Appendix M1

Water Supply Assessment
WATER FRONT PROJECT
REDONDO BEACH, CALIFORNIA
SB610 WATER SUPPLY ASSESSMENT
AUGUST 24, 2015

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**Introduction and Project Description**

California Water Service (Cal Water) is submitting this California SB 610 Water Supply Assessment (WSA) for the proposed Waterfront Project (hereafter referred to as “WFP”). The Hermosa-Redondo (HR) district or system of Cal Water provides potable water service to all businesses at the existing site of the proposed WFP.

The WFP covers approximately 36 acres and is intended to provide mixed-use development compatible with the City of Redondo Beach's plan for revitalization of its waterfront. It includes redeveloping and expanding facilities for commercial uses, public access and recreation and improving infrastructure and parking.

The project site is comprised of approximately 31.2 acres of land, including the Seaside Lagoon, and 4.8 acres of water area made up of Basin 3 (3.5 acres) and proposed boat ramp area (1.3 acres). The WFP is located along the Pacific Ocean within the Santa Monica Bay, west of Catalina Avenue and a high-density residential development referred to as “The Village” or “Seascape,” south of Portofino Way, and north of Torrance Boulevard. The Torrance Boulevard Traffic Circle is included in the project site. The land portion of the project site is generally divided into two areas: northern and southern areas. The northern portion of the project site is accessed from Harbor Drive including feeder arterials of Herondo Street, Pacific Avenue, and Beryl Street, and the southern portion is accessed from Torrance Boulevard (also known as the Torrance Circle).

See Figure 2 in the Draft EIR, for a map delineating the project site boundaries and other developed adjacent areas.

The project site is currently developed and is used for commercial and recreational purposes. Commercial uses include restaurants, retail shops, and offices. Recreation uses include a public swimming pool and a waterside area called the “Seaside Lagoon.” Other uses include the Plaza Parking and Pier Parking structures (which provide a total of about 1,400 parking spaces), surface parking lots, the Horseshoe Pier, and Basin 3 of King Harbor (Redondo Beach Marina) which provides recreational uses including watercraft rentals, sightseeing, and slip rentals. Employment within the existing project site is approximately 1,228 persons.

The WFP includes demolition of approximately 207,402 square feet of existing structures, demolition/renovation of the existing Pier Parking Structure, demolition and reconstruction in kind of the Sport fishing Pier, and construction of up to approximately 523,939 square feet to include retail, restaurant, office space, cinema, a public market hall, and a boutique hotel, totaling approximately 304,058 square feet of net new development. (See Figure 3 in the Conceptual Site Plan.) The proposed project includes proposed enhancements to public recreation and open space. Construction of the WFP is expected to start in 2017 and be completed in about 27 months (2.25 years) or in 2019.

**Existing Uses within the WFP site (ft²):**
Retail: 41,364
Restaurant (quick and quality service): 102,321
Office 76,196
TOTAL: 219,881 ft² with 1,228 employees

Proposed Uses within the WFP site (ft²):
Retail 103,718; New = 62,354
Theater 48,117; New = 48,117
Restaurant (quick and quality service): 184,983; New = 82,662
Hotel: 122,965; New = 122,965
Office: 64,156; New = -12,040
TOTAL: 523,939 ft² with 2,832 employees

WFP Net New:
- Square footage: 304,058
- Employees: 1,604

The WFP is not specifically covered in Cal Water’s HR 2010 Urban Water Management Plan (UWMP); therefore, its water supply requirements are addressed in this WSA. The 2010 UWMP is based on data recorded through 2010 and is still the most recent UWMP; however, updated Cal Water records data for 2011 – 2014 on population, customer services, water demand and well supply were obtained and used in this WSA. This data shows that water demand per service connection for the following user categories have decreased in the HR district: single and multi-family residential and commercial (all uses in the proposed WFP). Even though growth of commercial services in the HR district has been flat, Cal Water used a projected growth rate of 0.425% per year, which was incorporated into its demand projections in the UWMP. In 2014, Cal Water had a total of 1,847 commercial service connections.

Cal Water has compared its residential service growth projections with those of Southern California Area Governments (SCAG) and Los Angeles County Economic Forecasts and after adjusting for HR district boundary variances found them reasonably consistent.

The 2010 HR UWMP can be referenced for more detailed information on historic and forecasted water demand and supply. In June 2009, Cal Water completed a Water Supply and Facilities Master Plan (WSFMP) for the HR system that included a projection of future water demand and an assessment of supply required to meet future demand. Information from the WSFMP was incorporated into the HR UWMP.

Senate Bill 610 (Chapter 643, Statutes of 2001) (SB 610) amended state law as of January 1, 2002, to include consideration of water supply availability when cities and counties are making land use development decisions. SB 610 requires detailed information on water supply availability be provided to local public agency decision-makers prior to approval of development projects that meet or exceed any of the following criteria:

1. A residential development of more than 500 dwelling units.
2. A shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet.
3. A commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
4. A hotel or motel with more than 500 rooms.
5. An industrial, manufacturing or processing plant or industrial park planned to house more than 1,000 persons occupying more than 40 acres of land or having more than 650,000 square feet of floor area.
6. A mixed-used project that includes one or more of the projects specified above.
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Because the proposed WFP exceeds criterion 6 above, a WSA is required. This WSA assesses the adequacy of the water supply to meet the estimated demands of the proposed WFP over the next 20 years and those of Cal Water’s HR system customers and projected new users under normal, single dry year and multiple dry year conditions. (Water Code §10911(a)). SB 610 requires that the information presented in a WSA be included in the administrative record that is the basis for an approval action by the local public agency.

SB 610 recognizes local control and decision-making regarding availability of water for projects and approval of projects. A WSA is to be provided to local governments for inclusion in environmental documentation for projects subject to the California Environmental Quality Act (as defined in Water Code 10912 [a]).

