetered use (flow testing, reservoir cleaning, main flushing, firefighting, etc.), faulty meters, evaporation, sheared hydrants, and system leaks. The industry average for unaccounted-for water is 7 percent, PWP's unaccounted-for water is less than unaccounted-for water losses for a municipal utility that serves 26,000 connections.

In 2009, the California Water Conservation Act (also known as Senate Bill X7-7 or SBX7-7) was passed into law and requires urban water suppliers to reduce per capita water use 20 percent by

2020 (20x2020). To assist water purveyors, DWR provides a guidance manual with methodologies for calculating water use targets to reduce water demands and meet the 20X2020 goals.

TABLE 5-1
PWP'S 2020 WATER DEMANDS

Water Use Category	Total Volume (af)
Single-family residential	13,593
Multi-family residential	5,190
Commercial	6,530
Institutional/Governmental	1,311
Other Potable	80
Losses	2,586
Total Direct Use Demand	**29,290**

NOTE:
af = acre-feet

Source: *PWP Final 2020 Urban Water Management Plan, Table 4-1*

The gross water use entering PWP's distribution system is the total volume of water produced by PWP from local groundwater, plus the water imported from MWD, plus the groundwater purchased from local water agencies, minus the water delivered to other suppliers.

Projected water use can be determined by examining past and current water use trends, along with consideration of land use planning data, climate change, and other factors relevant to sector-specific water use. This section provides a detailed description of the current demands and the methodology used to project demands, including the following:

- Land use and demographic projections: Overview of current land use and how land use changes are expected to change demand for water in the future.
- Demand forecast: Provides the methodology used to forecast demand to year 2040 based on 2020 demands.

5.1.2 City Projected Demands

Land Use and Population

The City consists of a mix of land uses, including residential, commercial, industrial, institutional and open space, with residential and commercial being the dominating uses. The City is largely built-out, meaning there are few vacant sites available for new developments and growth is expected to be due primarily to increases in housing density and land use intensity.

Past water use as it relates to PWP's service area is detailed in its 2020 UWMP water use is tracked by PWP's billing system, which categorizes customers into four primary types: residential (including single-family and multi-family residential), commercial and industrial, city accounts, and miscellaneous. The single-family residential customers include individually metered houses, whereas historically the multi-family residential customers include apartments and condominiums that have master meters for the entire building or complex. However, since

January 1, 2018, the SB 7 legislation requires all new multi-family residential units to have individual water meters per unit, sometimes referred to submetering. In addition to these uses, there is non-revenue water that represents system-wide water losses. These losses are discussed in Section 4.3.

In 2020, PWP's water use totaled approximately 29,290 afy as shown in Table 5-1 Water demand during this period decreased through 2016 even though population increased during this same period. Single family residential customers achieved more than 25 percent reduction. This decrease in water consumption is likely the result of the state's conservation measures implemented in 2014 to mitigate drought impacts, as well as social awareness, outreach campaigns by state and water agencies, the economy and weather. Water demand has slightly increased since 2017 following the end of the drought and the relaxing of water use restrictions, yet remains well below historical levels. A breakdown of 2020 water use by sector is provided in Table 5-1.

MWD as the regional wholesale water supplier, prepares water resources reports, studies and plans necessary to manage its regional water supplies based on current and future supply and demand scenarios. As part of its 2020 UWMP, MWD provided PWP and other member agencies with population and supply and demand calculations. Potable water demand for 2025, 2030, 2035, and 2040 are estimated by using the total retail demand projections provided by MWD as part of the regional planning process as provided in the 2020 UWMP. Potable water demand for 2045 is based on the City's adopted 2020 Water System and Resource Plan, Appendix A. **Table 5-2** contains the projected demands by water use classes. In general, as shown in Table 5-2, total demands are expected to evolve over time with a trend towards lower demand relative to 2020 and near-term 2025 conditions due to the reductions imposed by SB 606 and Assembly Bill (AB) 1668, which require a reduction in indoor water use, tempered by the expected increase in housing units as discussed in Section 2.1. The values in Table 5-2 are not reduced to reflect additional water savings from PWP's conservation programs; therefore, actual water demand values may be lower when accounting for PWP's conservation programs.

