

## 4.0 ENVIRONMENTAL IMPACT ANALYSIS

### H. WATER SUPPLY

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#### 1. INTRODUCTION

This section addresses water demand associated with the proposed project and assesses the adequacy of water supply and infrastructure capacity to meet that demand. The proposed project's consistency with relevant plans and regulations is also discussed. The focus of this section is on the availability of water supply, and indirect impacts to groundwater resources, as a result of the proposed project. Water supply availability analysis is based in part on the *Water Supply Summary* prepared by Power Engineers (May 2012), which is contained in Appendix F of this Draft EIR.<sup>1</sup>

#### a. Regulatory Framework

##### (1) State

##### (a) California Urban Water Management Plan Act

The California Urban Water Management Planning Act (California Water Code [CWC] Division 6, Part 2.6, Sections 10610-10656) addresses several State policies regarding water conservation and the development of water management plans to ensure the efficient use of available supplies. The California Urban Water Management Planning Act also requires water suppliers to develop water management plans every five years to identify short-term and long-term demand management measures to meet growing water demands during normal, dry, and multiple-dry years. Specifically, municipal water suppliers that serve more than 3,000 customers or provide more than 3,000 acre-feet (AF) per year of water must adopt an Urban Water Management Plan (UWMP).

##### (b) Senate Bill 610, Senate Bill 221, and Senate Bill 7

State legislation addressing water supply, Senate Bill (SB) 610 and SB 221, became effective January 1, 2002. SB 610, codified in CWC §10910 et seq., describes requirements for both water supply assessments (WSAs) and UWMPs applicable to the California Environmental Quality Act (CEQA) process. SB 610 requires that for projects subject to CEQA that meet specific size criteria, the 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 normal, single-dry, and multiple-dry year conditions. In accordance with SB 610 and Section 10912 of the CWC, such projects subject to CEQA requiring completion of a WSA include the following:

- Residential developments of more than 500 dwelling units;

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<sup>1</sup> *Pasadena Water and Power, Glenarm Repowering Project (GT-5 Combined Cycle Installation), Permitting Support – Water Supply Summary. Prepared for Pasadena Water and Power by Power Engineers, May 23, 2012.*

- Shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- Commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- Hotels, motels, or both, having more than 500 rooms;
- Industrial, manufacturing, or processing plants, or industrial parks planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
- Mixed-use projects that include one or more of the projects specified in this subdivision; or
- Projects that would demand an amount of water equivalent to or greater than the amount of water required by a 500-dwelling-unit project.

The WSA must be approved by the public water system at a regular or special meeting and must be incorporated into the CEQA document. The lead agency must then make certain findings related to water supply based on the WSA.

In addition, under SB 610, a water supplier responsible for the preparation and periodic updating of an UWMP must describe the water supply projects and programs that may be undertaken to meet the total project water use of the service area. If groundwater is identified as a source of water available to the supplier, the following additional information must be included in the UWMP: (1) a groundwater management plan; (2) a description of the groundwater basin(s) to be used and the water use adjudication rights, if any; (3) a description and analysis of groundwater use in the past five years; and (4) a discussion of the sufficiency of the groundwater that is projected to be pumped by the supplier.

Complementary legislation to SB 610 was enacted on November 10, 2009, with the passage of SB 7. SB 7 mandates new water conservation goals for UWMPs, requiring urban water suppliers to achieve a 20 percent per capita water consumption reduction by the year 2020 statewide, as described in the “20 x 2020” State Water Conservation Plan.<sup>2</sup> As such, each updated UWMP must now incorporate a description of how each respective urban water supplier will quantitatively implement this water conservation mandate, in addition to the requirements of SB 610.

Additionally, SB 221 addresses water supply in the land use planning process and focuses on new residential subdivisions in non-urban areas. SB 221 requires that written verification from the water service provider be submitted indicating sufficient water supply is available to serve a proposed subdivision, or the local agency shall make a specified finding that sufficient water supplies are or will be available prior to completion of a project. SB 221 specifically applies to residential subdivisions of 500 units or more. In addition, Government Code Section 66473.7(i) exempts “...any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses; or where the immediate

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<sup>2</sup> *California State Water Resources Control Board, 20 x 2020 Water Conservation Plan, February 2010.*  
[http://www.swrcb.ca.gov/water\\_issues/hot\\_topics/20x2020/docs/20x2020plan.pdf](http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/docs/20x2020plan.pdf).

contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses; or housing projects that are exclusively for very low and low-income households.”

The proposed project is not subject to the requirements of SB 610, as it neither includes the development of 500 residential units or retail in excess of 500,000 square feet nor would it generate a water demand equivalent to or greater than that required by a 500 dwelling unit project. Therefore, a WSA is not required from the water supplier to demonstrate the proposed project’s water demand is included as part of the most recently adopted UWMP. Further, the proposed project is not subject to the requirements of SB 221 because it is located within an urbanized area and because it does not propose the development of 500 or more dwelling units. However, CEQA still requires an analysis of impacts to water supply under its general terms, which is provided below.

### **(c) California Code of Regulations**

Title 20, Sections 1605.1(h) and 1605.1(i) of the California Code of Regulations (CCR) establishes efficiency standards (i.e., maximum flow rates) for all new federally-regulated plumbing fittings and fixtures, including showerheads and lavatory faucets. The maximum flow rate for showerheads and lavatory faucets are 2.5 gallons per minute (gpm) at 80 pounds per square inch (psi) and 2.2 gpm at 60 psi, respectively. In addition, Section 1605.3(h) establishes State efficiency standards for non-federally regulated plumbing fittings, including commercial pre-rinse spray valves.

### **(d) Global Warming and Climate Change**

Global warming and climate change should be considered in assessing water supply in California. Potential impacts of climate change on California’s water resources include changes in both water and air temperature, changes in precipitation patterns, and changes in sea levels that could increase pressure on the Sacramento-San Joaquin River Delta (Delta) levees. The impact of climate change on California’s water supply has already been the subject of study. In response to Governor’s Executive Order S-3-05, California Department of Water Resources (DWR) prepared its most recent report on this issue in May 2009, entitled “Using Future Climate Projections to Support Water Resources Decision Making in California,” which presents an overview of the advances that DWR has made toward using future climate projection information to support decision making by quantifying possible impacts to water resources for a range of future climate scenarios. Advances have been made in using future climate projection information in water resources planning in California, including improved understanding of how well selected climate models represent historical climate conditions and refined methodologies for representing stream flows, outdoor urban and agricultural water demands, and sea level rise in planning tools. The range of impacts presented indicated the need for adaptation measures to improve the reliability of future water supplies in California.<sup>3</sup> DWR has further addressed the issue of climate change and how it can affect California’s water supply, by undertaking mitigation and adaptation measures. DWR is a member of the California Climate Action Registry and is listed as a “Climate Action Leader” for reporting its greenhouse gas emissions for three consecutive years (2007, 2008 and 2009), and having the data verified by third party audit.<sup>4</sup> In 2008, DWR adopted the “Climate Change Adaptation Strategy,” which urges a new approach to California’s water and

<sup>3</sup> “Using Future Climate Projections to Support Water Resources Decision Making in California,” May 2009, California Department of Water Resources, page 2.

<sup>4</sup> California Climate Action Registry, Climate Action Leaders. <http://www.climateregistry.org/about/members/climate-action-leaders.html>. Accessed April 26, 2011.

other natural resources in the face of changing climate.<sup>5</sup> In 2009, DWR adopted its own Sustainability Policy, and in 2010, DWR established clear and measurable goals for sustainability implementations.<sup>6,7</sup>

In December 2010, DWR prepared a survey which presents summaries of 13 different reports and studies prepared by DWR addressing climate change entitled “Climate Change Characterization and Analysis in California Water Resources Planning Studies - Final Report.” Although DWR was one of the early leaders in including climate change analysis in its planning studies and reports, it does not currently have a standard framework or a set of recommended approaches for considering climate change in its planning studies. A variety of approaches to characterize and analyze future climate have been used in various DWR planning studies. The December 2010 paper summarized the approaches and methodologies that have been used since 2006. It is the first comprehensive comparative look at the different approaches, their strengths and weaknesses, and how they have been used in past studies. This work is anticipated to lay the groundwork for a future DWR study aimed at developing a standard framework and a consistent set of approaches to be used for characterizing and analyzing climate change in future DWR planning studies and which may provide guidance for DWR partners and grantees.<sup>8</sup>

While climate change is expected to continue through at least the end of this century, the magnitude and nature of future changes are uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood.<sup>9</sup> However, preliminary modeling conducted by DWR indicates that under one climate change scenario, average yearly SWP Table A deliveries in 2050 would be reduced by 10.2 percent.<sup>10</sup>

In light of these conclusions, both governmental agencies and non-governmental organizations recommend that water decision-makers operate existing water systems to allow for increased flexibility. Other recommendations include incorporating climate change research into infrastructure design, conjunctively managing surface water and groundwater supplies, and integrating water and land use practices. As a result, in March 2002, the Metropolitan Water District of Southern California’s (MWD) Board of Directors adopted climate change policy principles that relate to water resources. These principles are reflected in MWD’s Integrated Resource Plan (IRP), which was updated October 12, 2010.<sup>11</sup> Further, in response to climate change and uncertainty, MWD’s 2010 Regional UWMP incorporated three basic elements to promote

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<sup>5</sup> *Climate Change Adaptation Strategies for California’s Water: Managing an Uncertain Future*, California Department of Water Resources, October 2008. <http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>.

<sup>6</sup> *Memorandum to All DWR Employees, “Sustainability Workgroup,”* California Department of Water Resources, April 22, 2009. [http://www.water.ca.gov/climatechange/docs/Sustainability\\_Policy.pdf](http://www.water.ca.gov/climatechange/docs/Sustainability_Policy.pdf).

<sup>7</sup> *Memorandum to All DWR Employees, “Sustainability Targets,”* California Department of Water Resources, September 20, 2010. [http://www.water.ca.gov/climatechange/docs/Sustainability\\_Policy.pdf](http://www.water.ca.gov/climatechange/docs/Sustainability_Policy.pdf).

<sup>8</sup> “Climate Change Characterization and Analysis in California Water Resources Planning Studies - Final Report,” California Department of Water Resources, December 2010, page v.

<sup>9</sup> “Progress on Incorporating Climate Change into Management of California’s Water Resources,” July 2006, California Department of Water Resources, page 2-54.

<sup>10</sup> Table A water deliveries represent the schedule of the maximum amount of water that water contractors to the DWR may receive annually from the SWP. There are 29 water contractors who have signed long term contracts with the DWR for a total of 4,173 million acre feet per year (AFY). Table A deliveries are not guarantees of annual delivery amounts but are used to allocate individual contractors’ portion of the delivery amounts available.

