IV. Environmental Impact Analysis

M.1 Utilities and Service Systems—Water Supply and Infrastructure

1. Introduction

This section of the Draft EIR analyzes the Project's potential environmental impacts related to available water supplies and the infrastructure required to service the Project. The analysis describes existing regional water supplies and existing water infrastructure serving the Project Site, calculates the water demand generated by the Project, and evaluates whether there is sufficient water supply and infrastructure capacity to meet that demand. The analysis is based in part on the *Water Supply Assessment for the ArtCenter College of Design Master Plan Project, Pasadena, CA* (WSA) prepared by RMC Water and Environment (January 2017), which is included in Appendix M of this Draft EIR, and the *ArtCenter College of Design Master Plan Utility Infrastructure Technical Report: Water* (Water Infrastructure Report) prepared by KPFF Consulting Engineers (March 2017), which is also included in Appendix M of this Draft EIR.

2. Environmental Setting

a. Regulatory Framework

(1) State

(a) Senate Bill 610

Senate Bill (SB) 610, codified in the California Water Code (CWC), Sections 10910 et seq., became effective January 1, 2002. SB 610 requires counties and cities to consider the availability of adequate water supplies for certain new large development projects. These statutory provisions include requirements for both water supply assessments (WSA) and Urban Water Management Plans (UWMP) applicable to the California Environmental Quality Act (CEQA) process. SB 610 requires that for specified projects subject to CEQA, the urban water supplier must prepare a WSA that determines whether the projected water demand associated with a proposed project is included as part of the most recently adopted UWMP. Specifically, a WSA shall identify existing water supply entitlements, water rights, or water service contracts held by the public water system, and prior years' water deliveries received by the public water system. In addition, it must address water

supplies over a 20-year period and consider average, single-dry, and multiple-dry years. In accordance with SB 610 and Section 10912 of the CWC, projects subject to CEQA requiring submittal of a WSA include the following:

- Residential developments of more than 500 dwelling units;
- Shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- Commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- Hotels, motels, or both, having more than 500 rooms;
- Industrial, manufacturing, or processing plant, or industrial park of more than 40 acres of land, more than 650,000 square feet of floor area, or employing more than 1,000 persons;
- Mixed-use projects that include one or more of the above-identified categories; or
- A project that would demand an amount of water equivalent to or greater than the amount of water required by a 500-dwelling unit project.

The Project is subject to the requirements of SB 610 since the development is considered a "project," as defined by CWC Section 10912, and consists of an institutional establishment that would require an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

(b) Senate Bill X7-7

Senate Bill X7-7 (Water Conservation Act of 2009), codified in California Water Code, Section 10608, requires all water suppliers to increase water use efficiency. Enacted in 2009, this legislation includes the setting of an overall goal of reducing per capita urban water use, compared to 2009 levels, by 20 percent by December 31, 2020. The State was required to make incremental progress toward this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. Cumulative Statewide savings from June 2015 through November of 2016 were estimated at 22.6 percent.[1]

[1] *State Water Resources Control Board, Media Release, "Statewide Water Savings Nearly Reach 19 Percent in November; Most of State Still Experiencing Drought Conditions," January 4, 2017.*

(c) California Urban Water Management Plan Act

The California Urban Water Management Planning Act (CWC, Sections 10610–10656) addresses several State policies regarding water conservation and the development of water management plans to ensure that adequate supplies are available to meet existing and future demands. The California Urban Water Management Planning Act also requires water suppliers to develop water management plans every five years to identify short- and long-term demand management measures to meet growing water demands during normal, single-dry, and multiple-dry years. Specifically, municipal water suppliers that serve more than 3,000 customers or provide more than 3,000 acre-feet per year (AFY) of water must adopt an UWMP. A number of recent requirements regarding preparation of water management plans have been added to the Urban Water Management Planning Act. These additional requirements include a narrative description of water demand measures implemented over the past five years and future measures planned to meet 20-percent demand reduction targets in urban water use by December 31, 2020; a standard methodology for calculating system water loss; a voluntary reporting of passive conservation savings, energy intensity, and climate change; and an analysis of water features that are artificially supplied with water. Pasadena Water and Power (PWP) approved its most recent UWMP in June 2016.

(d) California Plumbing Code

Title 24, Part 5 of the California Code of Regulations establishes the California Plumbing Code. The California Plumbing Code sets forth efficiency standards (i.e., maximum flow rates) for all new federally-regulated plumbing fittings and fixtures, including showerheads and lavatory faucets. The current 2016 California Plumbing Code, which is based on the 2015 Uniform Plumbing Code, has been published by the California Building Standards Commission and went into effect on January 1, 2017. In addition, the California Building Standards Commission approved an Emergency Supplement to the 2013 California Plumbing Code in 2016, in order to establish new or replacement standards on an emergency basis for insertion in the 2013 California Plumbing Code.[2] This Emergency Supplement is also applicable to the now effective 2016 California Building Code.

[2] *California Building Standards Commission, Revision Record for the State of California, Emergency Supplement, 2013 Title 24, Part 5, California Plumbing Code.*

(e) Sustainable Groundwater Management Act of 2014[3,4]

The Sustainable Groundwater Management Act of 2014, passed in September 2014, is a comprehensive three-bill package that provides a framework for the sustainable management of groundwater supplies by local authorities. The Sustainable Groundwater Management Act requires the formation of local groundwater sustainability agencies to assess local water basin conditions and adopt locally-based management plans. Local groundwater sustainability agencies must be formed by June 30, 2017. The Sustainable Groundwater Management Act provides 20 years for groundwater sustainability agencies to implement plans and achieve long-term groundwater sustainability, and protects existing surface water and groundwater rights. The Sustainable Groundwater Management Act provides local groundwater sustainability agencies with the authority to require registration of groundwater wells, measure and manage extractions, require reports and assess fees, and request revisions of basin boundaries, including establishing new subbasins. As required by the Sustainable Groundwater Management Act, in December 2016, the California Department of Water Resources published on its website the best management practices (BMPs) for sustainably managing groundwater.[5] Furthermore, under the Sustainable Groundwater Management Act, groundwater sustainability agencies responsible for high- and medium-priority basins must adopt groundwater sustainability plans within five to seven years, depending on whether the basin is in critical overdraft.

(f) Article 22.5 Drought Emergency Water Conservation, California Code of Regulations (Emergency Declaration and Executive Orders B-29-15, B-36-15 and B-37-16)

In response to California's drought conditions, in January 2014, Governor Edmund G. Brown, Jr. (Governor Brown) proclaimed a State of Emergency and directed State officials to take all necessary action to make water available. Key measures in the proclamation included:

- Asking all Californians to reduce water consumption by 20 percent and referring residents and water agencies to the Save Our Water campaign—www. saveourwater.com—for practical advice on how to do so;

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[3] *Association of California Water Agencies, October 2014, 2014, Sustainable Groundwater Management Act of 2014, www.acwa.com/content/groundwater/groundwater-sustainability, accessed July 15, 2016.*

[4] *Association of California Water Agencies, October 2014,Sustainable Groundwater Management Act of 2014 Fact Sheet.*

[5] *California Department of Water Resources, Best Management Practices, http://water.ca.gov/ groundwater/sgm/bmps.cfm, accessed February 8, 2017.*

- Directing local water suppliers to immediately implement local water shortage contingency plans;

- Ordering the State Water Resources Control Board (SWRCB) to consider petitions for consolidation of places of use for the State Water Project and Central Valley Project, which could streamline water transfers and exchanges between water users;

- Directing the Department of Water Resources (DWR) and the SWRCB to accelerate funding for projects that could break ground in 2014 and enhance water supplies;

- Ordering the SWRCB to put water rights holders across the State on notice that they may be directed to cease or reduce water diversions based on water shortages;

- Asking the SWRCB to consider modifying requirements for releases of water from reservoirs or diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies and improve water quality.