**Waterfront Project Water Demand Forecast**

Forecasting net new water demand for the WFP development plan is based on multiplying the estimated water use on a gallons per day per square foot (gpd/ft²) basis for each commercial use category by the new square footage for that category and summing the total.

For a development project in Cal Water’s Dominguez system in nearby Torrance, PCR Services Corporation (PCR), used data derived by the County Sanitation Districts of Los Angeles (CCDLA), to develop a table of estimated water demand for various commercial activities. As there was good agreement between the estimate of residential water usage derived from Cal Water data and those developed by PCR using CCDLA data, estimates of water demand for commercial activities developed by PCR using CCDLA factors are used for the WFP and are summarized below.

<table>
<thead>
<tr>
<th>Commercial Activities – Average Water Use Factors</th>
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<tbody>
<tr>
<td>Category</td>
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<tr>
<td>Retail</td>
</tr>
<tr>
<td>Quick or quality service restaurants</td>
</tr>
</tbody>
</table>

**Existing Average Daily Water Use in the WFP Area:**

Retail:
0.164 gpd/ft² x 41,364 ft² = 6,784 gpd

Restaurant (quick and quality service):
1.10 gpd/ft² x 102,321 ft² = 112,554 gpd

**Office:**
The average water use factor based on Cal Water customer use data from 5 commercial office buildings was 0.04 gpd/ft².
0.04 gpd/ft² x 76,196 ft² = 3,048 gpd
Total existing average daily water use: 122,386 gpd

**Estimated WFP Water Use:**

The WFP will replace buildings constructed from the late 1950s to 1990s with buildings that will fully comply with current city codes including the California Plumbing Code and the California Green Building Code, which mandate installation of water conserving plumbing fixtures and fittings.

Existing water use in the WFP area is based on higher historic water use rate data (gpd/ft²). It is expected that at a minimum new WFP facilities will achieve a reduction in water use rates of 20%.

For example, old toilets often exceed 2 gallons per flush. Later toilets use 1.6 gallons per flush. The latest water efficient toilets use only 0.6 gallons per flush. Depending on the reference toilet, the latest toilets achieve 62.5% to 70% reduction in water use. In restaurants, new dishwashers will be installed which use less water than older conventional machines, which use between 7 and 14 gallons per wash load. New water efficient machines use between 4.5 and 7 gallons per wash load. Using an average of 10.5 gallons for conventional machines and 5.75 gallons for new water efficient machines results in an average savings of 4.75 gallons per load or a reduction of 45%.

1. **Retail:**
   \[
   0.80 \times 0.164 \text{ gpd/ft}^2 \times 103,718 \text{ ft}^2 = 13,608 \text{ gpd}
   \]

2. **Theater:**
   Modern multiplex theaters offer expanded food service facilities and provide ample restroom facilities for customers. Therefore, the average water use factor is assumed to be higher than traditional theaters and is estimated at half of that of a restaurant with water savings machines and toilet fixtures:
   \[
   0.80 \times 0.55 \text{ gpd/ft}^2 \times 48,117 \text{ ft}^2 = 21,172 \text{ gpd}
   \]

3. **Restaurant (quick and quality service):**
   \[
   0.80 \times 1.10 \text{ gpd/ft}^2 \times 184,983 \text{ ft}^2 = 162,785 \text{ gpd}
   \]

4. **Hotel:**
The water use factor for a hotel with a restaurant in another Cal Water district was estimated to be 0.50 gpd/ft². Therefore:
0.80 x 0.50 gpd/ft² x 122,965 ft² = 49,186 gpd

5. **Office:**
The average water use factor based on Cal Water customer use data from 5 commercial office buildings in another Cal Water district was 0.04 gpd/ft². Therefore:

0.80 x 0.04 gpd/ft² x 64,156 ft² = 2,053 gpd

6. **Landscape irrigation:**
Based on Conceptual Site Plan (Figure 3 in the Planning Document), there are trees and shrubs in areas due west of Harbor Drive and a small section of Pacific Ave Reconnection. While trees and shrubs are dispersed, it is conservatively estimated that an acre of land will be irrigated. Data from the Dominguez district yield an average irrigation rate is 2.5 acre-ft/year/acre. However, that included grass and flower plantings. For average landscape irrigation use in the WFP, a 20% use reduction is used resulting in an estimated use of 2 acre-ft/year (AFY) or 1,784 gpd

7. **Total estimated average daily water use in the WFP is:** 250,588 gpd

Accordingly, the net increase in average daily water use by the WFP is estimated to be:

250,588 gpd - 122,386 gpd = 128,202 gpd or **143.6 AFY**

**Hermosa-Redondo System Background Information**

Cal Water’s Rancho Dominguez District is located in the southern corner of Los Angeles County approximately ten miles north of Los Angeles Harbor. The Rancho Dominguez District includes three separate water systems or districts (Dominguez, Hermosa-Redondo and Palos Verdes), a leased system (Hawthorne), and various operations and billing contracts. Information in this WSA pertains to the HR system only. Figure 1 shows the three service areas or districts and the general location of the HR service area.
The HR service area includes the cities of Hermosa Beach and Redondo Beach and approximately 5 percent of Torrance. It is bounded on the north by the cities of Manhattan Beach and Lawndale, on the east by Gardena and Torrance, on the south by Palos Verdes Estates, and on the west by the Pacific Ocean. The HR service area boundary is shown in Figure 2.
Cal Water uses U.S. Census data in estimating populations in all of its districts in California. Its methodology for estimating existing and future populations has been reviewed and accepted by the California Public Utilities Commission (CPUC), which provides regulatory oversight of privately owned water and wastewater utilities. Estimates of the population serviced by Cal Water in the HR system are based on overlaying the 2010 U.S. Census Tract Block data with the service area boundary as shown in Figure 2. LandView 5 and MARPLOT® software were used to generate data.

When compared to year 2000 Census data, the 10 year growth rate in Cal Water’s Hermosa-Redondo service area is 5.86% based on a 2000 population estimate of 89,673 and a 2010 population estimate of 94,925. This was an increase of 5,252 persons in 10 years or average annual increase of 525 persons. Housing units increased from 43,084 to 44,777 or 1,693 units in 10 years for an average annual increase of 169 units.