TABLE 5-2
PROJECTED WATER DEMAND (AF)

Water Use Category	2025	2030	2035	2040	2045
Single Family	12,800	12,000	11,900	11,800	Not Available
Multi-Family	4,800	4,550	5,000	5,250	
Other	100	100	150	180	
Commercial	6,500	5,900	5,850	6,000	
Institutional/Governmental	900	850	870	900	
Unaccounted-for Losses	1,650	1,600	1,550	1,500	
Total	**26,750**	**25,000**	**25,320**	**25,630**	**25,950**

NOTE:
af = acre-feet

Source: *PWP Final 2020 Urban Water Management Plan, Table 4-4 (2025, 2030, 2035, 2040 data); PWP, 2020 Water System and Resource Plan, Appendix A, p. A-6 (2045 data).*

5.1.3 Proposed Project Demands

Proposed Project Demand – Construction and Operation

Proposed Project construction activities are anticipated to commence in 2023 and be completed in 2026. Over this period, water would be used for dust control purposes during demolition, solid excavation, grading activities, equipment cleaning, vehicle wash downs, washout basins, and re-compaction of backfill materials, concrete pouring and other construction-related uses. Based on construction projects of similar size and duration, a conservative estimate of construction water use could be up 50 gallons per day per 1000 square-feet (gpd/1000 sf). Construction activities for the Project would occur on approximately 90,400 square feet. Based on water use of 50 gpd/1000 sf of construction activities at the project site, water use during construction is assumed to be 4,520 gallons per day (gpd). Water use during the 34-month (approximately 1,020 days) construction period would be up to approximately 4.61 million-gallons (MG) or 14.1 acre-feet (AF). Calculated annually, this would be 1.63 MG/year or 4.99 afy.

The expected water use of the Project once fully operational was determined by analyzing demand based on planned uses as described in Section 1 and as shown in Table 1-1, and with water demand shown in **Tables 5-3 and 5-4**. To determine the water demand factors of the Project, water use demand factors were formulated based on data from the PWP 2020 UWMP as well as current and historical uses at similar facilities along with information similar mixed-use projects. The Project water demand includes all indoor (commercial and residential) uses in all water year types.

TABLE 5-3
BUILDING A WITH MEDICAL OFFICE/COMMERCIAL WATER DEMAND

Proposed Land Use	Amount	Units	Generation Rate	GPD	AFY
Project Land Uses					
Medical Office Building (A)					
Medical Office Building	151,000	sf	300 gpd/1,000 sf	45,300	50.74
MOB Commercial (Fast Casual Restaurant)	3,000	sf	1000 gpd/1,000 sf	3,000	3.36
Assisted Living Facility (B)					
Independent Living - Studios	28	du	156 gpd/du	4,368	4.89
Independent Living - 1 BR	53	du	156 gpd/du	8,268	9.26
Independent Living - 2 BR	14	du	195 gpd/du	2,730	3.06
Assisted Living	113	beds	125 gpd/bed	14,125	15.82
Commercial (Fast Casual Restaurant)	5,882	sf	1000 gpd/1,000 sf	5,882	6.59
Landscaping [a]	n/a	n/a	170 gpd	170	0.19
Subtotal				**83,843**	**93.91**
Existing Land Use to Remain under the Project					
Whole Foods Grocery[b]	73,671	sf	150 gpd/1,000 ft	11,051	12.38
TOTALS				**94,894**	**106.29**

NOTE:
gpd = gallons per day; gpy = gallons per year; afy – acre-feet per year

[a] Landscaping water demand is based on estimated annual average daily water demand. Refer to Attachment 2 for calculation details regarding the landscaping water demand.

[b] Existing structure and land use to be retained.

Source: Affinity Project Development Plan. Calculated water demands based on Los Angeles Bureau of Sanitation, 2020 wastewater generation rates.

TABLE 5-4
BUILDING A WITH RESIDENTIAL/COMMERCIAL WATER DEMAND

Proposed Land Use	Amount	Units	Generation Rate	GPD	AFY
Project Land Uses					
Residential/Commercial Building (A)					
Residential Living [a]	197	du	195 gpd/du	38,415	43.03
Commercial (Fast Casual Restaurant)	3,000	sf	1000 gpd/1,000 sf	3,000	3.36
Assisted Living Facility (B)					
Independent Living - Studios	28	du	156 gpd/du	4,368	4.89
Independent Living - 1 BR	53	du	156 gpd/du	8,268	9.26
Independent Living - 2 BR	14	du	195 gpd/du	2,730	3.06
Assisted Living	113	beds	125 gpd/bed	14,125	15.82
Commercial (Fast Casual Restaurant)	5,882	sf	1000 gpd/1,000 sf	5,882	6.59
Landscaping [b]	n/a	n/a	170 gpd	170	0.19
Subtotal				**76,958**	**86.20**
Existing Land Use to Remain under the Project					
Whole Foods Grocery[c]	73,671	sf	150 gpd/1,000 ft	11,051	12.38
TOTALS				**88,009**	**98.58**

NOTES:
gpd = gallons per day; gpy = gallons per year; afy – acre-feet per year

[a] For conservative water resources planning purposes residential living units were assumed to be 2 bedroom units with associated water demand of 195 gpd/du.

[b] Landscaping water demand is based on estimated annual average daily water demand. Refer to Attachment 2 for calculation details regarding the landscaping water demand.

[c] Existing structure and land use to be retained.

Source: Affinity Project Development Plan. Calculated water demands based on Los Angeles Bureau of Sanitation, 2020 wastewater generation rates.