In April 2014, Governor Brown issued a Proclamation of Continued State of Emergency that strengthened the State's ability to manage water and habitat effectively in drought conditions and called on all Californian's to redouble their efforts to conserve water. The Executive Orders and regulatory requirements described below have been codified in Article 22.5 Drought Emergency Water Conservation of the California Code of Regulations.

In April 2015, Governor Brown issued Executive Order B-29-15 calling for mandatory water reduction measures directed at conserving water use, streamlining the State's drought response, and investing in new technologies to make the State more drought resilient. The goal of the executive order was to reduce potable urban water usage by 25 percent Statewide through February 28, 2016, as compared to 2013 usage levels. This executive order directed the SWRCB to work with cities in implementing water usage reductions measures such as replacing up to 50 million square feet of lawns with drought-tolerant landscaping, creating temporary consumer rebate programs to replace older, energy-inefficient appliances, banning the watering of ornamental grass on public street medians, and prohibiting new residential developments from irrigating with potable water unless systems include water-efficient drip systems. The executive order also sought to prioritize State water infrastructure projects and incentivize new technology for water efficiencies, streamline permitting and review of emergency drought salinity barriers, and simplify the approval process for voluntary water transfers and emergency drinking water projects. In addition, the executive order directed the California Energy Commission (CEC)

to adopt emergency regulations establishing standards to improve the efficiency of water appliances, including toilets, urinals, and faucets. The CEC, DWR, and SWRCB were directed to implement a rebate program that incentivizes the replacement of inefficient household appliances and an additional program that offers innovative water management technologies for businesses, residents, industries, and agriculture.

In November 2015, Governor Brown issued Executive Order B-36-15, which called for additional actions to build on the State's response to record dry conditions and assist recovery efforts from devastating wildfires. These included extension of previous executive orders, prioritization of projects that enhance water conservation, support for the extension of water restrictions, and support for projects that remediate wildfire damage and restore power plant operation.

On January 1, 2016, new efficiency standards for toilets, faucets, and other appliances became effective. Based on a review of the standards established by the CEC, the majority of the plumbing fixture standards already in place by the California Plumbing Code, or the City's Green Building Ordinance, are more restrictive than those established by the CEC.

In May 2016, Governor Brown issued Executive Order B-37-16, which extends the requirements of Executive Order B-29-15 and further directs the DWR and the SWRCB to develop long term efficiency targets that go beyond the 20-percent reductions mandated by Senate Bill X7-7, as previously discussed. The executive order established longer-term water conservation measures that include permanent monthly water use reporting, new urban water use targets, reducing system leaks and eliminating wasteful practices, strengthening urban drought contingency plans and improving agricultural water management and drought plans.

As a result, on May 18, 2016, the SWRCB further revised emergency regulations in consideration of improved hydrologic conditions. The prior percentage reduction-based water conservation standard was replaced by a localized "stress-test" approach, which requires local water agencies to ensure a three-year supply under three more dry years like the State experienced from 2012–2015. Water agencies that would face shortages under three additional dry years are required to meet a conservation standard equal to the amount of shortage. On November 30, 2016, State agencies, including the SWRCB released a public draft of *Making Water Conservation A California Way of Life*, which addresses elements of Executive Order B-37-16 that require State agencies to develop a

framework for using water more wisely, eliminating water waste, strengthening local drought resilience, and improving agricultural water use efficiency and drought planning.[6]

On February 8, 2017, the SWRCB readopted and extended the emergency regulations, continuing the January 2014 drought declaration and Executive Order B-37-16 from May 2016.[7] The SWRCB stated that the reassessment of water supply conditions and the need for continued urban conservation regulations are subject to precipitation, snowpack levels, and other variables to be measured and determined until at least through the end of spring in 2017.[8]

(g) Executive Order B-40-17 and Making Conservation a California Way of Life

On April 7, 2017, following the reassessment of water supply conditions, Governor Brown issued Executive Order B-40-17 and lifted the drought state of emergency for all California counties except for Fresno, Kings, Tulare, and Tuolumne. In addition, Executive Order B-40-17 rescinded the two emergency proclamations from January and April 2014 and four drought-related executive orders issued in 2014 and 2015.[9] However, Executive Order B-40-17 built upon Executive Order B-37-16 to maintain urban water use reporting requirements and prohibitions of wasteful practices, such as watering during rainfall, hosing off sidewalks, and irrigating ornamental turf on public street medians.[10] As such, the Making Water Conservation a California Way of Life Final Report was also released with the announcement of Executive Order B-40-17. This final report was prepared by the DWR, SWRCB, the California Public Utilities Commission, the California Department of Food and Agriculture, and the California Energy Commission, who will work closely with the State Legislature to implement four objectives: using water more wisely, eliminating water

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[6] *California State Water Resources Control Board, Water Conservation Portal—Emergency Conservation Regulation, State Plan Seeks to Make Water Conservation A Way of Life, November 30, 2016.*

[7] *State Water Resources Control Board, Fact Sheet, Prohibitions, Monthly Reporting, and Stress Tests Continue with Extended Water Conservation Regulations, February 8, 2017.*

[8] *State Water Resources Control Board, Board Meeting Session—Office of Research, Planning and Performance, Item 9, February 8, 2017.*

[9] *The four executive orders include Executive Order B-26-14 from September 2014, Executive Order B-28-14 from December 2014, Executive Order B-29-15 from April 2015, and Executive Order B-36-15 from November 2015.*

[10] *Office of Governor Edmund G. Brown Jr., Newsroom, Governor Brown Lifts Drought Emergency, Retains Prohibition on Wasteful Practices, April 7, 2017, www.gov.ca.gov/news.php?id=19747, accessed May 4, 2017.*

waste, strengthening local drought resilience, and improving agricultural water use efficiency and drought planning.[11]

(h) California Water Plan[12]

Required by Water Code Section 10005(a), the California Water Plan is the State's strategic plan for managing and developing water resources Statewide for current and future generations. It provides a collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future.

The plan, updated every five years, presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The Water Plan also evaluates different combinations of regional and Statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship. The evaluations and assessments performed for the plan help identify effective actions and policies for meeting California's resource management objectives in the near term and for several decades to come. While the California Water Plan cannot mandate actions or authorize itemized spending, policy-makers and lawmakers have the ability to authorize specific actions and appropriate necessary funding. In addition, while the California Water Plan Update 2013 represents the latest complete update, the California Water Plan Update 2018 is in development and will work in tandem with Governor Brown's California Water Action Plan, as discussed further below.

(i) California Water Action Plan

The first California Water Action Plan (Action Plan) was published in January 2014 to provide a roadmap for the State's path toward sustainable water management.[13] The Action Plan discusses the challenges for managing the State's water resources supply,

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[11] *California Department of Water Resources, State Water Resources Control Board, California Public Utilities Commission, California Department of Food and Agriculture, and California Energy Commission, Making Water Conservation a California Way of Life Final Report, April 2017.*

[12] *California Department of Water Resources, About the Water Plan, www.water.ca.gov/waterplan/about_us/index.cfm, accessed February 8, 2017.*

[13] *California Department of Natural Resources, California Water Action Plan, http://resources.ca.gov/california_water_action_plan/, accessed February 10, 2017.*

scarcity, and quality, and also considers the effects of ecosystems, flooding, population growth, and climate change and floods.[14] The following ten actions were presented:

1. Make conservation a California way of life;
2. Increase regional self-reliance and integrated water management across all levels of government;
3. Achieve the co-equal goals for the Delta;
4. Protect and restore important ecosystems;
5. Manage and prepare for dry periods;
6. Expand water storage capacity and improve groundwater management;
7. Provide safe water for all communities;
8. Increase flood protection;
9. Increase operational and regulatory efficiency; and
10. Identify sustainable and integrated financing opportunities.