<sup>11</sup> *Integrated Water Resources Plan, Report No. 1373, Updated October 12, 2010.* The Metropolitan Water District of Southern California. <http://www.mwdh2o.com/mwdh2o/pages/yourwater/irp/IRP2010Report.pdf>.

adaptability and flexibility, important in addressing impacts of climate change: conservation, groundwater recharge, and water recycling.<sup>12</sup>

MWD also approved criteria to further explain its position on the conveyance options that are currently being discussed to remedy the Delta, which include addressing projected sea level rise and change in inflows due to climate change. MWD's criteria provide that, "whatever option is chosen, it should provide water supply reliability, improve export water quality, allow flexible pumping operations in a dynamic fishery environment, enhance the Delta ecosystem, reduce seismic risks, and reduce climate change risks."<sup>13</sup> MWD has demonstrated a commitment to addressing climate change by evaluating the vulnerability of its water systems to global warming impacts and has developed appropriate response strategies and management tools that account for the impacts of climate change on future water supplies. For further discussion on the effects of global climate change, please refer to **Section 4.B, Air Quality**, of this Draft EIR.

## (2) Local

### (a) City of Pasadena Ordinance Nos. 6275, 7165 and 7193

The City of Pasadena has adopted several ordinances in an effort to reduce water consumption. Specifically, City of Pasadena Ordinance Nos. 6275 and 7165, which together constitute the Water Waste Prohibitions and Water Supply Shortage Plans, under Pasadena Code of Ordinances (PCO), Title 13, Chapter 13.10. The purpose of the ordinances is to establish a water conservation and supply shortage program that will reduce water consumption within the City of Pasadena and its service territory through conservation, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, and maximize the efficient use of water within the City of Pasadena and its service territory to avoid and minimize the effect and hardship of water shortage to the greatest possible extent.

The ordinances establish permanent water waste and conservation standards intended to alter behavior related to water use efficiency at all times and further establishes four levels of water supply shortage response actions to be implemented during times of declared water shortage or declared water shortage emergency, with increasing restrictions on water use in response to worsening drought or emergency conditions and decreasing supplies.<sup>14</sup> The 13 permanent Water Waste Prohibitions which Pasadena Water and Power (PWP) customers must adhere to include enforcement provisions and are as follows:

- Limits of watering hours
- No watering during periods of rain
- No water flow or runoff
- No washing down hard or paved surfaces
- Obligation to fix leaks, breaks or malfunctions
- Recirculating water required for water fountains and decorative water features

<sup>12</sup> *The Regional Urban Water Management Plan, November 2010. The Metropolitan Water District of Southern California.* [http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP\\_2010.pdf](http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP_2010.pdf).

<sup>13</sup> *Report for Metropolitan Water District of Southern California Board Meeting September 11, 2007 Agenda Item 8-4, emphasis added.*

<sup>14</sup> *City of Pasadena Code of Ordinances, Ordinance 6275 and 7165.*

- Limits on washing vehicles
- Drinking water served upon request only
- Restaurants required to use water conserving dish wash spray valves
- Commercial lodging establishments shall provide guests option to decline daily linen services
- No installation of single pass cooling systems
- No installation of non-recirculating equipment in commercial car wash and laundry systems
- Re-circulating water systems for commercial conveyor car wash systems

In July 2009, a Level 1 Water Shortage was declared, placing limits on the number of days you could water your lawn or fix a plumbing or sprinkler leak.<sup>15</sup> On May 9, 2011, the Pasadena City Council declared that the two-year Level 1 Water Shortage had ended and PWP customers are no longer restricted regarding the number of days they may water outdoors and are allowed to fix plumbing and sprinkler leaks within seven days, instead of three days, as previously required.<sup>16</sup>

City of Pasadena Ordinance No. 7193 (Title 13, Chapter 13.22) contains provisions requiring water efficient landscaping. Requirements for new and rehabilitated landscaping include watering provisions, the selection of drought-tolerant and/or native plant species, limitations on turf slopes, water feature requirements and controls for irrigation, as well as design plan review for projects which would landscape areas greater than 2,500 square feet (new or rehabilitation projects) or greater than one acre, for existing landscapes.

PWP also provides rebates to its customers through its MWD-sponsored programs, for installation of ultra-low-flow toilets, dual flush ultra-low-flow toilets, high-efficiency clothes washers, low-flow flushometers, pre-rinse kitchen sprayers, water pressurized brooms and cooling tower conductivity controllers, as well as introducing zero-consumption urinal technology to City facilities.<sup>17</sup>

#### **(b) City of Pasadena Green Building Program**

On January 1, 2011, the new California Code of Regulations Title 24 California Green Building Standards Code (CALGreen) came into effect, and on December 6, 2010, the City of Pasadena adopted Ordinance 7201, adopting the Title 24 CALGreen Building Codes under Pasadena Municipal Code Sections 14.04.500-578.<sup>18,19</sup> However, prior to the CALGreen Building Code update, Pasadena had its own Green Building Program. On April 15, 2006, the City of Pasadena approved a set of progressive green building regulations, creating the Green Building Program for private and public sector buildings, under Pasadena Municipal Code Chapter 14.90 (Green Building Practices Ordinance). The purpose of the Green Building Program is to create a program that increases the environmental soundness of buildings to compliment the City's desire to improve

<sup>15</sup> *City of Pasadena Code of Ordinances, Title 13, Chapter 13.10.040 (A) and (B).*

<sup>16</sup> "City Council Declares Water Shortage Over," *City of Pasadena*, [http://ww2.cityofpasadena.net/waterandpower/watershortage/default.asp#Water\\_Shortage\\_Level](http://ww2.cityofpasadena.net/waterandpower/watershortage/default.asp#Water_Shortage_Level)

<sup>17</sup> *Metropolitan Water District of Southern California, Member Agencies*, <http://www.mwdh2o.com/mwdh2o/pages/memberag/agencies/pasadena.htm>

<sup>18</sup> *2010 California Green Building Standards Code ("CALGreen"), California Code of Regulations, Title 24, Part 11.*

<sup>19</sup> *Ordinance 7201, an Ordinance of the City of Pasadena Adopting the California Code of Regulations Title 24 incorporating the 2010 California Building Code Chapters 1-35 and Appendix Chapters C, D, H, I and J; the California Residential Building Code; the 2010 California Mechanical Code; the 2010 California Plumbing Code; the 2010 California Electrical Code; the 2010 California Fire Code and the California Green Building Standards Code.*

the health of persons living, working and visiting Pasadena, and to cultivate standards that provide for a sustainable future. Furthermore, environmentally sound buildings seek to reduce the impacts buildings have on the local, regional and global environment including global warming, heat island effect, air pollution, and occupant health.<sup>20</sup> On December 19, 2005, the Pasadena City Council unanimously approved a green building program with three components: (1) green building ordinance, (2) incentives, and (3) outreach and education.<sup>21,22</sup> As such, the City of Pasadena requires specified types of developments to demonstrate that they meet the intent of the criteria for certification of the appropriate US Green Building Council's "Leadership in Energy and Environmental Design" (LEED) level. With regards to water efficiency, PWP supports Pasadena's Green Building Program goals by providing financial incentives to projects which are certified as LEED projects at each level, as energy and water conservation are an important function of LEED qualification.<sup>23</sup>

### **(c) Pasadena Water and Power 2010 Urban Water Management Plan**

In accordance with the California Urban Water Management Planning Act, PWP adopted the 2010 UWMP in June 2011, which incorporates the water conservation mandates of SB 7.<sup>24</sup> The UWMP details PWP's efforts to promote the efficient use and management of its water resources. PWP's UWMP used a service area-wide method in developing its water demand projections. This methodology does not rely on individual development demands to determine area-wide growth. Rather, the growth in water use for the entire service area was considered in developing long-term water projections for the City of Pasadena through 2035. The driving factors for this growth are demographics, weather, and conservation. PWP used anticipated growth in the various customer class sectors, as provided by MWD, who reallocated projected demographic data from the Southern California Association of Governments (SCAG) into member agencies' service areas. The data used was based on SCAG's 2008 Regional Transportation Plan Forecast.<sup>25</sup>

The 2010 UWMP addresses priorities and water supply and demand forecasts through 2035. Projections of water demand for PWP were developed as part of the recently completed Water Integrated Resources Plan (WIRP) based on historical water use factors, projected demographics, and passive (or code-based) water conservation, as described below.<sup>26</sup> MWD, PWP's supplemental water supplier, has also been actively developing plans and making efforts to provide additional water supply reliability for the entire Southern California region. PWP coordinates closely with MWD to ensure implementation of MWD's water resource development plans and supplemental water reliability report prepared by MWD. This allows PWP to work collaboratively with MWD to ensure the City's anticipated water demands are also incorporated into MWD's long-term water resources development plan.<sup>27</sup>

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<sup>20</sup> *Staff Report to Pasadena City Council, Regarding Green Building Ordinance and Program, December 19, 2005.*

<sup>21</sup> *Staff Report to Pasadena City Council, Regarding Green Building Ordinance and Program, December 19, 2005.*

<sup>22</sup> *City of Pasadena Planning Department, Green Building Program,*  
[http://www.ci.pasadena.ca.us/GreenCity/Green\\_Building\\_Program/](http://www.ci.pasadena.ca.us/GreenCity/Green_Building_Program/).

<sup>23</sup> *Staff Report to Pasadena City Council, Regarding Green Building Ordinance and Program, December 19, 2005, Attachment 2, Pasadena Department of Water and Power LEED Incentives.*

<sup>24</sup> *Pasadena Water and Power 2010 Urban Water Management Plan, at page ES-2,*  
<http://ww2.cityofpasadena.net/waterandpower/UWMP/FinalAdoptedUWMPJune2011.pdf>.

<sup>25</sup> *Ibid, at 2-5.*

<sup>26</sup> *Ibid, at 3-2.*

<sup>27</sup> *Ibid, at 1-5.*

#### (d) Pasadena Water and Power 2011 Water Integrated Resources Plan

On January 12, 2011, PWP completed their Water Integrated Resources Plan (WIRP), the source document for Pasadena's UWMP, which is required to be completed every five years. The WIRP provides an achievable, long-term strategy to meet Pasadena's current and future water needs, through 2035. In addition to meeting the mandates of SB 7, the goals of the WIRP are to sustainably and cost-effectively address local and regional water supply and demand issues, reflect community values, and adapt to changing conditions.<sup>28</sup> Planning objectives were developed by PWP staff, an Advisory Committee representing Pasadena's major stakeholders, and members of the public, and approximately 50 water supply and conservation options were considered for study in the WIRP. After extensive evaluation of these options, a recommended supply portfolio, called Hybrid 1, was determined to be the best strategy.<sup>29</sup>

The major elements included in this recommended strategy are (1) aggressive water conservation through new ordinances and rebates; (2) Devil's Gate Dam storage to Eaton Canyon for groundwater recharge; (3) recycled water from Los Angeles-Glendale Water Reclamation Plant for non-potable reuse, focusing on Brookside Golf Course and surrounding park areas; (4) recycled water from Los Angeles-Glendale Water Reclamation Plant 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.<sup>30</sup>

The stated benefits of these six major elements for PWP are: (1) greater supply reliability during droughts and emergency situations; (2) reduced overall lifecycle costs compared to a future in which these elements are not implemented; (3) improved groundwater levels; (4) improved local environment and surface water quality; (5) mitigation against potential climate change impacts; (6) consistency with MWD's regional water strategy of increasing conservation and local water supplies; and (7) compliance with the new state mandate for reducing per capita water usage by 20 percent by the year 2020.<sup>31</sup>

Projecting future water demands requires understanding of current uses and forecasts of demographics, and as described above, the forecast of Pasadena's demographics is based on SCAG's most recent regional transportation plan. Future water demands are also a function of planned water conservation efforts. However, since new water conservation will be evaluated along with new water supplies, the demand projection only accounts for current conservation and efficiencies that are expected to come from California's plumbing codes. **Table 4.H-1, Pasadena Water Demand Forecast through 2035**, presents the water demand forecast for PWP's service area without new water conservation, under normal weather. Total water demands are projected to be 43,300 AFY in 2035, representing an annual increase of 0.5 percent (similar to the historical growth rate from 1990 to 2010).