Historical Project-Site Demands

Historically, the Project site has been used for commercial uses. Based on conservative water resources planning estimates for these existing uses, as shown in **Table 5-5**, existing water demand at the Project site is calculated to be approximately 30.72 afy. Demand currently generated by would be replaced by the demand associated with the Project or Building A residential/commercial development. Whole Foods would remain on the Project site and would continue to generate water demands throughout construction and operation of the Project. Two existing buildings totaling approximately 5,882 square feet would also remain on the Project site; fast-casual restaurant uses are proposed and analyzed in these two buildings as part of the Project water demand analysis. As a conservative assumption, landscape water is not included in the historical water demands, which results in a slight overestimation of the Project's net increase in water demand relative to existing conditions.

TABLE 5-5
HISTORICAL WATER DEMANDS (CALCULATED)

Land Use Category	Square feet	Generation Unit	GPD	GPY	AFY
Existing Land Use to Remain under the Project					
Whole Foods Grocery[a]	73,671	150 gpd/1,000 ft	11,051	4,033,487	12.38
Existing Land Uses to be Removed under the Project					
Fitness[b]	2,880	300 gpd/1,000 ft	864	315,360	0.97
Event Rentals[b]	3,002	100 gpd/1,000 ft	300	109,573	0.34
Animal Hospital	12,676	100 gpd/1,000 ft	1,268	462,674	1.42
Event Rentals	21,437	100 gpd/1,000 ft	2,144	782,451	2.40
Restaurant (Fast Casual)	7,493	1000 gpd/1,000 ft	7,493	2,734,945	8.39
Restaurant (Fast Casual)	4,306	1000 gpd/1,000 ft	4,306	1,571,690	4.82
Subtotal	**45,912**		**16,375**	**5,976,693**	**18,34**
		TOTALS	**27,426**	**10,010,180**	**30.72**

NOTES:
gpd = gallons per day; gpy = gallons per year; afy – acre-feet per year

[a] Existing structure and land use to be retained.

[b] Existing structure to be retained. The existing Fitness (2,880 square feet) and Event Rentals (3,002 square feet) land uses would be repurposed for the Commercial (Fast Casual Restaurant, 5,882 square feet) land use under the Project.

Source: Affinity Project, Notice to Proceed and Initial Study Project Description, August 2021. Affinity Project Development Plan. Calculated water demands based on Los Angeles Bureau of Sanitation, 2020 wastewater generation rates.

Net Total Project-Site Demands

As shown in Table 5-3 and Table 5-5, the Project with Building A Medical Office/Commercial would result in a net total demand of approximately 75.57 afy (106.29 – 30.72 = 75.57 afy). As shown in Table 5-4 and Table 5-5, the Project with Building A Residential/Commercial would result in a net total demand of approximately 67.86 afy (98.58 – 30.72 = 67.86 afy).

Projected Single-Dry and Multiple-Dry Year Demand

In all water year types including single-dry and multiple-dry years, it is anticipated that the worst case (conservative estimate) Project net demand of approximately 76 afy or 68 afy under the development scenario with Building A Residential/Commercial instead of the Medical Office Building (A) will remain unchanged, unless consumers within the City's service area are specifically asked to reduce water use through active conservation measures described in Section 8 of PWP's 2020 UWMP.

This page intentionally left blank

SECTION 6
Supply-Demand Comparison

This section reviews the regional, local, and Project-level supply and demand considerations.

6.1 MWD's Water Supply Sufficiency

MWD strives for a "diverse water portfolio" that allows it to meet demands even in years when its primary supplies would be inadequate. In fact, MWD has developed a water supply portfolio capable of meeting all demands in any given year. As documented in MWD's 2020 UWMP that it plans for drought conditions and potential water shortages, and therefore has taken measures to have water in storage within its existing water supply systems and facilities to use during years when SWP and CRA supplies are curtailed. Using surplus water from normal and wet years, MWD's large storage portfolio contains both dry-year storage and emergency storage that can be used to meet demand in case of shortages. As documented in its 2020 IRP scenario planning components are being used to predict a broader range of possible water supply and demand futures. As previously discussed, MWD's UWMP, its Water Shortage Contingency Planning and Drought Risk Assessments use a similar approach to assess reliability of water supplies and sufficiency to meet demand. Operational studies used in this assessment demonstrate that MWD has sufficient water supply to meet the anticipated future demand for every hydrologic year on record. Therefore, MWD does not anticipate any reductions in water supply availability even if SWP and/or CRA supplies are curtailed due to drought and/or water quality concerns over the study period.

Tables 6-1, 6-2 and 6-3 illustrate the available water supplies as hydrologic conditions change when compared to demand changes through 2045. In years of above-average rainfall, MWD can store more water throughout its storage system effectively building up more supplies for single-dry or multiple-dry years.

6.2 Local Water Supply Sufficiency

Table 6-1 compares the City's projected supply and demand over a 20-year planning horizon (in this case, projected out to 2045) under normal water year conditions. As shown in Table 6-1, the City can satisfy all customer demands in each year.