In complementing local efforts, the Action Plan emphasizes collaboration between different levels of government, water agencies, conservationists, tribes, farmers, and other stakeholders. Since the Action Plan Update for 2016 has been released, its implementation progress has also been documented with focuses on policy, funding, and coordinated projects. The Action Plan will continue to be implemented simultaneously with the California Water Plan Update 2018 as it is completed.

(2) Regional

As discussed in detail below, the Metropolitan Water District of Southern California (MWD) is a primary source of water supply within Southern California. Based on the water supply planning requirements imposed on its member agencies, including PWP, and ultimate customers, MWD has adopted a series of official reports on the state of its water supplies. In response to recent developments in the Sacramento Delta, the MWD has developed plans intended to provide solutions that, when combined with the rest of its supply portfolio, will ensure a reliable long-term water supply for its member agencies.

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[14] *California Department of Natural Resources, California Water Action Plan 2014.*

(a) MWD's Integrated Water Resources Plan

The Integrated Water Resources Plan (IRP) is the long-term water resources strategy for the MWD in Southern California. As it was first adopted in 1996, the goal of the IRP has been to ensure that a reliable water system will extend into the future. The 2015 IRP Update, adopted in January 2016, provides MWD's strategy for water resource reliability through the year 2040 and establishes targets for a diversified portfolio of water supply investments. The 2015 IRP Update calls for stabilizing and maintaining imported water supplies; meeting future growth through increased water conservation and sustaining and developing new local supplies; pursuing a comprehensive transfers and exchanges strategy; building storage in wet and normal years to manage risks and drought; and preparing for uncertainty with Future Supply Actions. Overall, the strategies presented in the 2015 IRP Update include investments to maintain the reliability of imported water supplies, expansion of local water supplies, and reduction in water demand through a variety of conservation and water use efficiency initiatives.[15]

(b) MWD's 2015 Regional Urban Water Management Plan

MWD's 2015 Urban Water Management Plan (UWMP) addresses the future of MWD's water supplies and demand through the year 2040.[16] Based on the 2015 UWMP, MWD has supply capabilities that would be sufficient to meet expected demands from 2020 through 2040 under single dry-year and multiple dry-year hydrologic conditions. MWD has comprehensive plans for stages of actions it would undertake to address up to a 50-percent reduction in its water supplies and a catastrophic interruption in water supplies through its Water Surplus and Drought Management and Water Supply Allocation Plans. MWD has also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the Southern California region and is working with the State to implement a comprehensive improvement plan to address catastrophic occurrences that could occur outside of the Southern California region. MWD is also working with the State on the Delta Risk Management Strategy to reduce the impacts of a seismic event in the Delta that would cause levee failure and disruption of State Water Project deliveries. In addition, MWD has plans for supply implementation and continued development of a diversified resource mix of programs that enable the region to meet its water supply needs, including those in the Colorado River Aqueduct, State Water Project, Central Valley transfers, local resource projects, and in-region storage. As set forth in its 2015 UWMP, MWD will also continue

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[15] *Metropolitan Water District of Southern California, Integrated Water Resources Plan 2015 Update, January 2016.*

[16] *Metropolitan Water District of Southern California, 2015 Urban Water Management Plan, June 2016.*

investments in water use efficiency measures to help the region achieve a 20-percent-per-person potable water use reduction by 2020.

(c) MWD's Water Surplus and Drought Management Plan

In 1999, MWD incorporated the water shortage contingency analysis that is required as part of any urban water management plan into a separate, more detailed plan, called the Water Surplus and Drought Management Plan. The overall objective of the Water Surplus and Drought Management Plan is to ensure that shortage allocation of MWD's imported water supplies is not required.[17] The Water Surplus and Drought Management Plan provides policy guidance to manage MWD's supplies and achieve the goals laid out in the agency's IRP. The Water Surplus and Drought Management Plan separates resource actions into two major categories: Surplus Actions and Shortage Actions. The Water Surplus and Drought Management Plan considers the region to be in surplus only after MWD has met all demands for water, including replenishment deliveries. The Surplus Actions store surplus water, first inside and then outside of the region. The Shortage Actions of the Water Surplus and Drought Management Plan are separated into three subcategories: Shortage, Severe Shortage, and Extreme Shortage. Each category has associated actions that could be taken as a part of the response to prevailing shortage conditions. Conservation and water efficiency programs are part of MWD's resource management strategy through all categories.

(d) MWD's Water Supply Allocation Plan

While the Water Surplus and Drought Management Plan included a set of general actions and considerations for MWD staff to address during shortage conditions, it did not include a detailed water supply allocation plan or implementation approach. Therefore, MWD adopted a water supply plan called the Water Supply Allocation Plan in February 2008, which has since been implemented three times, most recently in April 2015. The Water Supply Allocation Plan includes a formula for determining reductions of water deliveries to member agencies during extreme water shortages in MWD's service area conditions (i.e., drought conditions or unforeseen cuts in water supplies). The formula allocates shortages of MWD supplies and seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level, and takes into account growth, local investments, changes in supply conditions and the demand hardening aspects of non-potable recycled water use and the implementation of conservation savings programs. The allocation period covers 12 consecutive months from July of a given year through the following June.

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[17] *Metropolitan Water District of Southern California, Water Surplus and Drought Management Plan: Report No. 1150, August 1999.*

(3) Local

(a) PWP's 2015 Urban Water Management Plan

PWP's 2015 UWMP details the required information regarding water supply sources (current and projected), water quality issues that may affect supplies, conservation practices implemented, shortage contingency planning, and overall supply reliability.[18] According to PWP's 2015 UWMP, the current per capita potable water demand for 2015 was 148 gpd, which was well below the 2015 target of 190 gpd. The reduced demand was likely due to on-going conservation programs implemented in the wake of California's ongoing drought. In order to acquire data as required by the UWMP, the PWP has implemented seven Demand Management Measures, as described in Section 8 of the 2015 UWMP. Such measures include the following:

- Wastewater Waste Prevention Ordinances—The PWP implements permanent wastewater prohibitions and prohibitions associated with four levels of water conditions. On June 1, 2015, the Pasadena City Council established a water conservation target of 28 percent and adopted additional actions.

- Metering—As the PWP does not have any unmetered water accounts, all newly established accounts are required to have a water meter, thereby eliminating the possibility of new unmetered accounts. The PWP will ensure that meters are tested, repaired, and replaced to ensure that meters are functions as intended and that water use is correctly measured. Additionally, non-potable customers will have separate meters for irrigation once the Pasadena Non-Potable Water Project is on-line. The PWP is also developing a rebate program for submeters for multi-family customer segments of new and existing new development.

- Conservation Pricing—PWP implements a tiered water rate structure preapproved by the California Urban Water Conservation Council (CUWCC) BMP 1.4, Retail Conservation Pricing. PWP's water rate structure includes an increasing tier block rate design and varying seasonal unit prices to encourage water use reductions.

- Public Education and Outreach—PWP has an active public information program based on the premise that providing customers with pertinent information will lead to more efficient water use. PWP provides outreach to both the Commercial/Industrial/Institutional (CII) and residential customer sectors through workshops, presentations, and online and mailed resources.

[18] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

- Programs to Assess and Manage Distribution System Real Loss—PWP annually conducts system water audits by comparing total volume of billed water use to the total supply entering the system.

- Water Conservation Program Coordination and Staffing Support—PWP has a designated water conservation program manager that is dedicated to water conservation issues and developing and implementing PWP's conservation programs and initiatives.

- Other Demand Management Measures—Additional programs BMPs include, but are not limited to, water survey programs for residential customers, residential plumbing retrofits, large landscape conservation programs, greywater program, drought tolerant demonstration gardens at City facilities, water waste enforcement program, and residential and CII conservation rebate programs.