Based on 2010 U.S. Census data, occupant density is 2.12 persons per residential unit (single family and multifamily units).

A summary of the census data for 2010 for the HR system is shown in Table 1.
This data was used as a baseline for estimating population starting in 2010. To calculate estimated population after 2010, the Census 2010 population was divided by the total number of dwelling units served by Cal Water in 2010 to produce a population density value. This value was then multiplied by the number of Cal Water dwelling units in each future year.

The five and ten-year growth rates for each customer service type were used to estimate the future number services to 2040. The projection using the ten-year growth rate correlated most closely with past growth and was used for estimating future number of services and population in the HR service area.

In its 2010 UWMP Cal Water estimates the HR service area population to be 113,200 in 2040. Table 2 presents Cal Water’s population forecast in 5-year increments. It is noted that this forecast yields a higher population in 2020 then if the growth rate between 2000 and 2010 based on US Census data were used: 1.0586 x 94,925 = 100,488 persons in 2020 versus the Table 2 projection of 101,740, which is 1,252 persons more.

The Cal Water 2010 UWMP forecast is compared with the projection by the Southern California Association of Governments (SCAG) in Figure 3.
SCAG population projections assume Cal Water serves the following percentages of each city:

- 100% of Hermosa Beach City
- 100% of Redondo Beach City
- 5% of Torrance City

Figure 3 shows that the population growth projected in the 2010 UWMP is higher than that projected by SCAG. The 2010 Census data population of approximately 95,000 persons is the same as the SCAG projection. The Cal Water 2010 UWMP estimate is 96,430. In 2035, the SCAG projection is 102,000 versus the Cal Water projection of 110,000. As mentioned previously Cal Water’s service area includes approximately 5% of the City of Torrance which is likely not included in the population projection prepared by SCAG.

In 2015, Cal Water updated its population forecast as shown in Table 3. This forecast shows reduced increases in population compared to the 2010 UWMP, but is still higher than SCAG projections. The updated Cal Water forecast was used in the WSA.

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Area Population</td>
<td>89,637</td>
<td>94,925</td>
<td>96,050</td>
<td>98,311</td>
<td>100,625</td>
<td>102,994</td>
<td>105,419</td>
<td>107,902</td>
</tr>
</tbody>
</table>
Hermosa Redondo System Water Demand

Before the passage of Senate Bill 7 (SBx7-7), Cal Water projected water demand by multiplying the projected number of services for each of its user classes by one of three (high, average and low) historic water use rates for each user class. The three water use rates were derived from metered customer water records. Projected increases in the number of customers in each user class were based on historic growth rates for that user class unless a particular growth rate was determined to be non-representative in which case the overall customer growth rate was used. The sum of projected demands for each user class equaled the total projected demand for the HR system. Three separate demand projections for the HR system were calculated in this manner: high, average and low.

After the passage of SBx7-7, the above method was no longer used for projecting HR district water demand. However, this method is still used for projecting growth in services by user class, population, and distribution of demand among user classes. Figure 4 shows total demand by user class for all applicable user classes in 2010. Note there are no other user classes in the HR district such as sales to other agencies, use of water for saline intrusion barrier, use of water to recharge the groundwater basin or use of water for agricultural irrigation or livestock. The largest user class is single family residential where water use is 53.3% of total demand followed by multifamily residential use which is 20.6% of total demand. Combined residential demand is 73.9% of total demand. Commercial water use, which is the user class for the WFP, is the third largest use at 12.7% of total demand.

Demand projections in the 2010 UWMP were developed to meet SBx7-7 requirements. Two demand projections were made: 1) an unadjusted baseline demand and 2) a target demand. The unadjusted baseline water demand projection is the total demand expected without any water conservation. It is equal to forecasted population multiplied by the base per capita water use, which is the average for the period from 2005 to 2009.

Prior to the drought years of 1989 to 1991, the average demand per service for all user classes remained fairly constant at an annual average usage of 220,000 gallons per service – total annual demand divided by the total number of services in the HR district. After the drought, demand gradually increased, but remained below pre-drought levels. In the past ten years there has been a gradual reduction in demand per service with the low point occurring in 2010 at the end of a three year drought. Cal Water’s previous conservation goal of a 10 percent reduction in demand (based on pre-drought levels) has been accomplished. Implementation of additional water conservation best management practices will continue. Reduction in demand notably occurred in the multifamily residential user class due in part to an aggressive program to replace high water volume toilets.

HR service area target water demand projection includes conservation savings due to both passive and active demand management. The target demand is calculated by multiplying SBx7-7 target per capita water use values by the projected population.
California Senate Bill x7-7 Baseline and Targets

Senate Bill No. 7 (SBx7-7) adopted in November 2009 mandates a statewide 20% reduction in per capita urban water use by December 31, 2020. The CPUC directed Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use. To increase water conservation, Cal Water in 2010 developed five-year conservation program plans for all of its service districts. The HR service area Conservation Master Plan is in Appendix G of the 2010 UWMP.

SBx7-7 requires reducing per capita water use by at least 10 percent on or before December 31, 2015. SBx7-7 requires urban retail water suppliers to develop 2015 and 2020 water use targets in accordance with specific requirements and provides several ways to calculate them. Retail water suppliers can also form regional alliances within the same hydrologic region to achieve compliance. Cal Water is including the HR system in a regional alliance with four other Cal Water districts or service areas in the South Coast hydrologic region. For these five districts or service areas (Hermosa-Redondo, Dominguez, East Los Angeles, Palos Verdes, and Westlake), district-specific targets and a regional alliance target have been established.

District-specific and regional per capita targets for Cal Water districts within the South Coast hydrologic region are shown in Table 4. The 2015 and 2020 district-specific targets for
Hermosa-Redondo District are 134 and 126 gpcd, respectively. The 2015 per capita demand is estimated to be 114 gpcd (10.95 mgd/96,050 persons) which is below both the 2015 and 2020 targets. The projected average daily water use of 10.95 mgd and population of 96,050 are based on Cal Water historic data and projections using the methods described previously.