TABLE 6-1
PASADENA NORMAL-YEAR SUPPLY AND DEMAND COMPARISON – POTABLE (AFY)

	2025	2030	2035	2040	2045
Supply Totals	31,078	31,192	31,284	31,537	31,409 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,328	6,192	5,964	5,907	5,459

NOTES:
afy = acre-feet per year

[a] The 2045 supply total is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 supply total projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

[b] PWP, 2020 Water System and Resource Plan, Appendix A, p. A-6 (2045 data).

Source: *PWP Final 2020 Urban Water Management Plan, Table 7-2*

The future water demands for the City and the entire region have been estimated by MWD using its new Econometric Demand Model. This model uses forecast data from SCAG for variables including population, housing units, and employment. Although the City is using lower demand projections which take into account the reductions to meet 20x2020 targets, these MWD projections provide the basis for dry-year reliability planning.

Generally, dry weather, especially hot, dry weather, causes an increase in water demand, mostly for landscape irrigation. However, water use efficiencies and conservation practices during past droughts have successfully lowered water demand.

For water supply planning purposes, PWP in its final 2020 UWMP presented a comparison of projected water supply and demand for over a 20-year planning horizon. Based on this information, PWP's final 2020 UWMP projects that neither PWP nor its customers will experience supply deficits in normal or non-drought years through the year 2040. As a result, PWP does not expect critical shortages during the 20-year planning period in PWP's current 2020 UWMP. When taking dry and multiple dry years into account, as discussed in section 4.4.3 above PWP's water supply and demand forecasting model projected that beginning in 2020 and extending to 2040, PWP can meet its service area water demand without implementing conservation measures approximately 91 percent of the time; while in the remaining 9 percent of this period, the projected water supply shortage could range from approximately 1,000 to 1,500 afy. Based on extrapolated data from PWP's final 2020 UWMP, critical shortages would not be expected through 2045.

Chapter 8, Water Shortage Contingency Plan (WSCP), of the PWP 2020 UWMP, explains how PWP intends to act in the case of an actual water shortage condition. The WSCP anticipates a water supply shortage and provides pre-planned guidance for managing and mitigating a shortage. Prior to invoking the WSCP, PWP can implement voluntary or mandatory demand management measures (DMMs) as described in detail in Chapter 9 of its final 2020 UWMP. Through planned implementation of DMMs, PWP forecasts that no critical shortages will take place during the 20-year planning period and no critical shortages are expected through 2045.

PWP has continuously implemented a water conservation program since 1991. Voluntary and mandatory DMMs can reduce demand by 10, 15, 20 and as much as 25 percent in some years.

Table 6-2, and **Table 6-3**, provide a comparison of supply to demand during single-dry- and multiple-dry-year periods. As shown in these tables, water demand in the City will increase over the 20-year planning period (in this case, projected out to 2045). Water supplies provided by MWD and supplemented by groundwater supplies are sufficient to meet demand. As shown in Table 6-2, PWP can meet existing demand, in addition to new demands created by the Project, and no shortfall will occur.

TABLE 6-2
SINGLE-DRY-YEAR SUPPLY AND DEMAND COMPARISON – POTABLE (AFY)

	2025	2030	2035	2040	2045
Supply Totals	31,886	32,003	32,098	32,172	32,224 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	5,136	7,003	6,778	6,542	6,274

NOTE:
afy = acre-feet per year

[a] The 2045 supply total is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 supply total projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

[b] PWP, 2020 Water System and Resource Plan, Appendix A, p. A-6 (2045 data).

Source: *PWP Final 2020 Urban Water Management Plan, Table 7-3*

6.2.1 Multiple-Dry Years

As shown in Table 6-3, PWP uses MWD's projections to provide the basis for dry year reliability planning. PWP's draft 2020 UWMP evaluates supply and demand comparisons for multiple-dry years. The City's water supply during a dry period could exceed the supplies used during a normal year given the ability to purchase additional imported supplies from its wholesaler, MWD. Furthermore, MWD projects sufficient supplies and storage to meet demands in future single- and multiple-dry-year scenarios (Tables 6-2 and 6-3).

TABLE 6-3
MULTIPLE-DRY-YEAR SUPPLY AND DEMAND COMPARISON (AFY)

Years	2025	2030	2035	2040	2045
Year 1					
Supply Totals	31,533	31,943	32,047	32,130	31,978 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,783	6,943	6,727	6,500	6,028
Year 2					
Supply Totals	31,533	31,943	32,047	32,130	31,978 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,783	6,943	6,727	6,500	6,028
Year 3					
Supply Totals	31,533	31,943	32,047	32,130	31,978 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,783	6,943	6,727	6,500	6,028
Years 4					
Supply Totals	31,533	31,943	32,047	32,130	31,978 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,783	6,943	6,727	6,500	6,028
Year 5					
Supply Totals	31,533	31,943	32,047	32,130	31,978 [a]
Demand Totals	26,750	25,000	25,320	25,630	25,950 [b]
Difference	4,783	6,943	6,727	6,500	6,028

NOTES:
afy = acre-feet per year

[a] The 2045 supply total is projected based on a second order polynomial extrapolation (e.g., curve of best fit) from year 2025, 2030, 2035, and 2040 data in the PWP Final 2020 Urban Water Management Plan. The anticipated 2045 supply total projected in this table may differ from PWP's official projection in future updates to its Urban Water Management Plan. Refer to Attachment 1 for calculation details regarding the projected 2045 extrapolation.