The 2015 UWMP projects that PWP is on track to meet its 2020 target of 169 gpd. Overall, the 2015 UWMP estimates PWP will have adequate water supplies to meet demand through 2040.

(b) PWP's Water Integrated Resources Plan

In January 2011, PWP completed a Water Integrated Resources Plan (WIRP) to provide an overall long-term water resources strategy through the year 2035. The WIRP serves as the primary source document for preparation of the PWP's UWMP, discussed above. Approximately 50 water supply and conservation options were considered in the WIRP. A recommended supply portfolio that increases water conservation and local water supplies was determined to be the best strategy.

The WIRP outlined the following major elements in the recommended strategy to secure the future water supply of the City:

1. Aggressive water conservation through new ordinances and rebates;

2. Devil's Gate Dam storage to Eaton Canyon for groundwater recharge;[19]

3. Recycled water from the Los Angeles–Glendale Water Reclamation Plant (LAG WRP) for non-potable reuse, focusing on Brookside Golf Course and surrounding park areas;

[19] *The County of Los Angeles has since abandoned the Devil's Gate Dam project.*

4. Recycled water from LAG WRP for groundwater recharge in Eaton Canyon (tertiary-treated indirect potable reuse with blending of natural runoff and surface waters);

5. Groundwater storage of imported water; and

6. On-site stormwater capture projects for direct landscaping use and groundwater recharge.

Out of these six elements, the first, "Aggressive water conservation through new ordinances and rebates," and sixth, "On-site stormwater capture projects for direct landscaping use and groundwater recharge," would potentially apply to the Project. The fourth strategy would not apply to the Project because of the distance between Eaton Canyon and the Project Site. The third strategy would not apply to the Project because it applies to Brookside Golf Course and the surrounding park areas, which do not include the Project Site. The fifth strategy would not apply to the Project because it does not apply to private developments. The WIRP also mentions "Develop ordinances that require new developments along planned recycled water corridors to have recycled water connection capability." Current plans for using reclaimed water include irrigation of golf courses, freeway landscaping, parks, schools, and large turf areas, and use in industrial processes.

(c) Pasadena Municipal Code

The Pasadena Municipal Code (PMC) includes provisions for existing development and new construction projects within the City. Chapter 13.10 of the PMC incorporates the City's Water Waste Prohibitions and Water Supply Shortage Plans, which establish 13 permanent and mandatory restrictions on wasteful water use, as follows:

- No outdoor watering between 9:00 A.M. and 6:00 P.M., except with a hand-held container, hand-held hose with a shut-off nozzle, or briefly when adjusting the sprinkler system;

- No watering during periods of rain;

- No excessive water flow onto the pavement or gutters from watering landscaped areas of any kind;

- No washing down of paved surfaces unless for safety or sanitation using a bucket, hose with shut-off nozzle, machine that recycles water, or low-volume/ high-pressure broom;

- All property owners must fix leaks, breaks, or malfunctions when identified or within seven days of receiving a notice from PWP;

- Fountains and water systems must use a recirculating water system;
- Vehicles must be washed with a bucket or hand-held hose with a shut-off nozzle (except for commercial car washes);
- Restaurants may only serve drinking water when requested by the patron;
- Restaurants must use water-saving dish wash spray valves;
- Commercial lodging facilities must provide guests the option of declining daily bed linen and towel changes and display notice of the option in each bathroom;
- No installation of single pass cooling systems in buildings requesting new water service;
- No non-recirculating water systems may be installed at commercial car washes and laundry systems; and
- Effective July 1, 2011, all commercial car washes must have recirculating water systems or obtain a city waiver.

In addition, Chapter 13.22 of the PMC, the Water Efficient Landscape Ordinance, includes specific plant types and the use of recycled water for irrigation and/or water features. Chapter 17.44 of the PMC, the Landscape Ordinance, encourages the efficient use of irrigation, appropriate plant materials, and regular maintenance of landscaped areas.

Furthermore, per Chapter 13.20 of the PMC, the Project Applicant may be charged a connection fee for establishing service from an existing water main, and Chapter 13.28 allows the City to establish an assessment district to pay for a water main replacement.

b. Existing Conditions

(1) Current and Projected Water Supply

PWP's water supply consists of three existing sources, with an additional three sources planned over the 2040 timeframe. Current supply sources are groundwater, surface water (used for groundwater recharge at Arroyo Seco Canyon and Eaton Canyon), and imported water. Planned sources include non-potable water (estimated in 2019), indirect potable reuse (IPR) via groundwater recharge (estimated in 2030), and a groundwater storage program using MWD replenishment water (which will be implemented as needed), along with expansion of the existing surface water diversion (estimated in 2019). Table IV.M.1-1 on page IV.M.1-16, provides PWP's current annual water rights. Current and planned water supplies are described in the sections below.

Table IV.M.1-1
Current Annual Supply Rights

Supply	Volume	Right	Contract
Imported	15,229–21,617 AFY[a]		X
Groundwater—Raymond Basin	10,304 AFY	X	
Groundwater—Spreading Credits	60–80% of recharge volume	X	
Local Surface—Arroyo Seco Diversion	Up to 25 cfs	X	
Local Surface—Eaton Canyon Diversion	Up to 8.9 cfs	X	
Recycled Water—LAG	6,000 AFY	X	

AFY = acre-feet per year
cfs = cubic feet per second

[a] *Volume of imported supply is based on the range of MWD's projected demand for PWP's service area.*
Source: RMC, 2017.

(a) Groundwater

PWP produces groundwater from the Raymond Basin which underlies the northwest portion of the San Gabriel Valley. The Raymond Basin is an alluvial valley approximately 40 square miles in an area underlain by deposits of gravel, sand, silt, and clay. 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 Raymond Basin. Well yields in the alluvium range from a few hundred to several thousand gallons per minute (gpm). The alluvial aquifer system in the Raymond Basin consists of many individual interconnected water-bearing zones.

In 1944, the Raymond Basin was adjudicated.[20] The resultant Raymond Basin Judgment and its successive modifications assigned groundwater extraction rights based on the safe yield of three basin subareas: Monk Hill, Pasadena, and Santa Anita. PWP has decreed water rights of 12,807 AFY from the Monk Hill and Pasadena subareas and

[20] *When multiple parties withdraw water from the same aquifer, groundwater pumpers can ask the court to adjudicate, or hear arguments for and against, to better define the rights that various entities have to use groundwater resources. Through adjudication, the courts can assign specific water rights to water users and can compel the cooperation of those who might otherwise refuse to limit their pumping of groundwater. Watermasters are typically appointed by the court to ensure that pumping conforms to the limits defined by the adjudication. Water Education Foundation, Groundwater Adjudication, www.watereducation.org/aquapedia/groundwater-adjudication, accessed on March 15, 2017.*

has no rights in the Santa Anita subarea. In response to declining water levels, the Raymond Basin Management Board issued a resolution calling for a cooperative pumping reduction of 30 percent in the Pasadena subarea over a five-year period effective July 1, 2009. PWP's water pumping was decreased by 2,503 AF over 5 years to 10,304 AFY beginning in 2014.[21]

In average hydrologic conditions, PWP is currently pumping approximately 12,000 AFY from the Raymond Basin. The groundwater production value takes into account both PWP's decreed groundwater right and surface runoff spreading credits. Pumping credits from spreading of diverted surface runoff provided an average of 1,850 AFY of additional groundwater supply over the 2001–2015 period, ranging from 300 AF in dry years to 5,000 AF in wet years. Table IV.M.1-2 on page IV.M.1-18 provides the amount of groundwater pumped at each well between 2011 and 2015.