<table>
<thead>
<tr>
<th>District or Service Area</th>
<th>Population</th>
<th>2015 Target</th>
<th>2020 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominguez</td>
<td>144,190</td>
<td>193</td>
<td>171</td>
</tr>
<tr>
<td>East Los Angeles</td>
<td>148,740</td>
<td>121</td>
<td>115</td>
</tr>
<tr>
<td>Hermosa-Redondo</td>
<td>94,070</td>
<td>134</td>
<td>126</td>
</tr>
<tr>
<td>Palos Verdes</td>
<td>67,620</td>
<td>253</td>
<td>225</td>
</tr>
<tr>
<td>West Lake</td>
<td>16,740</td>
<td>442</td>
<td>393</td>
</tr>
<tr>
<td><strong>Regional Targets</strong></td>
<td></td>
<td><strong>176</strong></td>
<td><strong>160</strong></td>
</tr>
</tbody>
</table>

Regional targets are the population-weighted average of the district targets.

If per capita demand remains at this projected average for 2015, the HR service area will meet its 2020 per capita water use target.

Cal Water does not sell water to other agencies, nor does it supply water for saline barriers, groundwater recharge, conjunctive use or recycling. HR service area water use is exclusively by Cal Water customers and does include unaccounted for distribution system losses. System losses are summarized and some small amount of recycled water supplied by WBMWD for non-potable uses are shown in Table 5.

<table>
<thead>
<tr>
<th>Category</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycled Use</td>
<td>153</td>
<td>155</td>
<td>159</td>
<td>162</td>
<td>166</td>
<td>169</td>
<td>173</td>
</tr>
<tr>
<td>Unaccounted for system losses</td>
<td>481</td>
<td>1,027</td>
<td>1,028</td>
<td>1,055</td>
<td>1,083</td>
<td>1,112</td>
<td>1,142</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>634</td>
<td>1,182</td>
<td>1,186</td>
<td>1,217</td>
<td>1,249</td>
<td>1,281</td>
<td>1,315</td>
</tr>
</tbody>
</table>

Actual and projected water demand through 2040 is shown in Table 6. Demand values represent the total target demand projection based on achieving SBx7-7 gpcd targets for 2015 and 2020. They include unaccounted for water losses in the HR distribution system.
WFP and HR Demand Comparison

The estimated projected HR system water demand increase between 2015 and 2035 is 1,076 AFY. Taken as a percentage of this increase, the WFP represents a 13.3% (143.6/1,076) increase. While it could be reasonably assumed that the projected increase in HR district water demand includes the WFP, the conservative position taken here is that it will be added to the projected demand for 2020 in Table 6. A revised total HR system demand including the WFP rounded up to 144 AFY is shown in Table 7.

<table>
<thead>
<tr>
<th>Table 7: Hermosa-Redondo System + WFP Projected Water Demands - AF</th>
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<tbody>
<tr>
<td>2015</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>HR System</td>
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<tr>
<td>Waterfront Project</td>
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<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Hermosa-Redondo System Water Demand Management

Cal Water is significantly expanding its water conservation programs. State law, CPUC directives and a state water conservation organization are focused on reducing urban water use and have provided much of the impetus for this emphasis. This includes:

1. Recent decisions by the CPUC directing regulated water utilities to reduce per capita urban water demand.
2. State legislation mandating urban water suppliers reduce per capita demand 20 percent by 2020.

Following is a brief summary of each.

The CPUC’s Decision 07-05-062 directed Class A and B water utilities to submit a plan to achieve a 5 percent reduction in average customer water use over each three-year rate cycle. This policy was refined under Decision 08-02-036, which established a water use reduction goal of 3 to 6 percent in per customer or service connection consumption every three years once a full conservation program, with price and non-price components, is in place. These decisions anticipated enactment of policies by the State legislature to reduce urban water use in California 20 percent by 2020.

SBx7-7 requires the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets. Urban retail water suppliers will not be eligible for state water grants or loans unless they comply with SBx7-7’s requirements.

There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the
requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Each of these compliance options is briefly described below.

Originally, the MOU established a set of BMPs that signatories agreed to implement in good faith. For each BMP, the MOU established the actions required by the water supplier (e.g. site surveys, fixture and appliance rebates, water use budgets, volumetric pricing and conservation rate designs), the implementation schedule, and the required level of effort (in the MOU this is referred to as the coverage requirement). Additionally, the MOU established the terms by which a water supplier could opt out of implementing a BMP.

BMPs are grouped into five categories. Two categories, Utility Operations and Education, are “Foundational BMPs” because they are considered essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are “Programmatic BMPs” and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. Table 8 lists the BMPs by category. The requirements and coverage levels of each BMP are set forth in Exhibit 1 of the MOU.

Cal Water’s CUWCC annual reports, which detail BMP implementation, are included in the 2010 UWMP as Appendix G.

Under Flex Track, a water supplier can estimate the expected water savings over the 10-year period 2009-2018 if it were to implement the programmatic BMPs in accordance with the MOU’s schedule, coverage, and exemption requirements, and then achieve these water savings through any combination of programs it desires. Thus, through the Flex Track compliance option, a water supplier agrees to save a certain volume of water using whatever it determines to be the best combination of programs. Because the savings target depends on the programmatic BMP coverage requirements, which in turn are functions of service area size and composition of demand, the volume of water to be saved under this compliance option must be calculated separately for each supplier.