[b] PWP, 2020 Water System and Resource Plan, Appendix A, p. A-6 (2045 data).

Source: *PWP Final 2020 Urban Water Management Plan, Table 7-4*

Furthermore, MWD's contingency plan for responding to water shortages is the Water Supply Allocation Plan (WSAP).[11] WSAP is based on a guiding principle for allocating shortages across MWD's service area. The WSAP formula uses different adjustments and credits to balance impacts of water shortage at the retail level, where local supplies can vary dramatically, and provide equity on the wholesale level among member agencies. It also takes into account the following: growth in demand, local investments, change in local supply conditions, the reduction

[11] WSAP approved by MWD Board of Directors in February 2008.

in potable water demand from recycled water, and the implementation of water conservation programs.[12]

Furthermore, as shown in Table 6-4 PWP has chosen to use the same dry year hydrologic scenarios as selected by MWD, which will allow PWP to use information about imported water supply reliability derived from modeling completed through the 2015 IRP Update process. Due to MWD's investments in continued reliability and sustainability programs that consider climate change issues the projections shown in Table 6-4 do not vary. The City's supply is determined to be reliable in normal-, single-dry-, and multiple-dry-year scenarios, with additional supplies purchased from MWD to meet demands in dry years as needed.

Even though Tables 6-2 and 6-3 show available MWD supply is sufficient to meet PWP's demands, based on MWD's IRP model simulations for the future under different hydrology conditions, it is possible that some extreme dry years could result in MWD allocations. MWD's model does in fact show some potential years in which allocations would be applied, reducing supply to PWP. For the years in which MWD supply could be reduced, a WSCP is in place. Table 6-4 provides the data for a five-year drought risk assessment with and without the WSCP in place.

TABLE 6-4
FIVE-YEAR DROUGHT RISK ASSESSMENT

	2021	2022	2023	2024	2025
Total Water Use	28,500	28,065	27,625	27,200	26,750
Total Supplies	29,290	31,533	31,533	31,533	31,533
Surplus/Shortfall w/o WSCP Action	790	3,468	3,908	4,333	4,783
Planned WSCP Actions (use reduction and supply augmentation)					
WSCP - supply augmentation benefit	182	182	182	182	182
WSCP - use reduction savings benefit	56	1,129	1,129	1,129	1,129
Revised Surplus/(shortfall)	1,028	4,779	5,219	5,644	6,094
Resulting % Use Reduction from WSCP action	0%	4%	4%	4%	4%

Source: *PWP Final 2020 Urban Water Management Plan, Table 7-5*

This WSA finds that the City has sufficient water supplies under all hydrologic conditions, through agreements with and provided by MWD and use of its existing groundwater pumping rights from the RB. Because of MWD's long-term success of delivery of water to all customers and commitment to continue to serve treated water to all retailers, when SWP and CRA curtailments occur, MWD has supply flexibility through its vast network of water supply facilities and long-term water management programs to continue to meet all demands. In addition, PWP could pump additional local groundwater during drought, emergency or other surface supply reductions to meet demands in the future. Furthermore, consumers and retailers could effectively reduce demands by 10 or 25 percent to relieve demand pressure on local and regional supplies. It

[12] WSAP and the WSDM were incorporated into MWD's 2020 WSCP and prepared in conjunction with MWD's 2020 UWMP.

is reasonable to assume, based on the consumer demand reductions that PWP customers would continue to curb per-capita use and when necessary based on water supply allocations, customers could reduce per capita demands by up to 25 percent.

Project Water Supply Sufficiency

In normal years, the Project with Building A Medical Office/Commercial as detailed in Section 5 would create an estimated net demand of approximately 76 afy[13] of new water demand (a conservative estimate), or about 0.24 percent of the City's anticipated total system supply of 31,078 afy in 2025, 0.24 percent of the supply of 31,357 afy in 2040, and 0.24 percent of the supply of 31,409 afy in 2045. If the Project with Building A Residential/Commercial is pursued, this development scenario would use up to an estimated net demand of approximately 68 afy (a conservative estimate)[14], or about 0.22 percent of the City's anticipated total system supply of 31,078 afy in 2025, 0.22 percent of the supply of 31,357 afy in 2040, and 0.22 percent of the supply of 31,409 afy in 2045.