Although during normal and non-emergency conditions MWD has been able to meet Pasadena's supplemental water supplies with imported water, there have been times where the wholesale agency has had to impose water allocations. In fact, for the first time in its history, MWD allocated its imported water

<sup>28</sup> *Pasadena Water and Power Water Integrated Resources Plan, January 12, 2011, at page ES-2.*

<sup>29</sup> *Ibid, at ES-2 and ES-3.*

<sup>30</sup> *Ibid, at ES-3.*

<sup>31</sup> *Ibid.*

Table 4.H-1

**Pasadena Water Demand Forecast Through 2035<sup>a</sup>**  
(Acre-Feet Per Year)

Water Use Sector	2015 <sup>b</sup>	2020	2025	2030	2035
Single-Family	19,200	19,900	20,300	23,500	23,600
Multi-Family	6,800	7,200	7,400	7,600	7,700
Commercial/Institutional	10,800	11,100	11,300	11,500	11,600
Non-Revenue	3,200	3,300	3,400	3,400	3,400
<b>Total</b>	<b>40,000</b>	<b>41,500</b>	<b>42,400<sup>c</sup></b>	<b>43,000</b>	<b>43,300</b>

<sup>a</sup> Based on normal weather conditions and with passive conservation.

<sup>b</sup> Actual data reflecting water used for 2005 and 2010, respectively.

<sup>c</sup> The total water consumption for 2025 was actually denoted as totaling 42,500 in the WIRP table, which is the original source for this table; however, this is 100 AF more than the actual totals for 2025 as calculated. Therefore, this total has been adjusted for accuracy herein.

Source: Pasadena Water and Power, 2011 Water Integrated Resources Plan, Table 3-1, "Projected Water Demands for PWP", page 3-4.

supplies two years in a row, 2009 and 2010. This resulted in PWP having to impose mandatory restrictions on water use, which has since been lifted, as described above. Mandatory restrictions can be detrimental on the economy and quality of life. For example, if businesses perceive that water is not reliable they may not choose to locate in Pasadena. Even though MWD's water reliability analyses show that it will be able to meet all of its future demands for water, it is based on the assumption that a comprehensive solution to the Bay Delta is implemented by 2025, and that local utilities meet the 20 x 2020 conservation goal. Given the uncertainties surrounding the Bay Delta and how well all utilities are successful in meeting the 20 x 2020 conservation goal, it would be prudent for PWP to plan for the contingency that MWD will have to allocate water again between now and 2035.

The gap between the projected water demand and availability of existing water supplies indicates the potential water shortage that would have to be made up by either: (1) imposing mandatory rationing; (2) developing new sources of water supply; and/or (3) implementation of new water conservation programs. The potential shortfall in water supply under a situation in which MWD allocated water would be as much as 6,500 AFY by 2035, or 14 percent of demand.<sup>32</sup> However, these deficits could be greatly reduced or even eliminated if the Hybrid 1 portfolio of projects were implemented, thus providing enough water resources to compensate for a potential deficit caused by the uncertainty of future MWD allocations.<sup>33</sup>

## b. Existing Conditions

### (1) Water Supply

PWP is responsible for providing water within its service area and ensuring that the delivered water quality meets applicable California health standards for drinking water. PWP's service area is located within the

<sup>32</sup> *Ibid*, at 3-4 and 3-5.

<sup>33</sup> *Ibid*, at 6-12, 6-13, and Table 6-2, Summary of WIRP Elements.

northwestern portion of the San Gabriel Valley in Los Angeles County, encompassing approximately 23 square miles, and is slightly larger than the legal boundary of the City of Pasadena. PWP serves portions of unincorporated areas of Altadena, East Pasadena, and San Gabriel. The service area is bordered on the north by unincorporated 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 Canada Flintridge.<sup>34</sup>

As the proposed project is located within the City of Pasadena, PWP would be the water provider for the project. Water is supplied to the City from three primary sources, including local groundwater from the Raymond Basin, surface water diversions, and purchases of imported water. Approximately 32 percent of PWP supply is groundwater from the Raymond Groundwater Basin and is pumped out of 16 deep wells located throughout Pasadena, and approximately 67 percent of PWP water is imported from MWD, consisting of a blend of water from Northern California and the Colorado River. The remaining one percent is purchased from neighboring water agencies that combine surface water and groundwater.<sup>35</sup> These water resources are described in further detail below. There are an additional three water resources planned over the 2035 timeframe, including recycled water, Devil's Gate surface diversion, and a groundwater storage program using MWD replenishment water which will be implemented as needed.

#### **(a) Groundwater**

Raymond Basin is an alluvial valley approximately 40 square miles in area underlain by deposits of gravel, sand, silt, and clay. The basin is located in the northwest portion of the San Gabriel Valley in Los Angeles County, and bounded by the San Gabriel Mountains to the north, the San Rafael Hills to the west, and the Raymond Fault to the south/southeast. Raymond Basin 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.<sup>36</sup>

Groundwater discharge in the Raymond Basin occurs through pumping and subsurface outflow across the Raymond Fault. 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, other return flows, and cesspools; subsurface inflow from adjacent groundwater basins, bedrock areas, and the San Gabriel Mountains; artificial recharge through surface water spreading; and percolation of water from septic tanks.<sup>37</sup>

PWP currently utilizes two local water supplies within the Raymond Basin: groundwater, which is pumped directly into the distribution system; and surface water, which is diverted and spread for groundwater pumping credits. In order to alleviate overdraft conditions in the Raymond Basin, the Raymond Basin Judgment was signed on December 23, 1944. The Judgment assigns each pumper a "present unadjusted right" corresponding to the average amount of water that they pumped in the five years prior to 1937. Pasadena's present unadjusted right was 12,946 acre-feet per year (AFY). In the original Judgment, the

<sup>34</sup> Pasadena Water and Power, 2010 Urban Water Management Plan, at ES-2, <http://ww2.cityofpasadena.net/waterandpower/UWMP/FinalAdoptedUWMPJune2011.pdf>.

<sup>35</sup> Pasadena Water and Power, 2010 Consumer Confidence Report on Water Quality, <http://ww2.cityofpasadena.net/waterandpower/waterquality/2010PasadenaWaterQualityReport.pdf>; accessed, June 2012.

<sup>36</sup> Pasadena Water and Power 2010 Urban Water Management Plan, at 4-3.

<sup>37</sup> *Ibid*, at 4-4.

operating yield was determined to be 21,900 AFY for the entire Raymond Basin. However, according to the first modification of the Judgment in 1955, the operating yield was increased to a total operating yield of 30,770 AFY in the Raymond Basin. Therefore, the sum of all water that is pumped, excluding water pumped from individual storage accounts or as a result of spreading or injection credits, is regulated so as not to exceed the total operating yield of the basin. Based on the new operating yield, PWP's decreed right was calculated to be 12,807 AFY from the Western Unit (Monk Hill and Pasadena subareas); PWP has no water right in the Eastern Unit (Santa Anita subarea). In 2009, the Raymond Basin Management Board (RBMB) implemented a resolution to the 1955 decreed rights to slow declining water levels in the Western Unit of Raymond Basin. This resolution called for a cooperative pumping reduction for parties with water rights in the Pasadena subarea effective July 1, 2009, where RBMB seeks to reduce water production incrementally over five years until a 30% reduction is achieved. Hence, PWP's water right will be decreased by 2,503 AFY over 5 years to a final right of 10,304 AFY. In 2010 PWP's right was 12,056 AFY.<sup>38</sup>

In addition to operating yield pumping, a 1974 modification to the Raymond Basin Judgment allowed for each pumper with surface runoff diversion rights to recharge the Raymond Basin using injection wells or spreading grounds and then pump a portion of the water diverted from any well. The ability to spread surface runoff provides benefits of natural water treatment and storage of water diverted during the wet season for use in periods of higher demand. Pumping credits from spreading of diverted surface runoff provided an average of 2,380 AFY of additional groundwater over the 1999-2009 period, ranging from approximately 1,000 to 6,000 AFY in dry and wet years.<sup>39</sup>

As shown in **Table 4.H-2, Recent Groundwater Production from PWP's Raymond Basin Pasadena Subarea Wells**, over the past five years, groundwater production by PWP has averaged approximately 12,000 AFY. Over the same period, the combination of groundwater rights and pumping credits from surface runoff spreading has averaged approximately 14,000 AFY. With the completion of the Monk Hill Treatment System (MHTS), PWP's current pumping capacity is 37.1 cubic feet per second (cfs) or 26,800 AFY. This capacity is sufficient to pump the post 2014 operating rights of 10,304 AFY, plus an additional 6,000 AFY to extract surface runoff spreading credits in a wet hydrologic year.<sup>40</sup>

### **(b) Surface Water Diversions**

Surface runoff from the San Gabriel Mountains is a water supply source for PWP. PWP owns water rights to divert instantaneous runoff from Arroyo Seco up to 25 cfs and Eaton Canyon up to 8.9 cfs. Runoff in the Arroyo Seco ranges drastically and is most dependent upon climatic patterns. In wet years, such as 2004-2005, annual runoff can exceed 40,000 AFY, most of which is lost to the Pacific Ocean via the Los Angeles River. Conversely, in dry years such as 2003-2004, runoff is limited to less than 1,500 AFY. In addition to year-to-year variation, runoff in Arroyo Seco is highly seasonal. In the dry season, runoff is typically an order of magnitude below PWP's diversion rights. On average, current operations yield

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<sup>38</sup> *Ibid.*

<sup>39</sup> *Ibid.*

<sup>40</sup> *Ibid, at 4-5.*

Table 4.H-2

**Recent Groundwater Production from PWP's Raymond Basin Pasadena Subarea  
(Acre-Feet Per Year)**

<b>Well Name</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Bangham	5	407	2,357	2,028	757
Chapman	1,334	1,650	592	1	0
Copelin	-	4	299	1,692	663
Craig	1,126	385	-	0	0
Garfield	2,249	922	7	7	6
Jourdan	-	-	-	-	-
Monte Vista	1,454	1,227	841	0	-
Sunset	4	6	401	7	5
Villa	-	1,675	0	479	1,654
Twombly	3,264	3,089	3,249	3,258	3,054
Wadsworth	2,054	2,070	2,178	2,146	1,997
Woodbury	2,245	2,228	1,751	2,248	2,309
<b>TOTAL</b>	<b>13,739</b>	<b>13,664</b>	<b>11,674</b>	<b>11,867</b>	<b>10,447</b>