<table>
<thead>
<tr>
<th>Table 8: MOU Best Management Practices</th>
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<tbody>
<tr>
<td>BMP Group</td>
</tr>
<tr>
<td>1. Utility Operations Programs (F)</td>
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<td>2. Education Programs (F)</td>
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<tr>
<td>3. Residential (P)</td>
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<tr>
<td>4. Commercial, Industrial, Institutional (P)</td>
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<td>5. Landscape (P)</td>
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F = Foundational BMP, P = Programmatic BMP
Under the gpcd option, a water supplier can comply with the MOU by reducing its baseline gpcd by 18 percent by 2018. The baseline is the ten-year period 1997-2006. The MOU establishes interim gpcd targets and the highest acceptable levels of water use deemed to be in compliance with this option. The MOU’s gpcd option is similar to the method to set the SBx7-7 target, except that it uses a fixed baseline period and only runs through 2018.

Cal Water is using Flex Track to comply with the MOU because it provides the most flexibility in selecting conservation programs and allows for more streamlined reporting.

**Water Conservation Master Plans**

To comply with requirements for urban water use reduction, Cal Water developed Water Conservation Master Plans (WCMP) for each of its service districts or areas. WCMPs set forth a framework for compliance and describe Cal Water’s specific conservation actions to be implemented. Major tasks in the WCMPs include:

1. A complete review of State policies and development of a compliance strategy
2. Calculating all appropriate per capita targets
3. Determining water savings required from new programs
4. Performing an analysis of conservation programs
5. Developing a portfolio of conservation program actions
6. Creating a plan for monitoring and updating the WCMP

The Water Conservation Master Plan for the Hermosa-Redondo system is in Appendix G of the HR 2010 UWMP. A discussion of baseline and target water use is provided in Section 3 of the UWMP. Details on water savings requirements and the programs to be implemented are also provided. Table 9 is a summary of water conservation programs selected.
Table 9: Cal Water Hermosa-Redondo Conservation Programs

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Description</th>
<th>Target Market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORE PROGRAMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rebate/Vouchers for toilets, urinals, and clothes washers</td>
<td>Provide customer rebates for high-efficiency toilets, urinals, and clothes washers</td>
<td>All customer segments</td>
</tr>
<tr>
<td>Residential Surveys</td>
<td>Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs</td>
<td>All residential market segments</td>
</tr>
<tr>
<td>Residential Showerhead/Water Conservation Kit Distribution</td>
<td>Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum</td>
<td>All residential market segments</td>
</tr>
<tr>
<td>Pop-Up Nozzle Irrigation System Distribution</td>
<td>Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.</td>
<td>All customer segments</td>
</tr>
<tr>
<td>Public Information/Education</td>
<td>Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.</td>
<td>All customer segments</td>
</tr>
<tr>
<td><strong>NON-CORE PROGRAMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet/Urinal Direct Install Program</td>
<td>Offer direct installation programs for replacement of non-HE toilets and urinals</td>
<td>All customer segments</td>
</tr>
<tr>
<td>Smart Irrigation Controller Contractor Incentives</td>
<td>Offer contractor incentives for installation of smart irrigation controllers</td>
<td>All customer segments</td>
</tr>
<tr>
<td>Large Landscape Water Use Reports</td>
<td>Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets</td>
<td>Non-residential customers with significant landscape water use and potential savings</td>
</tr>
<tr>
<td>Large Landscape Surveys &amp; Irrigation System Incentives</td>
<td>Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers</td>
<td>Non-residential customers with significant landscape water use and potential savings</td>
</tr>
<tr>
<td>Food Industry Rebates/Vouchers</td>
<td>Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves</td>
<td>Food and drink establishments, institutional food service providers</td>
</tr>
<tr>
<td>Cooling Tower Retrofits</td>
<td>Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits</td>
<td>Non-residential market segments with significant HVAC water use</td>
</tr>
<tr>
<td>Industrial Process Audits and Retrofit Incentives</td>
<td>Offer engineering audits/surveys and financial incentives for process water efficiency improvement</td>
<td>Non-residential market segments with significant industrial process water uses</td>
</tr>
</tbody>
</table>

Hermosa-Redondo System 2015 Conservation Program Activity Levels
The water savings requirement analysis shows that after accounting for water savings from existing water efficiency codes and ordinances, scheduled adjustments to water rates, and investments in conservation programs, projected 2015 baseline demand in Hermosa-Redondo system is less than the 2015 per capita water use target. Moreover, 24 of the 32 programs evaluated had benefit to cost ratios greater than or equal to one, indicating that implementation of these programs would be more cost-effective for rate payers than purchasing imported water from West Basin Municipal Water District (WBMWD). The Hermosa-Redondo system 2015 programs and the activity level include rebates to cover replacement of 1,200 toilets and 520 clothes washers, 60 customer surveys/audits, distributing 690 conservation kits and 6,000 pop up nozzles, 2,600 direct install toilets/urinals, 10 smart irrigation controller vendor incentives, 60 large
landscape water use reports, 50 large landscape surveys/incentives, 20 commercial kitchen rebates/vouchers, and 10 cooling tower/process water retrofit incentives.

Water Shortage Allocation Plans

Cal Water has also developed Water Shortage Allocation Plans (WSAP), which are plans of action to reduce water demand should significant water supply shortages occur. These actions may be implemented for several months or several years depending on circumstances. The WSAP differs from the WCMP, which is focused on achieving permanent reductions in per capita water use by Cal Water’s customers and is not driven by significant short or long reductions in supply. In the short-term, the WSAP assists Cal Water in further reducing demand so that it matches significant reductions in supply.

Implementation of Cal Water’s WSAP for the HR system will generally be triggered by actions taken by the West Basin Municipal Water District (WBMWD) and the Metropolitan Water District (MWD). Except in unusual circumstances, Cal Water will follow the lead of these agencies when deciding whether to implement its WSAP. Cal Water has a four-stage approach that corresponds to specific levels of projected water supply shortage. Depending on the supply reduction target, this approach becomes increasingly more aggressive in requiring customer water use reductions. The stage selected depends on such factors as wholesale supply reductions, availability of alternative supplies, time of year and coordinated regional actions among all affected water utilities and agencies.