As stated previously, the 2020 UWMP aligns with Pasadena's population and land use and consistent with SCAG population and employment projections includes potential water demands that would be generated by land use changes and new commercial and residential developments similar to the Project. To convey water to the Project site, this WSA assumes the Project would use treated water delivered through existing or upgraded infrastructure connected to and expanded upon the City's existing water conveyance systems.

[13] Calculated water demands based on Los Angeles Bureau of Sanitation, 2020 wastewater generation rates

[14] Calculated water demands based on Los Angeles Bureau of Sanitation, 2020 wastewater generation rates

SECTION 7
Conclusion

According to the requirements of Water Code Section 10910(c)(3) "the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available 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 the public water system's existing and planned future uses, including agricultural and manufacturing uses."

As previously shown in Tables 6-1, 6-2 and 6-3, MWD can meet all water demands in normal, single-dry, and multiple-dry years by utilizing its current and diverse water portfolio. Voluntary measures and, when required, demand reduction measures during dry years would alleviate system demand capacities during periods of SWP and CRA curtailments (for drought, emergency, or environmental mitigation reasons). As discussed, customers in the PWP's service area successfully reduced water uses and curbed demand in previous multiple-year droughts in 1990–1992 and 2008–2010 and significantly reduced demand by 25 percent in the most recent drought. Therefore, it is reasonable to assume that this level of conservation could be achieved again. As shown in Table 5-1, the total demand in PWP's service area in 2020 was 29,290, or 153 gallons per capita per day (gpcd), which is much lower than its 169 gpcd target—demand hardening is expected to occur over time; however, some level of conservation measures can still successfully reduce demand if necessary.

The current Project site water use is already included in existing demand. Therefore, net new demand would range from approximately 68 to 76 afy depending on land use scenario. As previously discussed, the Project would contribute to about 0.24 percent of the City's anticipated total system supply of 31,078 afy in 2025, 0.24 percent of the supply of 31,357 afy in 2040, and 0.24 percent of the supply of 31,409 afy in 2045. If the Project with Building A Residential/Commercial is pursued, this development scenario would use up about 0.22 percent of the City's anticipated total system supply of 31,078 afy in 2025, 0.22 percent of the supply of 31,357 afy in 2040, and 0.22 percent of the supply of 31,409 afy in 2045. As the Project with Building A Medical Office/Commercial and the Project with Building A Residential/Commercial would be consistent with the Project's land use designation in Pasadena's 2035 General Plan as part of planned growth within the City's Central District, potential demand for the Project is considered as part of the PWP 2020 UWMP. Therefore, this WSA finds that MWD, as the wholesale potable water supplier has sufficient water supplies available to serve its member agencies, including PWP, now and through the 2045 planning horizon. In addition, PWP's groundwater, including its annual groundwater credits stored in the RB, are reliable in all water year types. With that understanding, this WSA finds that PWP has sufficient water supplies in all

water year types provided through MWD and supplemented with local groundwater to meet existing demands combined with the Project demands and cumulative demands of the PWP 2020 UWMP.

SECTION 8
References

Arroyo Parkway, LLC. 2021. THE AFFINITY 555 South Arroyo Parkway. City Entitlement Plan. July 2021.

DWR (California Department of Water Resources). 2017. GSA Interactive Map. http://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true, accessed October 2017.

———. 2014. California Statewide Groundwater Elevation Monitoring (CASGEM) Program. Basin Prioritization (June 2014 Results), June. http://www.water.ca.gov/groundwater/casgem/basin_prioritization.cfm, accessed July 2017.

———. 2004. *California's Groundwater Bulletin 118: Raymond Groundwater Basin*, February 27. http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions.

———. 2003. *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001*. http://www.water.ca.gov/pubs/use/sb_610_sb_221_guidebook/guidebook.pdf.

Langridge, Ruth, Abigail Brown, Kirsten Rudestam, and Esther Conrad. 2016. *An Evaluation of California's Adjudicated Groundwater Basins*. Report for the State Water Resources Control Board. http://www.water.ca.gov/cagroundwater/docs/UCSC_Adjudicated_Groundwater_Basins_Report_FINAL.pdf.

MWD (Metropolitan Water District of Southern California). 2021a. *2020 Urban Water Management Plan*, June 2021. http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf.

Pasadena Water and Power. 2021. *Final 2020 Urban Water Management Plan, Final*, June 2021.

———. *Reports and Documents, Water Facts and Figures, https://ww5.cityofpasadena.net/water-and-power/reportsanddocuments/, accessed December 2021.*

———. 2020. *2020 Water System and Resource Plan, Appendix A*, November 2020.

———. 2016. *2015 Urban Water Management Plan*. Pasadena, CA, June. https://www.Pasadenawaterandpower.com/images/water/downloads/2015_UWMP_Final_0.