*Source: Pasadena Water and Power 2010 Urban Water Management Plan.*

approximately 2,500 AFY of PWP recharge in the Arroyo Seco Spreading Grounds, which produce approximately 1,500 AFY of PWP supply yield after RBMB credits are applied.<sup>41</sup>

Flow data was not available for Eaton Canyon at PWP's diversion point. RBMB uses a spreading credit formula that is based on metered outflows from Eaton Reservoir and flow downstream of the Eaton Canyon spreading basins. Over the past 10 years, PWP spreading credits obtained from Eaton Wash rights have averaged approximately 880 AFY, ranging from 300 AFY in 2003-2004 to 1,850 AFY in 2004-2005. Spreading basins in Eaton Canyon are owned and operated by the Los Angeles County Department of Public Works (LACDPW). Hydrologic assessment of Eaton Canyon watershed and long-term average spreading credits obtained showed little opportunity to increase yield from this source of supply. On the other hand, the Eaton Canyon spreading basins have the potential to provide additional storage and recharge capacity for other local surface runoff sources.<sup>42</sup>

### **(c) Metropolitan Water District of Southern California**

MWD is the largest water wholesaler for domestic and municipal uses in southern California. MWD imports a portion of its water supplies from northern California through the State Water Project's California Aqueduct and from the Colorado River through MWD's own Colorado River Aqueduct. As one of 26 member agencies of MWD, PWP purchases water from MWD to supplement PWP water supplies from local groundwater and surface water diversions. All 26-member agencies have preferential rights to purchase water from MWD. As of June 2002, PWP has a preferential right to purchase approximately one percent of

<sup>41</sup> *Ibid*, at 4-9 to 4-10.

<sup>42</sup> *Ibid*.

MWD's total water supply.<sup>43</sup> PWP will continue to rely on MWD to meet its current and future supplemental water needs.

Based on the water supply planning requirements imposed on its member agencies and ultimate customers, such as the requirements to adopt urban water management plans, water supply assessments and written verifications, MWD has adopted a series of official reports on the state of its water supplies. As described below, MWD has consistently stated that its water supplies are fully reliable to meet the demands of its customers, including PWP, in all hydrologic conditions through at least 2030.

In March 2003, MWD published a document entitled the *Report on Metropolitan Water Supplies: A Blueprint for Water Reliability* (Blueprint Report). The objective of the Blueprint Report was to provide member agencies, retail water utilities, cities, and counties within the MWD service area with information that may assist in their preparation of UWMP, water supply assessments, and written verifications. MWD utilized the SCAG regional growth forecast in calculating regional water demands for its service area, which is the same method used by the PWP in its 2010 UWMP. Thus, MWD considered the water demands of LPWP in the Blueprint Report.

The Blueprint Report fully discusses MWD's historical and projected deliveries of Colorado River and SWP water. The conclusion of the Blueprint Report and supplemental information published by MWD, such as its IRP Update and annual Implementation Reports, is that with its current water supply portfolio and planned actions, MWD will have sufficient water to meet the water demands of its customers for the next 20 years.

By comparing total projected water demands and conservatively estimating water supplies over the next 20 years, MWD has found that if its supply programs were implemented under its IRP “[b]ased on water supplies that are currently available, Metropolitan already has in place the existing capability to...[m]eet 100 percent of its member agencies’ projected supplemental demands (consumptive and replenishment) over the next 20 years” in average, wet, multiple dry, and single dry years. In multiple dry years, MWD reports that it will “[m]eet 100 percent of its member agencies’ projected supplemental demands (consumptive and replenishment) even under the repeat of the worst multiple year drought event over the next 15 years,” while in a single dry year it can “[m]eet 100 percent of its member agencies’ projected supplemental demands (consumptive and replenishment) even under the repeat of the worst single year drought event over the next 15 years.” MWD's additional reserve supplies will provide a “margin of safety to guard against uncertainties in demand projections and risks in fully implementing all supply programs under development.”

Summaries of MWD's individual supplies, along with the challenges facing each supply, are presented below. Additionally, described below are specific actions that MWD is taking to meet each of the challenges facing its water supplies. Over the past several decades, MWD has demonstrated that it can adapt to continuous change and address uncertainties in supply by developing a diverse portfolio, setting supply targets, monitoring its progress on a regular basis, and adapting its strategy to meet its targets.

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<sup>43</sup> *City of Pasadena, MWD Water Resources Management Report, January 8, 2008, at page 7.*

*(i) MWD Water Supply**The Colorado River*

MWD diverts water from the Colorado River at Lake Havasu on the California/Arizona border and conveys it across the Mojave Desert via the agency's Colorado River Aqueduct to Lake Mathews near Riverside. From there, MWD pumps the water into its feeder pipeline distribution system for delivery to its member agencies throughout Southern California.

MWD possesses the right to divert water from the Colorado River pursuant to a contract with the U.S. Secretary of the Interior under Section 5 of the federal Boulder Canyon Project Act. The Blueprint Report includes a description of MWD's 550,000 AF per year base apportionment water right, along with the Colorado River supply projects that MWD is implementing to maximize the reliability of Colorado River supplies. Following distribution of the Blueprint Report, a Quantification Settlement Agreement (QSA) and other related agreements were approved on October 10, 2003. These agreements address the supplies of all California users of Colorado River water, including MWD. Signing of the QSA and related agreements will allow implementation of the Colorado River supply projects identified in the Blueprint Report, as well as other projects. MWD described the QSA and related agreements and their impact on the reliability of MWD's supplies in its 2006 Integrated Water Resources Plan Implementation Report.

According to MWD, it is expected that its fourth priority apportionment of 550,000 AF per year of Colorado River water will be available every year for the next 20 years. This supply is "expected to be available during all year types, including wet, average, single dry year, and multiple dry year weather."

Current challenges facing MWD's Colorado River supply include risk of continued drought in the Colorado River Basin and pending litigation that may threaten implementation of part or all of the QSA. MWD has been aggressively preparing for these two risks to its Colorado River supply for many years. Its responses to these challenges are described in detail below.

The Colorado River Basin has experienced below-normal runoff for most of the past decade.<sup>44</sup> In 2009, Lake Mead was at its lowest level in over 40 years. As a result, an alternative has been proposed that would introduce new operating and accounting procedures to address the ability of MWD and others to store water in Lake Mead. Despite the challenges of recent Colorado River Basin hydrology, MWD "does not anticipate adverse water supply impacts resulting from the implementation of [the] shortage guidelines because California's 4.4 million acre-foot apportionment has a higher priority than a portion of Arizona and Nevada's apportionments during shortage conditions."

Programs that will help to implement the QSA and meet Colorado River water supply targets and that are currently in operation, close to completion or in progress include: the Imperial Irrigation District ("IID") and MWD water conservation and transfer program; the Coachella and All-American Canal lining projects; the IID and San Diego County Water Authority (SDCWA) water transfer; the Palo Verde Irrigation District land management and crop rotation program; and the Interim Surplus Guidelines adopted by the U.S. Secretary of the Interior. MWD is actively working to implement several of these QSA-related programs. In addition, MWD is participating in the "Intentionally Created Surplus" program to store water in Lake Mead for

<sup>44</sup> *Integrated Water Resources Plan, Report No. 1373, Updated October 12, 2010. The Metropolitan Water District of Southern California, page ii. <http://www.mwdh2o.com/mwdh2o/pages/yourwater/irp/IRP2010Report.pdf>.*

withdrawal during dry years.<sup>45</sup> During 2006 and 2007, MWD stored 50,000 AF of water in Lake Mead that it had saved under the Palo Verde Irrigation District Land Management and Crop Rotation Program. Collectively, these programs are expected to maintain the reliability of MWD's Colorado River supplies.

MWD's fourth priority apportionment of Colorado River water has been delivered to MWD every year since 1939, in all hydrologic year types. By existing contract, this supply "will continue to be available in perpetuity" due to California's senior rights on the Colorado River. MWD has affirmed that "[t]he historical record for available Colorado River water indicates that Metropolitan's fourth priority supply has been available in every year and can reasonably be expected to be available over the next 20 years." Thus, according to MWD, its Colorado River supply is secure through at least 2025.

The second challenge to MWD's Colorado River supplies is the pending litigation concerning the QSA and related agreements. That litigation has taken two forms: (1) a series of lawsuits against the lining of the All-American Canal; and (2) a series of lawsuits which challenge the IID/SDCWA transfer. The All-American Canal litigation has been litigated and resolved in favor of the QSA parties thus, increasing the certainty of MWD's Colorado River supplies since the publication of the Blueprint Report.<sup>46</sup>

Several lawsuits against the IID/SDCWA transfer were brought by the County of Imperial, various landowners within IID and environmental advocacy groups, and have been consolidated in Sacramento County Superior Court. In two of those lawsuits, the County of Imperial sued the State Water Resources Control Board (SWRCB), IID, and SDCWA regarding the legitimacy of the QSA approvals. In November 2004, the Superior Court dismissed those cases with prejudice on the ground that the County had failed to name MWD and the Coachella Valley Water District as necessary and indispensable parties to the actions on a timely basis. The County appealed that decision and the Court of Appeal affirmed the dismissal in 2007, which lifted a stay on the other QSA cases. On January 15, 2010, the Superior Court ruled that the agreement itself was not valid due to environmental obligations to restore the Salton Sea.<sup>47</sup> An appeal is likely to be filed by the IID. In addition, several demurrers have been filed and sustained in the consolidated cases, reducing the number of causes of action pending in the litigation. The water transfer challengers have filed motions for preliminary injunction, which were opposed by MWD and the other QSA parties.<sup>48</sup>

The QSA lawsuits could delay the implementation of programs authorized under the QSA or result in increased costs or other impacts, and it is impossible to predict with absolute certainty how the remaining litigation will be resolved. MWD is actively involved in the litigation and plans to defend the QSA fully to prevent any impacts to its Colorado River supplies.

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<sup>45</sup> *Ibid*, page 3-8.

<sup>46</sup> On April 6, 2007, the U.S. Court of Appeals for the Ninth Circuit dismissed the challenge to the lining of the All-American Canal and lifted the court-imposed injunction that for a period of time halted construction. The ruling allowed IID to commence work on the project to conserve water lost by seepage from the existing earthen canal. See *Consejo de Desarrollo Económico de Mexicali, A.C. v. United States*, 482 F.3d 1157 (2007).

<sup>47</sup> <http://articles.latimes.com/2010/jan/15/local/la-me-water15-2010jan15>.

<sup>48</sup> See *Notice of Motion and Motion of Putative Class Representatives for Preliminary Injunction or Other Immediate Provisional Relief*, Case No. 4353 (Filed October 15, 2007); *POWER's and James Albert Abatti's Combined Joinder in the Putative Class Representatives' Motion for Preliminary Injunction or Other Immediate Provisional Relief; Additional Points and Authorities in Support of Preliminary Injunction Based on CEQA*, Case No. 4353 (Filed October 16, 2007).