(b) Surface Water

Surface runoff from the San Gabriel Mountains is also a water supply source for PWP. PWP owns water rights to divert instantaneous runoff from the Arroyo Seco up to 25 cubic feet per second (cfs) and Eaton Canyon up to 8.9 cfs. The full amount of water available from PWP's diversion rights are not typically realized due to water quality issues and capacity limitations of PWP's existing facilities, as well as discounts for groundwater recharge taken when applying the Raymond Basin Management Board spreading credit methodology. Surface water diversions in the Arroyo Seco are used to augment local groundwater via recharge in the Arroyo Seco Spreading Grounds. On average, current operations yield approximately 2,500 AFY of recharge, which produce approximately 1,500 AFY of PWP supply yield after pumping credits are applied.[22] PWP also diverts additional surface runoff to provide groundwater recharge at the Eaton Canyon spreading basins. Over the past ten years, PWP spreading credits obtained from Eaton Wash rights have averaged approximately 750 AFY, ranging from 100 AFY in 2015 to 1,850 AFY in 2006.

(c) Imported Water

MWD is the largest water wholesaler for domestic and municipal uses in California, providing on average 1.7 billion gallons of water per day to 26 member agencies, including PWP. PWP has a contract to purchase imported water to supplement groundwater pumping. On average, PWP received 60 percent of its water from MWD based on the

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[21] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

[22] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

Table IV.M.1-2
Groundwater Volume Pumped—2011 to 2015 (AFY)

Groundwater Type	Well Name	2011	2012	2013	2014	2015
Alluvial Basin	Arroyo	1,822	2,577	2,473	2,115	2,124
Alluvial Basin	Bangham	2,005	1,952	776	986	508
Alluvial Basin	Chapman	366	829	76	444	1,033
Alluvial Basin	Copelin	31	5	3	0	1
Alluvial Basin	Garfield	0	938	46	97	627
Alluvial Basin	Sunset 20	7	5	3	1	1,136
Alluvial Basin	Ventura	703	1,423	201	134	45
Alluvial Basin	Well 52	269	649	1,423	1,448	40
Alluvial Basin	Well 58	3,055	888	2,927	1,429	2,291
Alluvial Basin	Well 59	1,960	2,114	2,227	2,225	2,058
Alluvial Basin	Windsor	51	1	0	1	1
Alluvial Basin	Woodbury	2,331	2,340	2,234	2,243	2,160
Total		**12,599**	**13,721**	**12,390**	**11,124**	**12,023**

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

period of 1995 through 2015. PWP receives treated water via five turnouts (i.e., connections to MWD's distribution system) from MWD's Upper Feeder. Water is treated at MWD's Weymouth Water Treatment Plant (WTP). During outages or interruptions at the Weymouth WTP, PWP can receive treated water from MWD's Jensen WTP via three of the five turnouts. Sufficient turnout capacity exists to meet existing and projected PWP demands. Although PWP's connection capacity is adequate to meet future demands, the reliability of MWD's imported water supplies has been reduced in recent years due to prolonged droughts and environmental restrictions.[23]

(d) Non-Potable Water

Currently, non-potable water is not included in PWP's water supply portfolio. PWP is implementing the *Pasadena Non-Potable Water Project* to provide a near-term non-potable water supply from recycled water, surfacing groundwater (tunnel water), and surface water. PWP currently has an agreement to purchase recycled water from the LAG WRP, and conveyance infrastructure to the vicinity of PWP's service area is already in place. PWP is currently in the process of completing final design of Phase I of their recycled water system, identified in the 2012 Recycled Water Master Plan (RWMP). The

[23] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

Phase I project is planned to be complete by 2019 and would serve 700 AFY of recycled water to Brookside Golf Course and nearby customers for irrigation. Purchased recycled water from LAG WRP would provide the majority of non-potable supplies for PWP.

Up to 430 AFY of the non-potable supply could potentially come from Devil's Gate and Richardson tunnel water, which currently flows to the Arroyo Seco below Devil's Gate Dam.[24] However, the Devil's Gate and Richardson tunnels have not had any flow for the last several years, and PWP is not currently pursuing design of tunnel water facilities. In future phases, the Arroyo Seco surface water could also provide the third non-potable water source, which originates primarily as rain and snow runoff from the San Gabriel Mountains.

After Phase I of the *Pasadena Non-Potable Water Project* is complete, PWP plans to extend the non-potable water system by implementing Phases II–VI. Buildout of this project would supply approximately 3,060 AFY of non-potable water to approximately 50 customers for landscape irrigation, cooling, and other non-potable uses.[25]

(e) Groundwater Replenishment

PWP is proposing a conjunctive use program as part of its 2011 WIRP to store additional groundwater reserves when imported replenishment water is available from MWD. Imported replenishment water is purchased at a reduced rate in comparison to normal water purchases. The water would be cycled and extracted as needed to reduce imported water costs and provide increased supplies during dry years and emergency conditions.

Replenishment could add up to 20,000 AFY in any given year, but would average 6,500 AFY over time. Replenishment water does not place a demand on MWD, but, rather, is only available to agencies if MWD has excess water. Given the potential variation in availability of replenishment water, this source is not included in PWP's assessment of long-term supplies. PWP considers this source as a way to maximize groundwater storage and increase water supply reliability in dry years.

(f) Current and Future Supplies

Table IV.M.1-3 on page IV.M.1-20 provides projected water supplies extending to 2040 in five-year increments for an average water year using only PWP's current water supply sources as documented in PWP's 2015 UWMP.

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[24] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

[25] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

Table IV.M.1-3
PWP Projected Water Supplies in Average Water Year (AFY)

	2015[a]	2020	2025	2030	2035	2040
Imported Water	15,229	20,934	20,986	21,237	21,529	21,617
Groundwater	12,023	12,684[b]	12,684	12,684	12,684	12,684
Total	**27,252**	**33,618**	**33,670**	**33,921**	**34,213**	**34,301**

[a] *Actual water supplies from 2015.*

[b] *12,684= 10,304 AFY (decreed) + 2,380 AFY (spreading credits based on long-term average)*

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

All planned projects will increase PWP's reliability and reduce its reliance on imported water. Projects that will increase available supplies include the Pasadena Non-Potable Water Project, and IPR. Groundwater replenishment with imported replenishment water will increase PWP's reliability by providing a local supply during droughts and emergencies. Table IV.M.1-4 on page IV.M.1-21 lists major projects planned during the 2015 to 2040 timeframe and associated supply volumes as described in the 2015 UWMP.

(2) Current and Projected Water Demands

PWP's existing and projected demands were obtained from its 2015 UWMP. The overall approach to forecast demands for PWP's service area was to ensure consistency with the City of Pasadena General Plan, MWD's IRP, and MWD's 2015 UWMP. In MWD's 2015 UWMP, MWD estimated the projected demands for their 26 member agencies using Southern California Association of Governments' (SCAG) 2012–2035 Regional Transportation Plan data. SCAG projections were based on extensive local review and incorporated zoning information from city and county general plans. To be consistent with MWD's 2015 UWMP and the City of Pasadena's General Plan, SCAG information was utilized in forecasting potable demands in PWP's service area. PWP used land use-based methods as the approach to project its demand forecasts. Based on water use factors, projected demographics, and water conservation estimates, PWP's normal water demands are projected to be 33,000 AFY by 2040. This demand forecast assumed current levels of active water conservation, as well as future water use efficiency from compliance with California's plumbing codes.