The percentage of supply shortage determined by MWD will be a significant factor in Cal Water’s decision on which stage of supply reduction it will implement for the Hermosa-Redondo system. Supply reductions percentages are shown for each of the 4 stages in Table 10.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Projected Supply Reduction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>5 to 10%</td>
</tr>
<tr>
<td>Stage 2</td>
<td>10 to 20%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>20 to 35%</td>
</tr>
<tr>
<td>Stage 4</td>
<td>35 to &gt;50%</td>
</tr>
</tbody>
</table>

Hermosa Redondo System Water Supply

Information from Cal Water’s 2010 UWMP, the 2009 WSFMP and more recent data on groundwater were used to develop the supply plan for the HR system to 2035.

The Hermosa Redondo system is supplied by the following water sources:

- Imported water purchased from Metropolitan Water District of Southern California through the West Basin Municipal Water District (WBMWD).

- Groundwater is pumped from the adjudicated West Coast groundwater basin (Silverado aquifer) currently using 2 wells. A third existing well has been inactive due to H₂S levels. Recent testing indicates that the H₂S has cleared, so it will be returned to service in 2015.
to determine if the third well can continuously operate without the need for a well head treatment system. If not, treatment will be added as scheduled in 2018. Total annual production for the 3 wells with 90% utilization is 2,890 AFY.

Recycled wastewater produced by the West Basin Municipal Water District in their West Basin Water Recycling Plant located in El Segundo.

Cal Water’s adjudicated right of the safe yield of the groundwater basin in the HR district is 4,070 AFY. However, Cal Water does not currently have the ability to sustain production and delivery of this quantity. The unused groundwater (1,170 AFY) is either sold to other entities or left for basin recharge. A portion of the unused adjudicated right can also be carried over into the following year. Cal Water intends to add treatment to existing wells in either the Dominguez or Hawthorne service areas and/or construct additional new wells in the future in order to fully use all of its West Coast Basin adjudicated water rights. Because of the potential to induce salt water intrusion into the fresh water aquifer, a fourth well with at least 1,300 AFY of production capacity (0.9 x 1,300 = 1,170 AFY) will not be constructed in the HR service area, but rather in the adjacent Dominguez service area. Since Cal Water’s purchase of WBMWD is for its three districts (Dominguez, Hermosa-Redondo and Palos Verdes) as a whole, adding an additional well in the Dominguez district with an annual effective production of 1,170 AFY allows Cal Water to allocate the equivalent amount of WBMWD water that would have gone to the Dominguez district to the HR district. Therefore, use of HR’s adjudicated right of an additional 1,170 AFY of groundwater in the Dominguez district is offset by the HR district using an equivalent amount of WBMWD supply.

For more detailed information on the groundwater system that the HR district draws water from, refer to Appendix D in the 2010 HR UWMP.

Purchased water from WBMWD, one of twenty-seven member agencies of Metropolitan Water District of Southern California (MWDSC), is estimated to 77.3% of HR’s 2015 and 71.7% of HR’s 2040 water demand. WBMWD serves as the regional wholesaler and developer of local supplies. They also provide the recycled water. The projected water supply source and volumes to meet the projected demands in Table 7 are shown in Table 11.

<table>
<thead>
<tr>
<th>Water Supply Sources</th>
<th>2010 Actual</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
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<td>11,024</td>
<td>11,292</td>
<td>11,568</td>
<td>11,849</td>
</tr>
<tr>
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<td>2,900</td>
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<td>155</td>
<td>159</td>
<td>162</td>
<td>166</td>
<td>169</td>
<td>173</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,516</strong></td>
<td><strong>13,417</strong></td>
<td><strong>13,820</strong></td>
<td><strong>14,086</strong></td>
<td><strong>14,358</strong></td>
<td><strong>14,637</strong></td>
<td><strong>14,922</strong></td>
</tr>
</tbody>
</table>
Since purchased water from WBMWD is the main source of supply, it is discussed in the following section.

**Purchased Water**

Purchased water is imported and supplied by MWDSC to WBMWD. It will continue to be the main supply source to the HR system at least through 2040.

Water from MWDSC is delivered through four interconnection feeders (Palos Verdes Feeder, Victoria Feeder, Long Beach Lateral and Extension and the Sepulveda Feeder) to WBMWD and through WBMWD service connections to the HR system. The maximum flow rate capacity of the service connections is much higher that the HR distribution system could accommodate so supply is not constrained by the delivery system.

Cal Water has a supply purchase agreement with WBMWD. Water purchased by Cal Water and supplied to the HR system comes from either the Colorado River Aqueduct, which is owned by MWD, or through the California Aqueduct, a facility of the State Water Project (SWP), which is owned and operated by the California Department of Water Resources (DWR).

MWD classifications of service and rate structure have changed in recent years and further changes are anticipated. Key to these changes is a purchase agreement for imported water between WBMWD and MWD. This agreement became effective January 1, 2003, had an initial term of five years, and establishes requirements for water sales within MWD’s service area. The agreement sets a Base Allocation for each Purchaser, which is essentially their share of the supply MWD has made available to WBMWD. The Base Allocation is determined on that Purchaser’s five-year average non-surplus purchases during fiscal years ending 1997 through 2001. Over the term of the agreement, the Purchaser commits to purchase at least 60 percent of the Base Allocation times five, which is known as the Purchase Commitment. If a Purchaser does not purchase the full Purchase Commitment over the term of the agreement, then they must pay for the balance at the current Tier 1 Supply Rate.

A two-tier rate and annual allocation is another aspect of this agreement. The agreement sets a Tier 1 Annual Maximum at 90 percent of the Base Allocation. All water purchased in any year in an amount that is equal to or less than the Tier 1 Maximum will be purchased at the current Tier 1 Rate. Any amount of water purchased in excess of the Tier 1 Annual Maximum will be at the Tier 2 Rate. In 2013, the Tier 1 rate for water purchased from WBMWD was $1,089/AF and the Tier 2 rate was $1,239/AF.