### ***State Water Project***

The State Water Project (SWP) is a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants that extend for 600 miles. The main purpose of the SWP is to divert and store surplus water during wet periods and distribute it to areas throughout the state. Other purposes of the SWP include flood control, power generation, recreation, fish and wildlife protection, and water quality management in the Sacramento-San Joaquin River Delta (Delta). The availability of SWP water supply is analyzed in terms of Table A and Article 21 water deliveries. Table A water deliveries represent the schedule of the maximum amount of water that water contractors to the DWR may receive annually from the SWP. There are 29 water contractors who have signed long term contractors with the DWR for a total of 4,173 million acre feet per year (AFY). Table A deliveries are not guarantees of annual delivery amounts but are used to allocate individual contractors' portion of the delivery amounts available. Article 21 deliveries refer to Table A deliveries with additional water supplies received only under the following conditions: the water is available only if it does not interfere with Table A allocations and SWP operations; the water is available only when there is excess water in the Delta; the water is only available only when conveyance capacity is not being used for SWP purposes or scheduled SWP deliveries; and the water must be stored by the contractor and not in the SWP system.

MWD possesses a contract with DWR that entitles it to water from the SWP.<sup>49</sup> MWD's share of the total SWP supply is approximately 46 percent based on its contracted Table A amount of 1,911,500 AF per year. This supply is diverted from the Feather River at Lake Oroville, released and conveyed through the Delta and rediverted at the Harvey O. Banks Delta Pumping Plant for conveyance through the California Aqueduct to Southern California and MWD. MWD described and analyzed the reliability of its SWP supplies in the Blueprint Report. MWD estimated the availability of SWP supplies "according to the historical record of hydrologic conditions, existing system capabilities, requests of the state water contractors and SWP contract provisions for allocating Table A, Article 21 and other SWP deliveries to each contractor." MWD estimated that in 2025, it will have 794,700 AF available in multiple dry years, 418,000 AF in a single dry year, 1,523,300 AF in an average year and 1,741,000 AF in a wet year.

Following the Blueprint Report, SWP supplies have been challenged through environmental litigation concerning the Delta. Specifically, the amount of water from the SWP that MWD will be able to supply to Southern California in the near future is uncertain given the recent federal court case *Natural Resources Defense Council, et al. vs. Kempthorne, et al. (NRDC)*. In spring 2007, various environmental groups sought to halt the operation of water pumps in the Delta to protect the Delta smelt and other endangered fish species living in the Delta. In May 2007, the U.S. District Court invalidated the Biological Opinion issued by the U.S. Fish & Wildlife Service, which had held that the Delta smelt were in "no jeopardy" from operational changes of the State Water Project in the Delta. New Biological Opinions governing the operations of the Delta were issued in 2009 and 2010. On February 24, 2011, U.S. District Court Judge Oliver Wanger finalized a stipulated settlement agreement through June 30, 2011, requiring parties to maintain scientific protections for Delta smelt, as provided by the latest Biological Opinion.<sup>50</sup>

<sup>49</sup> See *Contract Between the State of California Department of Water Resources and the Metropolitan Water District of Southern California For a Water Supply (November 4, 1960), as amended through Amendment No.28, available at [http://www.swpao.water.ca.gov/wsc/pdfs/MWDSC\\_0\\_C.pdf](http://www.swpao.water.ca.gov/wsc/pdfs/MWDSC_0_C.pdf).*

<sup>50</sup> *Consolidated Delta Smelt Cases, Case No. 1:09-cv-407 OWW, Stipulation and [Proposed] Order for Interim Remedy through June 30, 2011, U.S. District Court for the Eastern District of California, filed February 24, 2011.*

**(ii) MWD Programs****Delta Programs**

At present, both the California state government and MWD are evaluating Delta operations and options to address Delta smelt impacts and other environmental concerns. The CALFED Bay-Delta Program is a unique collaboration among 25 state and federal agencies that came together with a mission to improve California's water supply and the ecological health of the Delta. In addition, the Governor's Delta Vision Process and the Bay-Delta Conservation Plan (BDCP) are both focused on finding and implementing long-term solutions for the Delta. The purpose of the Delta Vision Process is to identify a strategy for managing the Delta as a sustainable ecosystem to continue to support the State's important environmental and economic functions. The Delta Vision Process entails the completion of two work products as prepared by phase. Phase I work product is the Delta Vision Report, which was completed in December 2007. The Delta Vision Report includes long-term strategic solutions for the conflicts in the Delta as recommended by the Delta Vision task force established by Governor Schwarzenegger. Phase II work product is the Delta Strategic Plan, a strategic plan that will assess alternative implementing measures and management practices to implement the Delta Vision Report recommendations. The plan will include modifications to existing land uses and services in the Delta, and will assess governance, funding mechanisms, water resource uses and ecosystem management practices. The Delta Vision Committee published the second draft of its Delta Strategic Plan in July 2008. The final plan was submitted to the Governor and Legislature on December 31, 2008. Additionally, the BDCP allows water contractors, who must comply with the federal and State Endangered Species Acts (ESAs), to work cooperatively to attain incidental take coverage via a habitat conservation plan and natural community conservation plan. Development of this plan is now underway under the aegis of the California Resources Agency, with the appropriate permits and completion of the first public draft of the plan in 2009.<sup>51</sup> The BDCP is guided by a Steering Committee of local water agencies, environmental and conservation organizations, state and federal agencies, and other interest groups. MWD is one of the parties that are drafting the BDCP to provide State and federal ESA coverage for its SWP operations.<sup>52</sup>

Furthermore, in May 2007, MWD's Board adopted a Bay Delta Action Plan as a framework to address water supply risks in the Delta both for the near- and long-term. The near- and mid-term actions outlined in the Delta Action Plan are intended to implement measures to reduce fishery and earth-quake related risks, such as aggressive monitoring, ecosystem restoration, local water supply projects, and emergency preparedness and response plans.

MWD is also focusing on voluntary Central Valley storage and transfer programs to bank MWD's SWP water supplies. In its 2006 Integrated Water Resources Plan Implementation Report, MWD reported that "492,000 acre-feet of dry year yield has been developed in Central Valley storage and transfer programs" and "potential partners and programs have been identified to meet IRP targets." This flexibility will assist MWD in addressing shortages due to drought or court-imposed cutbacks to protect Delta smelt. Further, MWD has employed conjunctive use programs which utilize groundwater basins to store water during wet seasons, which provides a buffer supply that MWD can extract during dry periods. In 2006, MWD developed groundwater storage capable of providing 135,000 AF of dry year supply. MWD continues to seek additional opportunities in southern California to expand groundwater conjunctive use storage programs.

<sup>51</sup> *Bay Delta Conservation Plan*, <http://baydeltaconservationplan.com>.

<sup>52</sup> *Integrated Water Resources Plan, Report No. 1373, Updated October 12, 2010. The Metropolitan Water District of Southern California*, page 3-10. <http://www.mwdh2o.com/mwdh2o/pages/yourwater/irp/IRP2010Report.pdf>.

At the regional and local levels, numerous water decision-makers are actively addressing the threats facing the Delta. A review of MWD's resource development programs demonstrates that although SWP supplies are facing challenges and may become more expensive based on the cost of ultimately adopted solutions, MWD's adaptive planning framework, which includes conservation, in-region surface water storage, groundwater storage programs, and local water production within the MWD area, will allow MWD to adapt to changing conditions and ensure a reliable, diverse water supply to its members agencies that supply water to municipal customers. MWD has spent the past decade increasing the capacity of its reservoirs and its overall water reserve is several times larger than it was during the 1991-1992 drought. Further, actions that are being taken by the CALFED process and the State should enhance reliability of the SWP supplies in the future. Both MWD and State agencies are aware of changing conditions that may impact the SWP and are planning accordingly to ensure a safe, reliable supply of SWP water.

***(iii) Additional MWD Actions to Mitigate Supply Risks***

In response to recent developments in the Delta, MWD is also engaged in identifying solutions that, when combined with the rest of its supply portfolio, will ensure a reliable long-term water supply for its member agencies. In the near-term, MWD will continue to rely on the plans and policies outlined in its *Regional Urban Water Management Plan*, *Water Surplus and Drought Management Plan*, and *Integrated Water Resources Plan* to address water supply shortages and interruptions (including potential shut downs of SWP pumps) to meet water demands. These plans are described in detail below.

*2010 Regional Urban Water Management Plan (RUWMP)*. Pursuant to the Urban Water Management Planning Act (discussed below), MWD prepared the 2010 RUWMP, which addresses the future of MWD's water supplies and demand through the year 2035. Campaigns for voluntary conservation, curtailment of replenishment water and agricultural water delivery are some of the actions outlined in the RUWMP to meet future water demand. If necessary, reduction in municipal and industrial water use and mandatory water allocation could be implemented. The RUWMP incorporates much of the actions and policies provided in MWD's *Water Surplus and Drought Management Plan and Integrated Resources Plan*.<sup>53</sup>

*Water Surplus and Drought Management Plan (WSDM)*. 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 WSDM. That plan provides policy guidance to manage MWD's supplies and achieve the goals laid out in the agency's *Integrated Resources Plan*. The WSDM also "identifies the expected sequence of resource management actions that [MWD] will execute during surpluses and shortages to minimize the probability of severe shortages and eliminate the possibility of extreme shortages and shortages allocations." MWD's 10 year WSDM categorizes its ability to deliver water to its customers by distinguishing between surpluses, shortages, severe shortages and extreme shortages. The WSDM's integration of management actions taken during times of surplus and shortages reflects MWD's belief that these actions are interrelated.

For example, MWD's regional storage facilities, such as Lake Skinner, Lake Mathews and Diamond Valley Lake, along with storage capacity available to MWD in Castaic Lake and Lake Perris, provide MWD with flexibility in managing its supplies. MWD's storage supplies and existing management practices allow MWD to mitigate shortages without having to impact retail municipal and industrial demands, except in severe or

<sup>53</sup> *Water Surplus and Drought Management Plan, Report No. 1150, The Metropolitan Water District of Southern California, August 1999.*

extreme shortages. MWD's 2010 RUWMP shows its expected ability to meet demands in single dry years by water supply source. For example, in 2015 MWD expects to have 1,048,000 AF in potential reserve and replenishment supplies, primarily through in-basin storage.<sup>54</sup> In 2035, MWD estimates that it will have 1,407,000 AF in potential reserve and replenishment supplies.<sup>55</sup> Anytime MWD withdraws from storage to meet demands, it is considered to be in a shortage stage. MWD has spent decades building up its storage reserves and groundwater management programs in order to prepare for a variety of shortage conditions. "Each [shortage] stage is associated with specific resource management actions designed to (1) avoid an Extreme Shortage to the maximum extent possible and (2) minimize adverse impacts to retail customers if an Extreme Shortage occurs." MWD notes that the "overriding goal of the WSDM Plan is to never reach Shortage Stage 7, an Extreme Shortage."