Table IV.M.1-5 on IV.M.1-22 presents the water demand forecast for PWP's service area under normal weather with inclusion of passive conservation and 8.5 percent of water

Table IV.M.1-4
Planned PWP Water Supplies (AFY)

	2015	2020	2025	2030	2035	2040
Current Supplies	**27,252**	**33,618**	**33,670**	**33,921**	**34,213**	**34,301**
Planned Supplies						
Non-Potable Water Project Phase I	0	700	700	700	700	700
Non-Potable Water Project Phase II	0	0	400	400	400	400
Non-Potable Water Project Phase III	0	0	0	900	900	900
Non-Potable Water Project Phase IV	0	0	0	280	280	280
Non-Potable Water Project Phase V	0	0	0	0	390	390
Non-Potable Water Project Phase VI	0	0	0	0	0	390
Tertiary Treated IPR	0	0	0	930	930	930
Groundwater Storage Program[a]	0	0	0	0	0	0
Total	**27,252**	**34,918**	**34,770**	**37,131**	**38,813**	**38,291**

[a] *During average years, this program will not produce water supplies but, in dry years or emergencies, will produce up to 5,000 AFY.*

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

losses and non-revenue uses. The demand projection only accounts for current conservation and efficiencies expected from California's plumbing codes.[26]

(3) Water Supply Reliability Assessment

The assessment of water supply reliability compares PWP's water supplies and demands under a range of hydrologic conditions through the year 2040 to demonstrate PWP's ability to meet these expected demands for a normal year, a single-dry year, and multiple-dry years.

As shown in more detail below, total water supplies exceed demands during normal, single-dry, and multiple-dry year scenarios. The excess supplies would be placed into groundwater storage in addition to the MWD replenishment water from the planned groundwater storage program for additional local supply reliability. The planned groundwater storage program has the ability to produce up to 5,000 AFY during dry years when the supply is needed. Although the supply reliability analyses produced by MWD and PWP show sufficient supplies are available during variable hydrologic conditions, it is

[26] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*

Table IV.M.1-5
Projected Water Demands for PWP (AFY)

Sector	2020	2025	2030	2035	2040
Potable Water					
Single-Family	14,903	14,659	14,555	14,563	14,421
Multifamily	5,490	5,536	5,530	5,477	5,526
Commercial/Institutional	7,843	7,672	5,778	5,596	5,403
Governmental	1,097	1,090	1,083	1,078	1,075
Losses	2,074	2,139	2,210	2,285	2,355
Other	479	415	353	292	230
Total Potable Water	**31,886**	**31,511**	**29,509**	**29,291**	**29,010**
Non-Potable Water	700	1,100	3,210	3,600	3,990
Total Water Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

possible that some extreme dry years could result in MWD allocations. Stored groundwater provides an additional water supply to provide reliability during extreme dry periods. In the case that PWP demands do exceed supplies during an extreme dry year(s), PWP's Water Shortage Contingency Plan, which planned for temporary or prolonged shortages of up to 50 percent of the normal supplies, is in place to reduce demands.

(a) Normal Year

Table IV.M.1-6 on page IV.M.1-23 summarizes the projected water supplies and demands under normal year conditions through 2040. Projections include planned supplies from the *Pasadena Non-Potable Reuse Project* (non-potable water), along with groundwater supplies replenished via IPR and the groundwater storage program. As shown in Table IV.M.1-6, total supplies would exceed demands in all years from 2020 through 2040. Any additional supplies that would exceed demands would be placed in groundwater storage for future use, increasing PWP's supply reliability.

(b) Single-Dry Year

The single-dry year is based on the year with the lowest available supply from MWD to PWP. MWD receives water supplies from the Colorado River Aqueduct and the State Water Project (SWP). The SWP is a water storage and delivery system managed by DWR to deliver water throughout the State. MWD received the lowest SWP allocation in history

Table IV.M.1-6
Projected Supply and Demand Comparison for a Normal Year (AFY)

Supply/Demand	2020	2025	2030	2035	2040
Groundwater	12,684	12,684	12,684	12,684	12,684
Imported Water	20,934	20,986	21,237	21,529	21,617
Non-Potable Water	700	1,100	3,210	3,600	3,990
Total Supply	**34,318**	**34,770**	**37,131**	**37,813**	**38,291**
Total Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**
Surplus for Groundwater Storage	1,732	2,159	4,412	4,922	5,291

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

in 1977, with the exception of 2015.[27] Because SWP deliveries to MWD represent the largest source for MWD and deliveries from MWD represent the largest source for PWP, and SWP supplies have been significantly more variable than Colorado River water, MWD based its determination of "lowest supply available" on the availability of SWP allocations, as did PWP. Single-dry year supplies and demands are presented in Table IV.M.1-7 on page IV.M.1-24.

In a single-dry year scenario, the amount of groundwater pumping would be reduced because there would be less surface water available to use as spreading credits. PWP's decreed groundwater would remain consistent at 10,304 AFY. In addition to decreed rights, PWP anticipates that approximately 660 AFY of groundwater would be available from spreading credits during dry years. This analysis assumes that availability of imported water would remain the same as normal year conditions, given MWD's supply assessment shows a 0-percent risk of supply allocation in the single-dry year scenario. MWD's analysis assumes that demands for imported water from its member agencies, including PWP, would increase in a single-dry year. Imported demands shown in PWP's 2015 UWMP for a single-dry year are lower than demands assumed by MWD. Recycled water, which comprises a majority of the non-potable supplies, is considered drought-proof and, therefore, would not change during a single-dry year scenario. Total demands for PWP's service area would remain the same, but there would be less excess water available for groundwater storage.

[27] *Based on the PWP 2015 UWMP, the year 2015 cannot be used; however, the year 2015 was included since MWD's model results are required to assess the reliability of future years under the repeat of the driest year condition. The 2015 hydrology has not been modeled by MWD, as modeling by MWD includes 1922 to 2012 hydrology.*

Table IV.M.1-7
Projected Supply and Demand Comparison for a Single-Dry Year (AFY)

Supply/Demand	2020	2025	2030	2035	2040
Groundwater	10,964	10,964	10,964	10,964	10,964
Imported Water	20,934	20,986	21,237	21,529	21,617
Non-Potable Water	700	1,100	3,210	3,600	3,990
Total Supply	**32,598**	**33,050**	**35,411**	**36,093**	**36,571**
Total Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**
Surplus for Groundwater Storage	12	439	2,692	3,202	3,571

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

(c) Multiple-Dry Years

The multiple-dry year period was based on the lowest average imported water supply availability to MWD (PWP's main source of water) for a consecutive multiple-year period. The multiple-dry year scenario was based on SWP supply availability to MWD from 1990–1992, as this period represents the lowest SWP allocation to MWD in history for a 3-year period. Multiple-dry year supplies and demands are presented in Table IV.M.1-8 on page IV.M.1-25.

In a multiple-dry year scenario, surface water available to use as spreading credits would be the primary source impacted. Although surface water is anticipated to be impacted under a multiple-dry year scenario, surface water available for spreading credits under the selected multiple-dry year period (1990–1992) stayed fairly consistent with single-dry year conditions. Therefore, PWP's total groundwater supplies are assumed to remain consistent with single-dry year conditions. Additionally, it was assumed that imported water would remain the same as normal year conditions, given that the supply assessment from MWD shows a 0-percent risk of supply allocation in the multiple-dry year scenario. PWP's estimated imported water demands for the multiple-dry year scenario are lower than the multiple-dry year demands that MWD has forecasted for PWP. Recycled water, which comprises a majority of the non-potable supplies, is considered drought-proof and would not be impacted under multiple-dry year conditions. Total demands would remain the same, but there would be less excess water available for groundwater storage as compared to normal year conditions.