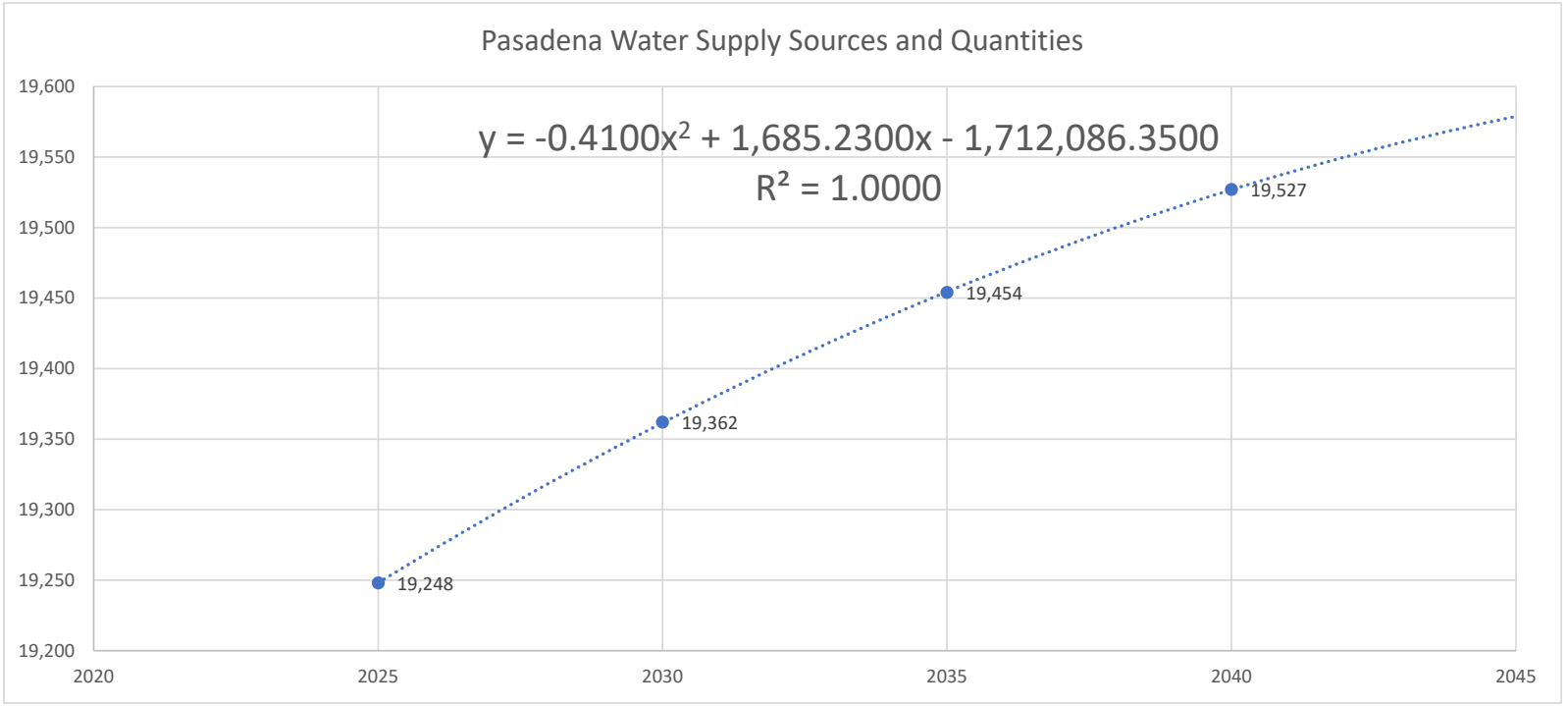
Tse, Michael, Associate Engineer, PWP. Email to Van Patten, Jason, Senior Planner, City of Pasadena, January 12, 2022.