In an actual shortage, MWD will take one or more of the following actions: (1) draw on storage out of reservoirs; (2) draw on out-of-region storage in the Semitropic and Arvin-Edison groundwater banks; (3) reduce or suspend long-term seasonal and groundwater replenishment deliveries; (4) draw on groundwater storage programs; (5) draw on SWP terminal reservoir storage; (6) reduce Interruptible Agricultural Water Program (IAWP) deliveries; (7) call on water transfer options contracts; (8) purchase additional water; and (8) reduce imported supplies to its members agencies by an allocation method. MWD clarifies that this list is not in any particular order, "although it is clear that the last action [taken] will be the curtailment of firm deliveries to the member agencies." If MWD were obligated to curtail firm deliveries, it would enforce these shortage allocations using rate surcharges. For example, if deliveries exceed 102 percent of a customer's allotment, the customer will be assessed a surcharge. MWD's actions in 2007 are instructive in demonstrating how the WSDM Plan is implemented in practice.

Prior to the start of calendar year 2007, MWD estimated that water demands would exceed annual supplies (not including stored water) by approximately 300,000 AF.<sup>56</sup> In response, MWD took the following actions: (1) called for water stored in its Central Valley storage programs; (2) initiated replenishment cuts and notified participating agencies with in-basin groundwater storage programs; (3) embarked on a public outreach and media conservation campaign; and (4) announced reductions in IAWP agricultural supplies.

In 1994, MWD established the IAWP to deliver surplus water for irrigation purposes at a reduced rate that is more affordable for certain sectors of the agricultural industry. In exchange for the discounted rate, the MWD General Manager has the authority to reduce IAWP deliveries up to 30 percent before it imposes mandatory allocations to municipal and industrial retail customers under its WSDM.

Due to dry conditions and the pending Delta smelt litigation in 2007 that may affect MWD's supplies, MWD will implement the water shortage actions which it outlined in its WSDM, which include a 30 percent reduction in IAWP deliveries. On October 9, 2007, MWD's Board of Directors announced that it will reduce IAWP deliveries over a 12-month calendar year beginning in January 2008. At that time, MWD has stated that it would not reduce water purchased by its member agencies at the full service rate.

<sup>54</sup> *The Regional Urban Water Management Plan, November 2010. The Metropolitan Water District of Southern California. Table 2-9, Single Dry Year Supply Capability and Project Demands, Repeat of 1977 Hydrology.* [http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP\\_2010.pdf](http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP_2010.pdf).

<sup>55</sup> *Ibid.*

<sup>56</sup> *Metropolitan Water District of Southern California, Water Surplus and Drought Management Plan at 3 (June 21, 2007) [Appendix J]. That figure did not include the risk of the SWP supply being restricted to protect Delta smelt, which in fact occurred.*

Additionally, MWD announced a strategic approach in 2008 regarding its WSDM Plan. Besides exercising interruptions to the IAWP, MWD's major strategies are as follows:

- Continue conservation campaign;
- Maximize recovery of water from Central Valley storage and banking programs;
- Purchase additional supplies to augment existing supplies; and
- Develop and implement a shortage allocation plan.

MWD is developing a long-term Drought Allocation Plan that may include reductions of full service deliveries. MWD has used several of these types of initiatives in the past (e.g., during the droughts of 1977-78 and 1989-92), which allowed the agency to meet the needs of its member agencies. At this time, MWD has not released any information regarding the details of its shortage allocation plan. Past experience demonstrates, however, that MWD has always provided its members agencies with sufficient supplies in the face of variable weather conditions, new environmental and water quality regulations, and ever-changing political and legal challenges. In addition, PWP intends to work within MWD's WSDM Plan to acquire its drought supplies from MWD in the future.

*Integrated Resources Plan.* MWD first adopted its IRP in 1996. The most recent IRP was completed in October 2010, and it discussed local water supply initiatives (e.g., local groundwater conjunctive use programs) and established a buffer supply to mitigate against the risks associated with implementation of local and imported water supply programs. The 2010 IRP noted that future water supply reliability depends not only upon actions by MWD to secure reliable imported supplies, but also further development of local projects by local agencies.

On October 10, 2006, MWD released its 2006 Integrated Water Resources Plan Implementation Report (2006 Implementation Report) to report on progress toward implementing the targets from the 2003 IRP Update. The 2006 Implementation Report included a summary of each of MWD's water resource development categories: (1) conservation; (2) local resources; (3) Colorado River Aqueduct; (4) SWP supplies; (5) Central Valley storage and transfer programs; (6) in-region groundwater conjunctive use storage; and (7) in-region surface water storage. This recent report concluded that "while changes occur in all resource areas, Metropolitan is able to maintain supply reliability through its diversified water resources portfolio."

MWD supported this conclusion by providing detailed updates for each of its resource categories, restating dry year IRP targets and examining current considerations, changed conditions, implementation strategies and identified programs, implementation challenges and cost information. As can be seen by these ongoing studies, MWD is continually updating its plans to meet ever-changing challenges to its water supplies.

#### **(d) Water Conservation and Recycling**

Water conservation and using recycled water will play an increasing role in meeting future water demands. As discussed above PWP has implemented water conservation and recycled water programs with efforts underway to further promote and increase the level of these programs. Current City of Pasadena Ordinance Nos. 6275, 7165 and 7193 provide permanent enforceable water waste prohibitions and efficient landscaping guidelines, as described above. In addition, Pasadena adopted the conservation mandates of the Title 24 CALGreen Building Codes under Pasadena Municipal Code Sections 14.04.500-578. PWP is also committed to supplying a higher percentage of the City's water demand through water conservation and

using recycled water. As detailed in the UWMP and the WIRP, ongoing and future water conservation, storm water capture, use of recycled water, and groundwater storage and recharge will ensure a reliable water supply for Pasadena residents and businesses.

## (2) Water Demand

For the period of 2008 to 2010, the annual average water demand for unit B-3 was approximately 41 million gallons of water annually, which is approximately 126 AFY. The current water demand for Unit B-3 varies due to fluctuations in power demand and weather conditions. During this period, the average operating hours per year for Unit B-3 was 2,004 hours, with the cooling tower using the majority of the water attributed to the Unit B-3. PWP currently provides water to the existing facility and plans to continue doing so for the new facility. Current PWP water supplies are sufficient for the existing uses on the site.

## (3) Water Infrastructure

Current water infrastructure serving the site consists of water mains located in the adjacent city streets. Currently, water is delivered to the site through an eight-inch City water main on East State Street, southeast of Railroad Street, serving the Broadway Plant, and a 12-inch water main on Glenarm Street serving the Glenarm Plant.<sup>57</sup> (A 12-inch City water main on East State Street, between South Fair Oaks Avenue and Railroad Street, extending north through the Glenarm Plant to Glenarm Street, is connected to two fire hydrants on the project site, but does not supply process or domestic water.) The existing water supply infrastructure and process piping provides water supplies for power plant operations, domestic uses, and fire-fighting purposes, and includes process piping, tanks for water storage, water treatment equipment, and process equipment such as turbines and cooling towers. The demineralized water treatment system treats incoming service water to provide the high purity water required by select process equipment, and PWP currently uses four demineralized water storage tanks at the site.

## 2. ENVIRONMENTAL IMPACTS

### a. Thresholds of Significance

The City of Pasadena has not adopted its own thresholds for the evaluation of impacts on water supply. Based on the Initial Study Environmental Checklist form contained in Appendix G of the State *CEQA Guidelines*, the project would have a significant impact on water supply if it would:

- |         |   |
|---------|---|
| WATER-1 | Use non-renewable resources in a wasteful and inefficient manner;   |
| WATER-2 | Fail to have sufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are needed; or   |
| WATER-3 | Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to |

<sup>57</sup> Pasadena Water and Power, *Glenarm Repowering Project (GT-5 Combined Cycle Installation), Permitting Support – Water Supply Summary*. Prepared for Pasadena Water and Power by Power Engineers, May 23, 2012.

a level which would not support existing land uses or planned uses for which permits have been granted).

## b. Methodology

The analysis of potential impacts to water resources was based on the increase in demand resulting from the proposed Project relative to the ability of the PWP to provide the required water for the Project. The analysis of impacts with regard to water infrastructure capacity is based on information provided by Power Engineers, in coordination with PWP. The analysis assesses whether the project's anticipated domestic water demand would be accommodated by the existing water infrastructure would be met.

## c. Project Features

The proposed project entails the replacement of Unit B-3, a gas-fired boiler and steam turbine, with Unit GT-5, a new combined-cycle power generating unit, which would fulfill the IRP objective of producing reliable, environmentally responsible electricity. Unit GT-5, which would be located south of the existing Glenarm Building, will include a new gas turbine, steam turbine, once-through steam generator (OTSG), wet type cooling tower, water storage tanks, electric powered fuel gas compressors, and an electric powered air compressor, as described in **Section 2.0, Project Description**, of this Draft EIR.

### (1) Water Conservation

Several design features are proposed that would reduce the consumption of natural resources and the resultant greenhouse gas emissions. The new administrative/control room, which would be housed within the existing Glenarm Building, consolidates administrative, maintenance, and control spaces to maximize use, efficiency, and security, and would be designed and constructed to achieve a minimum LEED rating of "Silver", in compliance with the City of Pasadena's Green Building Ordinance. The new Unit GT-5 would replace existing Unit B-3, which is aging and increasingly inefficient. Operation of Unit GT-5 is intended to allow PWP to provide customers with more reliable and environmentally sensitive power production.

The following project features, consistent with Pasadena's Green Building Ordinance, have been accounted for in the analysis contained in this report:

- The proposed project would, in part, reuse an existing building (i.e., the Glenarm Building), which would minimize construction waste. The construction waste stream would be further reduced by 95 percent (by weight) through recycling, reclamation, and reuse, to divert as much as possible from disposal in the landfill. Building materials to be used would have a high recyclable content, such as structured steel with 95 percent recycled content, and/or would contain rapidly renewable materials, and/or would be produced locally.
- The project site is located close to existing public transportation lines and basic services are available within walking distance.
- The project would install low-flow toilets, waterless urinals, and high-efficiency metered faucets to reduce water use by at least 30 percent below the baseline level of an equivalent commercial facility.
- The project would reduce lighting power density by at least 20 percent and would evaluate the feasibility of implementing specific controls to dim or switch off lights based on available daylight

and occupancy. The most energy-efficient and cost-effective HVAC equipment would be selected for the project and Energy Star eligible appliances and equipment would be installed.

- Unit GT-5 will be required to use recycled water when the infrastructure is in place.

In addition, equipment for the proposed project was selected to conserve water where possible. The three most significant water conservation features of the project are (1) selection of a zero blowdown once-through steam generator (OTSG), (2) selection of a high efficiency cooling tower, and (3) recovery of the gas turbine coil condensate.<sup>58</sup> In typical drum-type heat recovery steam generators (HRSG), small amounts of water (blowdown) are continuously discarded to prevent the buildup of dissolved and suspended solids in the feedwater. The proposed OTSG however, is a drum-free once-through HRSG. The OTSG has no blowdown requirement and therefore water consumption is reduced as compared to conventional type HRSGs.