Table IV.M.1-8
Projected Supply and Demand Comparison for Multiple-Dry Years (AFY)

	Supply/Demand	2020	2025	2030	2035	2040
Year 1	Groundwater	10,964	10,964	10,964	10,964	10,964
	Imported Water	20,934	20,986	21,237	21,529	21,617
	Non-Potable Water	700	1,100	3,210	3,600	3,990
	Total Supply	**32,598**	**33,050**	**35,411**	**36,093**	**36,571**
	Total Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**
	Surplus for Groundwater Storage	12	439	2,692	3,202	3,571
Year 2	Groundwater	10,964	10,964	10,964	10,964	10,964
	Imported Water	20,934	20,986	21,237	21,529	21,617
	Non-Potable Water	700	1,100	3,210	3,600	3,990
	Total Supply	**32,598**	**33,050**	**35,411**	**36,093**	**36,571**
	Total Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**
	Surplus for Groundwater Storage	12	439	2,692	3,202	3,571
Year 3	Groundwater	10,964	10,964	10,964	10,964	10,964
	Imported Water	20,934	20,986	21,237	21,529	21,617
	Non-Potable Water	700	1,100	3,210	3,600	3,990
	Total Supply	**32,598**	**33,050**	**35,411**	**36,093**	**36,571**
	Total Demand	**32,586**	**32,611**	**32,719**	**32,891**	**33,000**
	Surplus for Groundwater Storage	12	439	2,692	3,202	3,571

Source: Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.

(4) Water Infrastructure

(a) Hillside Campus

(i) Domestic Service

Based on available record data and documentation provided by PWP (Exhibit 1), there is a 12-inch water main that runs along MacMinn Drive and through the Hillside Campus (i.e., beneath the Ellwood Building and the South Lot within a 15-foot easement granted to PWP). An existing 4-inch domestic service water connection off of the 12-inch main serves the Hillside Campus.

(ii) Fire Service

Based on available record data and documentation provided by PWP, there is an existing 8-inch fire service water connection that serves the Hillside Campus. There are six fire hydrants along MacMinn Drive within the Hillside Campus. The hydrants are placed

approximately every 350 feet along MacMinn Drive from Lida Street to the southwest corner of the Ellwood Building. Three of the fire hydrants are located around the North Parking lot, one is located east of the Ellwood Building, one is located west of the Ellwood Building, and one is located southwest of the Ellwood Building.

(b) South Campus

(i) Domestic Service

Based on available record data and documentation provided by PWP, there are three existing water mains currently serving the South Campus—an 8-inch water main along Raymond Avenue, a 16-inch water main along Glenarm Street, and an 8-inch water main along Arroyo Parkway. The 870 Building and 888 Building are currently served by 2-inch domestic service water connections off of the 8-inch water main in Raymond Avenue. The 950 Building is currently served by four 2-inch domestic service water connections and one 4-inch domestic service water connection off of the 8-inch water main in Raymond Avenue. The 988 Parking Lot is currently served by a 6-inch domestic service water connection off of the 16-inch water main in Glenarm Street. The 1111 Building is currently served by one 4-inch and one 0.75-inch domestic service water connection off of the 8-inch water main in Arroyo Parkway.

(ii) Fire Service

The 870 Building and 888 Building are each currently served by one 6-inch fire service water connection off of the 8-inch water main in Raymond Avenue. The 950 Building is currently served by one 6-inch and one 8-inch fire service water connection off of the 8-inch water main in Raymond Avenue. The 988 Parking Lot is currently served by one 4-inch fire service water connection off of the 6-inch domestic service. The 1111 Building is currently served by one 6-inch fire service water connection off of the 8-inch water main in Arroyo Parkway. There are seven fire hydrants within the immediate vicinity of the South Campus. Three of the fire hydrants are located west of the 870, 888, and 950 Buildings along Raymond Avenue, one is located at the northwestern corner of the intersection of Glenarm Street and Raymond Avenue, one is located at the northwestern corner of the intersection of Glenarm Street and Arroyo Parkway, one is located east of the 1111 Building on Arroyo Parkway, and one is located northeast of the 1111 Building parking lot on Arroyo Parkway.

3. Environmental Impacts

a. Methodology

(1) Water Supply

The analysis of Project impacts on water supply is based on the WSA for the Project prepared by RMC Water and Environment pursuant to SB 610, which is included in Appendix M of this Draft EIR. The WSA includes a conservative calculation of the Project's anticipated net water demand, including two scenarios related to the development of the 888 Building. Under Scenario 1, the Project proposes improvements to existing facilities and new development including up to 310,100 square feet of new academic and commercial space and 230 new student housing units. Under Scenario 2, the Project proposes improvements to existing facilities and new development including up to 145,100 square feet of new academic and commercial space and 380 new student housing units. In accordance with Senate Bill 610, the resulting demand for water associated with the Project is analyzed relative to PWP's existing and planned future water supplies to determine if PWP would be able to accommodate the Project's water demands during average, single-dry, and multiple-dry years hydrologic conditions.

(2) Water Infrastructure

PWP performed a hydraulic analysis of its water system to determine if adequate fire flow is available to the fire hydrants surrounding the Project Site. PWP's approach consists of analyzing its water system model in the vicinity of the Project Site. Based on the results of the hydraulic analysis, PWP determined whether the Project fire hydrant flow needs can be met based on existing infrastructure. In addition, PWP performed flow tests to determine if available water conveyance exists for future development. PWP's approach consists of data ranging from available static pressure (i.e., how much pressure is available at the source before applying the Project's demand), to the available pressure at the maximum demand needed for the Project. Based on the results of the flow tests, PWP determined whether there is available water conveyance to serve the Project based on existing infrastructure.

b. Thresholds of Significance

Based on Appendix G of the State CEQA Guidelines, the Project would have a significant impact related to water supply facilities if there are not sufficient water supplies available to serve the project from existing entitlements and resources and new or expanded entitlements are needed.

c. Project Design Features

No specific project design features are proposed with regard to water supply and infrastructure.

d. Analysis of Project Impacts

Impact M.1-1: The Project would introduce new structures, residents, and employees to the Project Site, particularly the South Campus, which would result in an increase in water consumption. However, water supply and delivery systems are adequate to meet estimated Project demands.

(1) Construction

Construction of the Project would result in a temporary increase in water demand. As discussed in Section III, Project Description, of this Draft EIR, the Project would be developed in two phases. Specifically, buildout of Phase I may occur as early as 2022, and buildout of Phase 2 is planned for 2032. Demand for water would be associated with soil compaction and earthwork, dust control, mixing and placement of concrete, equipment and site cleanup, irrigation for plant and landscaping establishment, water line testing and flushing, and other short-term related activities. These activities would occur intermittently throughout construction of the Project (from the start of construction to Project buildout). The amount of water used during construction would vary depending on the conditions of soils, weather, and site-specific operations. However, based on a review of construction projects of similar size and duration, a conservative estimate of construction water use ranges from 1,000 to 2,000 gallons per day (gpd). Water use during construction would be limited and would be temporary in nature. In addition, as discussed above and as concluded in PWP's 2015 UWMP, projected water demand for the City would be met by the available supplies during an average year, single-dry year, and multiple-dry year through the year 2040, as well as the intervening years. Furthermore, the water use during construction would be less than the water demand during Project operation. As such, there is sufficient water for both phases of Project construction.

Improvements to the water system would be necessary to serve the Project. These improvements would involve the installation of new water lines within the Project Site to serve the new development and the connections between these lines and the City water lines in the public streets. Since there is existing development on the Project Site, the installation of the new on-site lines may also require the rerouting of one or more of the existing water lines that presently serve existing uses. Water service would be maintained to the existing on-site uses throughout the construction period, in accordance with standard City procedures. Construction activities associated with the installation of new or relocated

water line connections would be confined to trenching in order to place the water lines below surface. However, vehicular and pedestrian access within and immediately surrounding the Project Site may be affected during installation of the on-site water lines and the water line connections in the public streets. The Project's Construction Staging and Traffic Management Plan would ensure that the impacts of the various construction stages, including trenching, on the public right-of-way would be kept to a minimum.