This page intentionally left blank

Attachment 1: 2045 Projections

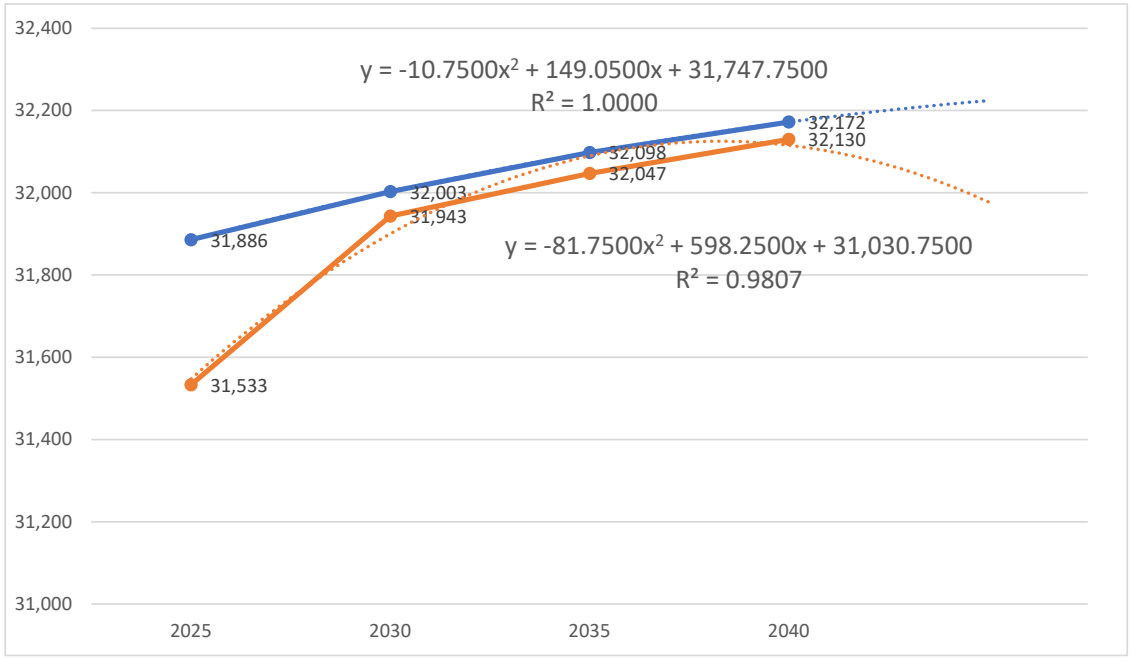
Projection for Tables 4-2, 4-3, and 4-5

Year	AFY
Data from PWP Final 2020 Urban Water Management Plan	
2025	19,248
2030	19,362
2035	19,454
2040	19,527
Projected data based on curve of best fit	
2045	19,579



Projection for Tables 6-2 and 6-3

x =	*1*	*2*	*3*	*4*	*5*	
	2025	**2030**	**2035**	**2040**	**2045**	*(Projected data based on curve of best fit)*
Supply Totals (Single)	31,886	32,003	32,098	32,172	32,224	
Supply Totals (Multiple)	31,533	31,943	32,047	32,130	31,978	



Attachment 2: Landscaping Water

WATER EFFICENT LANDSCAPE WORKSHEET

Affinity Project - Estimated Yearly Water Usage

Yearly Reference Evapotranspiration (ETo) 52.3

Hydrozone #	Plant Water Needs	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Landscape Area (sq. ft.)	PERCENT	ETAF x Area	pf x Area	Estimated Total Water Use (ETWU)
Regular Landscape Areas										
1st (Ground) Floor	VERY LOW	0.1	DRIP	0.81	0.1235	120	3%	15	12	480
1st (Ground) Floor	LOW	0.2	DRIP	0.81	0.2469	90	2%	22	18	721
1st (Ground) Floor	MODERATE	0.4	DRIP	0.81	0.4938	1140	24%	563	456	18,255
2nd Floor	VERY LOW	0.1	DRIP	0.81	0.1235	410	9%	51	41	1,641
2nd Floor	LOW	0.2	DRIP	0.81	0.2469	70	1%	17	14	560
2nd Floor	MODERATE	0.4	DRIP	0.81	0.4938	820	17%	405	328	13,131
3rd Floor	VERY LOW	0.1	DRIP	0.81	0.1235	10	0%	1	1	40
3rd Floor	LOW	0.2	DRIP	0.81	0.2469	315	7%	78	63	2,522
3rd Floor	MODERATE	0.4	DRIP	0.81	0.4938	20	0%	10	8	320
4th Floor	VERY LOW	0.1	DRIP	0.81	0.1235	205	4%	25	21	821
4th Floor	LOW	0.2	DRIP	0.81	0.2469	335	7%	83	67	2,682
4th Floor	MODERATE	0.4	ROTARY	0.75	0.5333	1200	25%	640	480	20,753
					Totals	4735		1910	1509	61,926
Special Landscape Areas										
					1.0000					
					1.0000					
					Totals	0		0	0	
ETWU = (Eto)(0.62)[(ETAF)(LANDSCAPE AREA) + ((1-ETAF)(SPECIAL LANDSCAPE AREA)]								**ETWU Total**		61,926
MAWA = (Eto)(0.62)[(ETAF)(LANDSCAPE AREA) + ((1-ETAF)(SPECIAL LANDSCAPE AREA)]*								**Maximum Allowed Water Allowance (MAWA)**		84,445

* WHERE ETAF = 0.55 FOR RESIDENTIAL AREAS AND 0.45 FOR NON-RESIDENTIAL AREAS

	SQUARE FEET	PERCENT OF TOTAL
TURF AREA	0	0%

ETAF CALCULATIONS:

Average Daily Water Usage Estimated (gallons)	170

REGULAR LANDSCAPE AREAS

TOTAL ETAF x AREA	1910
TOTAL AREA	4735
AVERAGE ETAF	0.40

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

ALL LANDSCAPE AREAS

TOTAL ETAF x AREA	1910
TOTAL AREA	4735
AVERAGE ETAF	0.40