A high-efficiency cooling tower was selected for the proposed project. The cooling tower will include drift eliminators to reduce the drift to less than 0.0005 percent of the inlet water flow. The drift eliminators capture water droplets prior to their release into the atmosphere and return them to the cooling tower basin, reducing the losses in the cooling tower. For the GL LM6000 gas turbine option, the inlet air chiller will be implemented. Condensate will form on the inlet air coils of the chiller, which will be collected for reuse. The condensate will be directed for the cooling tower for use as make-up water, thereby reducing the amount of potable water required for make-up. For further discussion of proposed water conservation features, please refer to **Section 4.D, Greenhouse Gases**, of this Draft EIR.

## (2) Fire Protection

Fire hydrants on the Broadway and Glenarm Plants are currently served by a 12-inch City water main south of the Glenarm Plant, between South Fair Oaks Avenue and Railroad Street, which provides water for firefighting purposes from the City's potable water system. The underground fire loop is routed around the plant to service fire hydrants in various locations as well as existing plant buildings. The existing fire loop has adequate water pressure to feed the fire suppression system currently in place on the Power Plant site, and an electric fire water pump provides additional head and flow to the system in the event of pressure loss within the City system.

The existing fire loop encircling the plant would be modified to accommodate the new plant layout as part of project implementation. Existing hydrants in the area of proposed Unit GT-5 would be relocated, and a new fire loop would encircle the GT-5 equipment. The City has recently increased the water pressure in its water system, and pressure and volume testing would be performed to determine if any new fire water pumps are required.<sup>59</sup>

## (3) New Water Supply Infrastructure

Implementation of the proposed project will require the installation of additional water supply infrastructure at the site. Proposed additions include water storage tanks, process piping, and process

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<sup>58</sup> *Ibid.*

<sup>59</sup> *Pasadena Water and Power, Glenarm Repowering Project (GT-5 Combined Cycle Installation): Description of Existing and Proposed Fire Protection. Prepared for Pasadena Water and Power by Power Engineers, December 9, 2011.*

equipment such as cooling towers, turbines, etc. Renovation of the Glenarm Building will also include additional kitchen and break room facilities, restrooms, and shower facilities. No new off-site water supply infrastructure is anticipated.

Three additional water storage tanks will be installed on-site: a demineralized water storage tank, a waste water storage tank, and a condensate storage tank. The anticipated sizes of the demineralized water storage tank and the waste water storage tank are approximately 25 feet in diameter; the height/capacity will be determined by power island selection and the associated water demand. The anticipated size of the condensate storage tank is approximately 15 feet in diameter; the height/capacity will also be determined by power island selection and the associated water demand. Additional process water piping will be installed within the site to deliver service water and demineralized water to process equipment and storage tanks.<sup>60</sup>

#### **d. Analysis of Project Impacts**

*WATER-1      Would the project use non-renewable resources in a wasteful and inefficient manner?*

*WATER-2      Would the project fail to have sufficient water supplies available to serve the project from existing entitlements and resources, and are new or expanded entitlements needed?*

##### **(1) Construction**

There are four major construction phases for the proposed project: soil remediation on the proposed Unit GT-5 site; demolition of existing structures on the Unit GT-5 site; construction of Unit GT-5; and construction of the administrative/control room within the adjacent Glenarm Building. Building sub-phases include building construction, architectural painting, and surrounding asphalt paving. Construction is anticipated to occur in two simultaneous phases and take up to 23 months each following project approval.

Project construction would create a temporary, intermittent demand for water over the approximately two-year construction period, for such activities as soil watering for site preparation, fugitive dust control, concrete preparation, painting, cleanup, and other short-term activities. Construction-related water usage is not expected to have an adverse impact on available water supplies or the existing water distribution system, and impacts would be less than significant.

##### **(2) Operation**

###### **(a) Water Demand**

Unit GT-5 is estimated to operate a maximum of 8,760 hours per year, compared to approximately 2,004 annual operating hours for existing Unit B-3 (the average for the years 2008 through 2010). Unit GT-5 therefore represents an increase of approximately 6,756 operating hours, or approximately 337 percent, over Unit B-3, resulting in much greater power production. Two equipment configurations are contemplated for proposed Unit GT-5: the GE LM6000 unit and the Rolls Royce Trent 60 unit. Although water usage would vary depending on the equipment selected, as well as based on fluctuations in power demand and weather conditions, assuming the most conservative circumstances, Unit GT-5 is expected to use up to 95,410,000 gallons of water annually, or about 293 AFY. This is an increase of 54,410,000 gallons annually, or about 167

<sup>60</sup> *Pasadena Water and Power, Glenarm Repowering Project (GT-5 Combined Cycle Installation), Permitting Support – Water Supply Summary. Prepared for Pasadena Water and Power by Power Engineers, May 23, 2012.*

AFY, over existing Unit B-3 water usage. Unit GT-5 would operate more efficiently in terms of water usage per megawatt generated compared to Unit B-3 (i.e., approximately 10,892 gallons per operating hour for Unit GT-5 versus approximately 20,459 gallons per operating hour for Unit B-3), but the increase in anticipated hours of operation would result in greater overall water usage.

In addition to process water usage by proposed Unit GT-5, the proposed 18,000-square-foot administrative offices/control room facility, to be located in the Glenarm Building, and the maintenance shops proposed in the 4,000-square-foot Pump Building on the parcel south of State Street are expected to result in relatively minor net new domestic water consumption. The operation of Unit GT-5 would require five new employees with an associated water consumption rate of 15 gallons per day (gpd) per person, for a total of 75 gpd or 27,375 gallons per year (gpy) (0.08 AFY).

An additional 35 employees are projected to be on-site following implementation of the proposed project. Water usage for approximately 10 operators and shop personnel would be approximately 30 gpd per person, and water usage for approximately 25 office personnel would be approximately 18 gpd per person, totaling approximately 750 gpd or 250,000 gpy (approximately 0.80 AFY).<sup>61</sup>

PWP's 2011 WIRP provides water demand projections in five-year increments through 2035, based on demographic data from SCAG's Regional Transportation Plan, as well as on billing data for each major customer class, weather, and conservation. As shown in Table 4.A-1, the City's water demand is estimated to reach 43,300 AF by 2035, which is an increase of 3,300 AF (less than eight percent) from the estimated 2015 consumption.<sup>62</sup> The 54,660,000 gpy (54,410,000 gpy + 250,000 gpy) or 167.8 AFY increase (167 AFY + 0.80 AFY) in water demand generated by the proposed project would constitute approximately 5.1 percent of the City's total increase in water demand through 2035, or approximately 0.39 percent of the City's projected water demand for 2035 (43,300 AF). The proposed project would fall within PWP's available and projected water supplies.

PWP is able to meet new demands currently and can meet future demands as the power plant will be using recycled water for industrial water as the population grows within the City. Given that 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, impacts associated with long-term operation of the proposed project would be less than significant.

#### **(b) Water Infrastructure**

PWP would be responsible for providing the necessary water infrastructure on the project site, as well as any extensions to connect the project site to existing water lines in the area, as described above. The proposed project would connect to any of the water mains that serve the Glenarm Plant. PWP's Water Division has confirmed that there is sufficient capacity in the existing off-site infrastructure, including water mains in Glenarm Street, South Fair Oaks Avenue, and State Street, to serve the proposed project, and there are 12 different water meters currently on the project site.<sup>63</sup> Implementation of the project's proposed water

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<sup>61</sup> *Ibid.*

<sup>62</sup> *As indicated in Table 4.A-1, the 2015 total is based on actual data reflecting water used in 2005 and 2010.*

<sup>63</sup> *Correspondence from Shan Kwan, Assistant General Manager, Water Services, to Gurcharan Bawa, Assistant General Manager, Power Supply, June 11, 2012.*

conservation measures would further reduce demand. Therefore, impacts associated with water infrastructure will be less than significant.

### (3) Global Warming and Climate Change

Global warming and climate change should be considered in assessing water supply in California. Potential impacts of climate change on California's water resources include changes in water and air temperature, changes in precipitation patterns, and changes in sea levels that could increase pressure on Delta levees. The impact of climate change on California's water supply has already been the subject of study. In response to Governor's Executive Order S-3-05, DWR prepared a July 2006 report entitled "Progress on Incorporating Climate Change into Management of California's Water Resources," which found that climate change may have a significant effect on California's future water resources and demand. This report also examined the potential impacts of selected climate change scenarios on operations of the SWP and Central Valley Project, Delta water quality, flood management, and evapotranspiration. Potential issues include a reduction of Sierra snowpack and seasonal water storage; increased rain and less snow impacting supply reliability and hydropower generation; increased variable precipitation and extreme weather events; and rising sea levels.<sup>64</sup>

As described above, in May 2009, DWR prepared a follow-up report entitled "Using Future Climate Projections to Support Water Resources Decision Making in California," which presents an overview of the advances that DWR has made since the 2006 report toward using future climate projection information to support decision making by quantifying possible impacts to water resources for a range of future climate scenarios.<sup>65</sup> In December 2010, DWR prepared a survey which presents summaries of 13 different reports and studies prepared by DWR addressing climate change entitled *Climate Change Characterization and Analysis in California Water Resources Planning Studies - Final Report*. Although DWR was one of the early leaders in including climate change analysis in its planning studies and reports, it does not currently have a standard framework or a set of recommended approaches for considering climate change in its planning studies.<sup>66</sup>

As indicated above and as reflected in the various DWR reports and technical memoranda prepared in response to Governor's Executive Order S-3-05, there are substantial uncertainties regarding the effects of global warming on California's water supplies. Although experts agree that the earth's atmosphere has warmed over the last century and will likely continue to warm in the future, how this warming will quantitatively affect future water supplies, and specifically, how this warming will affect SWP supplies remains speculative. Due to the global nature of this issue, the potential effects of global climate change on water supply related to the project are qualitatively discussed below as part of the cumulative impact analysis. For further discussion on the effects of global climate change, please refer to **Section 4.D, Greenhouse Gases**, of this Draft EIR.

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<sup>64</sup> "Progress on Incorporating Climate Change into Management of California's Water Resources," July 2006, California Department of Water Resources, pages 1-3 to 1-4.

<sup>65</sup> "Using Future Climate Projections to Support Water Resources Decision Making in California," May 2009, California Department of Water Resources, page 2.

<sup>66</sup> "Climate Change Characterization and Analysis in California Water Resources Planning Studies - Final Report," California Department of Water Resources, December 2010, page v.

#### **(4) Consistency with Regulatory Framework**

##### **(a) California Urban Water Management Plan Act**

PWP is consistent with the California Urban Water Management Plan Act. It is consistent with PWP's approved 2010 UWMP. The proposed project is within the range of development anticipated in the UWMP, which indicates that PWP will be able to meet future demand for water.

##### **(b) Senate Bill 610, Senate Bill 221, and Senate Bill 7**

As indicated above, the proposed project would not be subject to the requirements of SB 610 as it does not include the development of 500 residential units, or the development of a project requiring an amount of water equivalent to or greater than that required by a 500 dwelling unit project. Additionally, the proposed project would not be subject to the requirements of SB 221 because it would contain less than 500 dwelling units, and is located within an urbanized area and has been previously developed for urban uses. The proposed project will be in the service areas of the respective water suppliers who must also abide by the water conservation and planning goals of SB 7, to reduce the per capita water consumption 20 percent by 2020 statewide.