Based on the analysis provided above, Phase I and Phase II construction activities would result in a limited and temporary water demand and are not anticipated to have any adverse impact on water supply and infrastructure because the water use during construction would be less than the water demand during Project operation. As discussed above, PWP has sufficient water supplies in normal, single-dry, and multiple-dry year scenarios to meet expected demands through the year 2040. As such, there is sufficient water for both phases of Project construction, including the installation of any required water distribution infrastructure. In addition, construction impacts associated with the installation of on-site water facilities and off-site connections are expected to be confined to trenching and related construction activities which would be temporary in nature and limited in extent. Furthermore, any rerouting or upgrading of existing water lines would be completed in accordance with standard city procedures, which would preclude any interruptions in existing service. Therefore, Phase I and Phase II construction impacts to the City's available water supply and infrastructure would be less than significant.

(2) Operation

(a) Water Demand

Development of the Project would result in an overall increase in water demand from the Project Site during operation. Water consumed by the Project was estimated based on the projected student housing units and associated residential demands and net increase in commercial/institutional square footage, as analyzed in the WSA prepared for the Project (included in Appendix M of this Draft EIR). As shown in Table IV.M.1-9 on page IV.M.1-30, the Project would have an increased water demand of 116 AFY under Scenario 1 and 106 AFY under Scenario 2. Table IV.M.1-10 on page IV.M.1-31 presents the projected water demands of the Project over an 11-year time span starting in 2022 when Phase I is anticipated to be completed through 2032 following buildout of Phase II.

The total net increase in development resulting from the Project for both residential units and commercial square footage falls below the development capacities anticipated in the General Plan. As determined in the WSA, the total demand estimated in the 2015 UWMP for parcels within the Project Site is 186.3 AFY. Therefore, because the increased water demand generated by the Project under either scenario is lower than the 2015

Table IV.M.1-9
Total Project Water Demands

Type	Quantity[a]	Units[b]	Demand (gallons per day)	Demand (AFY)
Scenario 1				
Residential (Student Housing)	230 units	169 gal/mfu/day	38,870	44
Commercial	310,100 sf	76 gal/sf/year	64,178	72
Scenario 1 Total			**103,048**	**116**
Scenario 2				
Residential (Student Housing)	380 units	169 gal/mfu/day	64,220	72
Commercial	145,100 sf	76 gal/sf/year	30,213	34
Scenario 2 Total			**94,433**	**106**

AFY = acre-feet per year
gal/mfu/day= gallons per multi-family unit per day
sf = square feet
[a] *City of Pasadena, 2016*
[b] *Pasadena Department of Water and Power, 2015 Urban Water Management Plan, June 2016.*
Source: Eyestone Environmental, 2017.

UWMP estimate for the Project Site, the development resulting from the Project has been deemed accounted for in the 2015 UWMP water demand projections. As described in the General Plan Land Use Element, the vision for the South Fair Oaks areas capitalizes on existing uses, including the ArtCenter, to introduce housing for students and employees of major institutions in the area, and to convert underutilized industrial areas for new businesses and job-generating uses. The Project would fill this vision and align with uses proposed under the City's General Plan.

Based on the analysis above, the estimated water demand for the Project would not exceed the available supplies projected by PWP. Thus, PWP would be able to meet the water demand of the Project, as well as the existing and planned future water demands of its service area. Therefore, Phase I and Phase II development, would result in less-than-significant impacts on water supply.

(b) Water Infrastructure

Water service to the Project Site would continue to be supplied by PWP for domestic and fire protection uses. While domestic water demand is typically the main contributor to operational water consumption, fire flow demands have a much greater instantaneous

Table IV.M.1-10
Phased Project Water Demands

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Scenario 1											
Project Occupied Dwelling Units	230	230	230	230	230	230	230	230	230	230	230
Estimated Residential Water Demands (AFY)	44	44	44	44	44	44	44	44	44	44	44
Project Commercial Space (SF)	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	310,100
Estimated Commercial Water Demands (AFY)	20	20	20	20	20	20	20	20	20	20	72
Scenario 1 Total Water Demand	*64*	**64**	**63**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**116**
Scenario 2											
Project Occupied Dwelling Units	230	230	230	230	230	230	230	230	230	230	380
Estimated Residential Water Demands (AFY)	44	44	44	44	44	44	44	44	44	44	72
Project Commercial Space (SF)	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	86,355	145,100
Estimated Commercial Water Demands (AFY)	20	20	20	20	20	20	20	20	20	20	34
Scenario 2 Total Water Demand	***64***	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**106**

Source: RMC, January 2017.

impact on infrastructure and, therefore, are the primary means for analyzing infrastructure capacity.

As previously mentioned, PWP performed a hydraulic analysis of its water system to determine if adequate fire flow is available to the fire hydrants surrounding the Project Site. PWP also performed flow tests to determine if available water conveyance exists for future development.

Fire flow requirements are determined by the Pasadena Fire Department (PFD) in accordance with Table B105.2 of the 2016 California Fire Code. Pursuant to Project Design Feature K-2 in Section IV.K, Fire Protection, of this Draft EIR, automatic fire sprinkler systems will be installed in all new buildings. For the Hillside Campus, assuming Type IIA construction and fully sprinklered buildings, the maximum fire flow demand is 3,000 gpm with a residual pressure of 20 pounds per square inch (psi). The fire flow tests performed by PWP show that static pressures from 152 to 170 psi and flows from 4,444 to 6,615 gpm with residual pressures of 20 psi can be delivered to the Hillside Campus. For the South Campus, assuming Type IIA construction and fully sprinklered buildings, the maximum fire flow demand is 2,625 gpm with a residual pressure of 20 psi. The fire flow tests show that static pressures from 70 to 79 psi and flows from 2,845 to 7,985 gpm with residual pressure of 20 psi can be delivered to the South Campus.

In addition, the Project would incorporate a fire sprinkler suppression system to reduce or eliminate the public hydrant demands, which will be subject to PFD review and approval during the design and permitting of the Project.

Based on the above and through compliance with PFD and PWP requirements, the Project's fire flow impacts to water infrastructure would be less than significant.

4. Cumulative Impacts

The geographic scope of analysis for cumulative impacts on water supply is the PWP service area (i.e., the City), inclusive of existing and anticipated future development under the General Plan buildout. The 2015 UWMP prepared by PWP accounts for existing development within the City, as well as projected growth through the year 2040.

Additionally, under the provisions of Senate Bill 610, PWP is required to prepare a comprehensive water supply assessment for every new development "project" (as defined by Section 10912 of the Water Code) within its service area that reaches certain thresholds. The types of projects that are subject to the requirements of Senate Bill 610 tend to be larger projects that may or may not have been included within the growth projections of the 2015 UWMP. The water supply assessment for projects would evaluate

the quality and reliability of existing and projected water supplies, as well as alternative sources of water supply and measures to secure alternative sources if needed.

Furthermore, through PWP's 2015 UWMP process the City will meet all new demand for water due to projected population growth to the year of 2040, through a combination of water conservation and water recycling. These plans outline the creation of sustainable sources of water for the City of Pasadena to reduce dependence on imported supplies. PWP plans to achieve these goals by expanding its water conservation program. To increase recycled water use, PWP is expanding the recycled water distribution system to provide water for irrigation, industrial use, and groundwater recharge.

Based on the above, it is anticipated that PWP would be able to supply the water demands of the Project, as well as future growth associated with the buildout of the General Plan. Therefore, cumulative impacts on water supply would be less than significant.

5. Mitigation Measures

Project-level and cumulative impacts with regard to water supply and infrastructure would be less than significant. Therefore, no mitigation measures are required.

6. Level of Significance After Mitigation

Project-level and cumulative impacts to water supply and infrastructure during construction and operations of Phase I and Phase II of the Project would be less than significant without mitigation.