In the Imported Water Purchase Agreement between Cal Water and WBMWD, the Base Allocation, Tier Allocations, and Purchase Commitment are established as a combined amount for all four Cal Water systems served (Palos Verdes, Hermosa-Redondo, Dominguez and Hawthorne). The HR system shares in the combined amount with the other three service areas. The agreement became initially effective on January 1, 2003. There have been several subsequent amendments, with No. 4 dated January 1, 2008, being the most recent. It eliminated Cal Water’s Base Allocation, set the Tier 1 Annual Maximum to 70,000 acre-feet and the Purchase Commitment is 210,000 acre-feet. Cal Water has developed an allocation that distributes the Tier 1 Annual Maximum to each of its four districts, so that if the total Tier 1 Maximum is exceeded the applicable Tier 2 charges can be assessed to the appropriate district. Allocations among the four service areas are as follows: Dominguez 22,400 AF, Hawthorne 4,900 AF, Hermosa-Redondo 16,800 AF, and Palos Verdes 25,900 AF.
Purchased water is delivered through four WBMWD service connections from two MWDSC distribution feeders: the West Basin Feeder and the Palos Verdes Feeder. Because the four connections are located on these feeders, the HR system is completely reliant on these two feeders. Two other MWDSC feeders, the West Coast Feeder and the Sepulveda Feeder, also serve the region, and could be used as additional connections to improve system reliability. The total rated capacity of the four service connections is 26,930 gpm (38.8 mgd).

**Groundwater**

In 1961 the West Coast Sub-basin of the Coastal Plain of Los Angeles was adjudicated, with the Department of Water Resources as Watermaster. A copy of the adjudication order is located in Appendix J of the UWMP. The Department of Water Resources’ Annual Summary of Watermaster Service reports on groundwater status in the basin. This summary includes historical fluctuation of water level elevation in wells throughout the basin. These references indicate that, since the reduction in pumping began in 1954 and the adjudication was implemented in 1961, groundwater levels in the West Coast Basin have risen some 20 to 60 feet, depending on location. However, many groundwater elevations in the basin remain below sea level, requiring the maintenance of seawater intrusion barriers.

The West Coast basin is a pressurized aquifer groundwater basin with three primary aquifers: the 200-foot Sands, the Silverado Aquifer, and the Lower San Pedro Aquifer. These aquifers have continuity with the Pacific Ocean in Santa Monica Bay. Overdraft of the basin was caused by excessive pumping due to population growth and rapid industrialization of the Los Angeles Coastal Plain beginning in the 1930s. This overdraft caused lowering of the piezometric head of the aquifers, which increased pumping cost and resulted in seawater intrusion. The adjudication of the West Coast Basin began in 1945 when Cal Water, along with the City if Torrance and the Palos Verdes Water Company filed a lawsuit in Superior Court, Los Angeles County, to quiet title to the groundwater rights and control pumping in the basin. As part of the effort to resolve the overdraft condition, the West Basin Municipal Water District was formed in 1947 to distribute supplemental water to the major water purveyors imported into the region by the Metropolitan Water District of Southern California (MWD). In 1955 when pumpers realized the severity of the overdraft, groundwater pumping was limited under an interim agreement. In 1961, the Court rescinded the interim agreement and signed the West Coast Basin Judgment.

The Hermosa-Redondo district exercises an annual adjudicated right of 4,070 AF. This right is comprised of 3,071 AF issued to the District as part of the adjudication and 999 AF acquired when Cal Water purchased the Palos Verdes District from the Palos Verdes Water Company. Cal Water is active in leasing its unused annual water rights.

Three HR district wells can produce 2,000 gpm if operated at the same time. If operated 90% of the time, they would produce 2,900 AFY; hence, the need for an additional well to produce 1,170 AFY. The plan is to add a new well with a production capacity of approximately 805 gpm (90% utilization rate) in the future in the Dominguez district to produce 4,070 AFY of groundwater supply or improve the equivalent of amount of production from existing wells in the Dominguez district.
Figure 5 shows that the average groundwater level for the HR Service area has remained between 90-110 feet below surface since 1990.

Figure 5: Hermosa-Redondo District Average Well Level

Seawater intrusion has been a problem in the West Coast Basin since the 1930's. Two seawater intrusion barriers, the West Coast Basin Barrier and the Dominguez Gap Barrier, have addressed the threat of losing the basin to salt water. The Los Angeles County Department of Public Works operates both barriers and the Water Replenishment District buys the water used in these facilities from WBMWD. The West Coast Basin Barrier, comprised of 149 injection wells situated approximately parallel with the Santa Monica Bay coastline, has a greater impact on the operations of the Hermosa-Redondo District than does the Dominguez Gap Barrier, a much smaller facility, providing protection along the San Pedro Bay in the southern portion of the basin.

The West Coast Basin Barrier has effectively halted the intrusion of seawater along the coastline adjacent to the district; however, the timing and location of the installation allowed a plume of saline water to become entrapped inland of the barrier. This plume has been responsible for the closure of at least six wells in the Hermosa-Redondo service area.

The plume has continued to migrate inland, driven by groundwater elevations that are at or above sea level. Such elevations are intensified by water injections designed to prevent further
intrusion and a pumping depression resulting from heavy groundwater production by oil refineries in the Wilmington area. Estimates indicate that this plume originally contained 300,000 AF of brackish water making it difficult to site new groundwater wells.

Dominguez Water Corporation, with the support of the West Basin Municipal Water District, the Water Replenishment District of Southern California (WRD), Metropolitan Water District of Southern California and the United States Bureau of Reclamation, established a seawater desalinization demonstration project in July of 1993. Their effort has demonstrated that this plume can be extracted, treated, and put to beneficial use in an economical manner. That cost is further reduced through an incentive program offered by MWDSC so that the unit cost to the customer is less than the imported service from MWDSC. Following the merger of Cal Water and Dominguez in 2000, Cal Water has operated this desalination facility.