##### **(c) California Code of Regulations**

The proposed project would meet or exceed the water efficiency requirements set forth by Title 20 of the CCR through incorporation of the City's recommended water conservation measures, the project's design features, which are generally more stringent than the requirements set forth by Title 20 of the CCR. As such, the proposed project would be consistent with Title 20.

##### **(d) City of Pasadena Ordinance Nos. 6275, 7165 and 7193**

The proposed project would meet or exceed the water efficiency requirements set forth in Ordinance Nos. 6275, 7165 and 7193 through incorporation of the City's recommended water conservation measures, including those listed a project design features, above, which are generally consistent or more stringent than the requirements set forth in these ordinances. As such, the proposed project would be consistent with applicable regulations.

##### **(e) City of Pasadena Green Building Program**

PWP is consistent with the City of Pasadena Green Building Program with regards to water efficiency, as the proposed project's replacement of Unit B-3 with Unit GT-5 would be supportive of environmentally sound practices which seek to reduce the impacts of development on the local, regional and global environment including global warming, heat island effect, air pollution, and occupant health, as further described above. Due of the size of the project, compliance with the requirements of the Pasadena Green Building Ordinance is mandatory. In addition, the renovation of the Glenarm building to accommodate the control room component of the proposed project, would be required to achieve a minimum "Silver" rating from the US Green Building Council's LEED green building program. As such, the proposed project further demonstrates consistency with the City's Green Building Program.

### (f) Pasadena Water and Power 2010 UWMP and 2011 Water Integrated Resources Plan

As discussed above, the projected water demand for the proposed project would fall within PWP's projected future water demands set forth in their 2010 UWMP and the 2011 WIRP. In addition, these plans indicate that water would be available to meet the water demand of the projected service area through 2035.

*WATER-3            Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

The water supply for the proposed project would be provided by PWP. As discussed previously, approximately 36 percent of PWP's water supply is groundwater from the Raymond Groundwater Basin that is pumped out of 16 deep wells located throughout Pasadena, and the remainder is imported from MWD and from neighboring water agencies that combine surface water and groundwater.<sup>67</sup> Based on information contained in PWP's 2011 WIRP, the proposed project's water demand constitutes approximately 5.1 percent of the City's total increase in water demand through 2035, or approximately 0.39 percent of the City's projected water demand for 2035 (43,300 AF). The proposed project would fall within PWP's available and projected water supplies. No withdrawal directly from groundwater wells is proposed as part of the project, and project implementation would not substantially interfere with groundwater recharge. Impacts with respect to groundwater supplies would be less than significant.

## 3. CUMULATIVE IMPACTS

### a. Water Demand

As discussed above, PWP, as a public water service provider, is required to prepare and periodically update an UWMP to plan and provide for water supplies to serve existing and projected demands. The UWMP prepared by PWP, and based upon the WIRP, accounts for existing development within the City, as well as projected growth anticipated to occur through redevelopment of existing uses and development of new uses. Additionally, under the provisions of SB 610, PWP is required to prepare a comprehensive WSA for every new development "project" (as defined by Section 10912 of the CWC) within its service area. The types of projects subject to the requirements of SB 610 tend to be larger projects (i.e., residential projects with at least 500 dwelling units, shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space, commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space, etc.) that may or may not have been included within the growth projections of the UWMP. The WSA for such projects, in conformance with the UWMP, evaluates 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. In addition, as described above, SB 221 requires that for residential subdivisions with 500 units or more that are in non-urban areas, written verification from the service provider (i.e., PWP) be submitted indicating sufficient water supply is available to serve the proposed subdivision, or the local agency shall make a specified finding that sufficient water supplies are or will be available prior to completion of the project.

<sup>67</sup> Pasadena Water and Power, "FAQs About Your Water Service," [http://ww2.cityofpasadena.net/waterandpower/water\\_faqs.asp](http://ww2.cityofpasadena.net/waterandpower/water_faqs.asp).

**Section 3, General Description of Environmental Setting**, of this Draft EIR identifies 32 related projects located in the City of Pasadena that are anticipated to be developed within the vicinity of the project site and thus within the service area of PWP. These 32 related projects would cumulatively contribute, in conjunction with the proposed project, to water demand in the City. It is important to note that many of the related projects would replace existing water consuming uses. However, the current estimates for water use presented in this analysis generally do not consider the net gain in water but simply provide the overall anticipated water use, without taking into consideration, or taking any credit for, previously existing water consuming uses. Information regarding four projects for which water use credit is applied is considered in the cumulative water uses calculations, and accordingly noted below. Therefore, the estimates presented in this analysis are quite conservative in nature, as actual water usage may be over-estimated.

As shown in **Table 4.H-3, Estimated Cumulative Water Demand**, related projects would have an average daily water demand of approximately 448,791 gpd or 502.7 AFY. The proposed project in conjunction with related projects would yield a total average water demand of approximately 598,544 gpd equating to 670.5 AFY with the project. As stated above, PWP's UWMP projects yearly water demand is expected to reach 43,300 AF by 2035, which is an increase of less than eight percent from estimated 2015 water demand. The anticipated water demand increase of 598,544 gpd or 670.5 AFY from the development of the proposed project and related projects would equal approximately 1.5 percent of the total anticipated water demand by 2035. As such, the demand for water would fall within the available and projected water demand of PWP's UWMP and WIRP.

Furthermore, given that the UWMP and WIPR plan and provide for water supplies to serve existing and projected needs, including those of future growth and development as may occur through related projects, and that the requirements of SB 610, SB 221 and SB 7 provide means to ensure that the water supply needs of large development projects are carefully considered relative to PWP's ability to adequately meet future needs, it is anticipated that PWP would be able to supply the demands of the proposed project and related projects through the foreseeable future. In addition, compliance with the City's recommended water conservation measures would reduce the water consumption estimates of the proposed project and related projects, thereby reducing the demand on City supplies.

PWP would have adequate water to meet future water demands for the service area with the addition of the proposed project and related projects, and the proposed project's incremental impact on water supplies, considered together with related projects, would not contribute to cumulatively significant impacts.

## **b. Water Infrastructure**

Development of the proposed project in conjunction with the related projects would cumulatively increase water demand on the existing water infrastructure system. However, each related project would be subject to discretionary review to assure that the existing public utility facilities would be adequate to meet the domestic and fire water demands of each project. Furthermore, PWP as well as the City of Pasadena Department of Public Works conducts ongoing evaluations to ensure facilities are adequate. Therefore, the project's incremental contribution to cumulatively significant impacts on the water infrastructure system would be less than cumulatively considerable.

Table 4.H-3

## Estimated Cumulative Water Demand

Land Use	Amount of Development	Water Use Factor (gpd/unit) <sup>a</sup>	Water Use (gpd)	Water use (AFY)
Dwelling Units <sup>b</sup>	1,187 du	160	189,920	212.7
Commercial/Retail <sup>c</sup>	168,476 sq ft	0.08	13,478	15.1
Offices/Banks <sup>d</sup>	86,971 sq ft	0.15	13,046	14.6
Medical Office	146,400 sq ft	0.25	36,600	41.0
Restaurant	17,254 sq ft	0.30	5,176	5.8
Banquet/Assembly Hall	6,700 sq ft	0.80	5,360	6.0
Hotel <sup>e</sup>	194 rooms	130	25,220	28.2
Hospital	300 beds	75	22,500	25.2
Auto Parking	346,594 sq ft	0.20	69,319	77.6
Outdoor Water Use <sup>f</sup>			68,172	76.4
<b>Related Projects Total</b>			<b>448,791</b>	<b>502.7</b>
<b>Proposed Project Total</b>			<b>149,753<sup>g</sup></b>	<b>167.8</b>
<b>Grand Total</b>			<b>598,544</b>	<b>670.5</b>

<sup>a</sup> Water use factor is based on City of Los Angeles Department of Public Works, Bureau of Sanitation Sewer Generation Rates.

<sup>b</sup> Dwelling units were based on the assumption of 2 bedrooms per unit.

<sup>c</sup> Commercial/Retail uses include shopping areas. An existing retail use of 2,362 sq ft will be demolished for one of the related projects, and this amount was subtracted from the total area of Commercial/Retail related uses.

<sup>d</sup> Offices uses and banks have the same generation factors. An existing bank use of 24,885 sq ft will be demolished for one of the related projects, and this amount was subtracted from the total area of Offices/Banks related uses.

<sup>e</sup> Existing hotel uses totaling 186 rooms will be demolished for two of the related projects, and this amount was subtracted from the total number of new hotel rooms.

<sup>f</sup> Outdoor water use was calculated using a combination of the water use from 18% of dwelling units plus 28% of all other commercial uses, except auto parking.

<sup>g</sup> The estimated annual increase in water use for the proposed project is 54,660,000 gallons, which equates to approximately 149,753 gpd when divided by 365 days per year. The estimated total annual water use for the proposed project is 167.8 AFY.

Source: PCR Services Corp., June 2012.

### c. Global Warming and Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. Studies have found that, "Considerable uncertainty about precise impacts of climate change on California hydrology and water resources will remain until we have more precise and consistent information about how precipitation patterns, timing, and intensity will change" (Kiparsky et al. 2003). For example, some studies identify little change in total annual precipitation in projections for California (California Climate Change Center, 2008). Other studies show significantly more precipitation (Climate Change and California Water Resources (DWR 2006)). Even assuming that climate change leads to long-term increases in precipitation, analysis of the impact of climate change is further complicated by the fact that no studies have identified or quantified the runoff impacts such an increase in precipitation would have in particular watersheds.

Also, little is known about how groundwater recharge and water quality would be affected (Ibid.). Higher rainfall could lead to greater groundwater recharge, although reductions in spring runoff and higher evapotranspiration could reduce the amount of water available for recharge (Ibid.). The California Department of Water Resources (DWR 2006) report on climate change and effects on the State Water Project

(SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta, concludes that “[c]limate change will likely have a significant effect on California’s future water resources-[and] future water demand.” It also reports that “much uncertainty about future water demand [remains], especially [for] those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain” (DWR, 2006). The relationship between climate change and its potential effect on water demand is not well understood (DWR, 2006). DWR adds that “[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future.” Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows (Kiparsky 2003; DWR 2005; Cayan 2006, Cayan, D., et al, 2006) water yields from reservoirs could result.<sup>68</sup>

#### **4. MITIGATION MEASURES**

Based on the analysis above, the proposed project would not result in significant impacts related to domestic water supply. No further mitigation measures would be required.

#### **5. LEVEL OF SIGNIFICANCE AFTER MITIGATION**

As indicated above, the proposed project’s impacts on water supply and infrastructure would be less than significant.

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<sup>68</sup> *Greenhouse Gas Impact Assessment Technical Report, Glenarm Repowering Project, May 2012; prepared for Pasadena Water and Power Department; PCR Services Corporation.*