WRD is a public agency responsible for eliminating annual overdraft, reducing historical overdraft in both the West Coast and Central Basins, and protecting these basins from seawater intrusion or other contamination. Additionally, the WRD manages various groundwater quality cleanup programs. To finance its designated responsibilities the WRD levies a Replenishment Assessment on every acre-foot of groundwater produced in the Central and West Coast Basins.

The Los Angeles County Department of Public Works owns and operates all groundwater recharge facilities as a county funded activity through a longstanding inter-agency agreement. As a result, the costs associated with the capture and recharge of storm runoff water is not directly accountable in the cost of water replenishment. All other water used for replenishing the groundwater of the Central and West Coast Basins is funded by the WRDSC through the Replenishment Assessment.

The principle mechanisms for recharge in the West Coast Basin are the injection of water into the seawater intrusion barriers, in-lieu replenishment, and inflow to the West Coast Basin from the Central Basin. The Central Basin is recharged through percolation of water applied to surface spreading ponds in the Montebello Forebay.

Basin Boundaries and Hydrology

The West Coast Subbasin is bounded on the north by the Ballona Escarpment, an abandoned erosion channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills. The surface of the sub-basin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay.

The District is situated on the following basin:
- South Coast Hydrologic Region
- Coastal Plain of Los Angeles Basin
- West Coast Sub-basin
- Groundwater Basin Number: 4-11.03
A detailed description of the basin is given in the California's Ground Water Bulletin 118, Appendix D. Also, a brief summary of the basin adjudicated water rights is given in Appendix A at the end of this WSA.

**Groundwater Management Plan**

As the regional groundwater management agency for two of the most utilized groundwater basins in the state of California, the WRD plays an integral role in overall water resource management in southern Los Angeles County. The WRD manages groundwater for nearly four million residents in 43 cities of southern Los Angeles County. The 420 square mile service area uses about 250,000 acre-feet of groundwater per year, which equates to nearly 40 percent of the total demand for water. The WRD ensures that a reliable supply of high quality groundwater is available through its clean water projects, water supply programs, and effective management principles. A copy of the WRD Strategic Plan is included as Appendix J.

**Recycled Water**

Recycling of wastewater offers several benefits to Cal Water and its customers by helping to maintain a sustainable groundwater supply through direct recharge or by reducing potable water demand when recycled water is used for landscape irrigation and industrial uses previously served by potable water.

The HR service area currently receives recycled water from WBMWD, which acquires controls, distributes, and sells recycled water to several cities and agencies in the greater Los Angeles area.

WBMWD has constructed what is one of the largest water reuse projects in the United States. In its Phase I User Report, over 105 economically feasible recycled water users were identified with a combined estimated average annual demand of 19,100 AF. The project, when fully constructed, has the potential to deliver nearly 70,000 AF of tertiary treated recycled water per year. Following treatment at the Hyperion Water Treatment Plant owned by the city of Los Angeles and located near the Los Angeles airport, recycled water is being used for injection at the seawater intrusion barriers, for industrial operations and for landscape irrigation. Since 1995 the injection of recycled into the West Coast Basin Barrier has totaled over 100,000 AF. Figure 6 is a schematic of WBMWD’s distribution system.
Figure 6: WBMWD Recycled Water System
The Los Angeles County Sanitation District (LACSD) owns, operates, and maintains the sewer system consisting of gravity sewers, pumping stations, and force mains to collect wastewater in the Hermosa-Redondo service area. Collected wastewater is discharged to trunk sewers and interceptors owned and operated by the LACSD. The wastewater is conveyed to LACSD’s Joint Water Pollution Control Plant in Carson, where it receives secondary treatment prior to discharge through an ocean outfall. Although this plant does not currently produce recycled water, it is being considered as a potential source of recycled water in the future.

Supply Adequacy and Reliability Assessment

This section combines and compares previously presented information on projected demand and supplies for the Hermosa-Redondo system to address the question of whether its supplies are adequate and reliable for the next 20 years for normal hydrologic conditions, one dry year and a multiple dry year period. Note that supply equals demand due to the fact that the connections of the HR distribution system to the WBMWD water transmission system enable Cal Water to draw water needed to meet demand. Using more groundwater from HR district wells reduces the amount of water delivered by WBMWD.

Normal Water Year

Groundwater supply is limited to Cal Water’s adjusted pumping allocation (APA) and by the capacity of wells to pump water. As explained previously, Cal Water will increase its active pumping capacity through new and existing wells within its combined service area located in the West Coast Basin to enable it to fully use its APA by 2018.

Cal Water’s combined projected purchased water for all four of its districts receiving WBMWD water will be below its Tier I maximum of 70,000 AFY in normal hydrologic years.

According to MWDSC’s 2010 Regional Urban Water Management Plan, sufficient supplies of imported water will be available in normal hydrologic years to meet all projected demands. For the WSA analysis, normal demand equals the SBx7-7 target water demand projection plus recycled water use. Table 12 simply shows that total supply (Table 11) is equals projected demand (Table 7) for a normal hydrologic year because of the way in which the hydraulics of the MWDSC and WBMWD systems are connected to the HR system and operated. Any reduction in pumped groundwater is made up by purchased water supply.

<table>
<thead>
<tr>
<th>Water Supply Sources</th>
<th>2010 Actual</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Basin Municipal Water District</td>
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<td>11,024</td>
<td>11,292</td>
<td>11,568</td>
<td>11,849</td>
</tr>
<tr>
<td>Pumped groundwater</td>
<td>1,424</td>
<td>2,890</td>
<td>2,900</td>
<td>2,900</td>
<td>2,900</td>
<td>2,900</td>
<td>2,900</td>
</tr>
<tr>
<td>Recycled Water</td>
<td>134</td>
<td>155</td>
<td>159</td>
<td>162</td>
<td>166</td>
<td>169</td>
<td>173</td>
</tr>
<tr>
<td>Total Supply = HR + WFP Demand</td>
<td>12,516</td>
<td>13,417</td>
<td>13,820</td>
<td>14,086</td>
<td>14,358</td>
<td>14,637</td>
<td>14,922</td>
</tr>
</tbody>
</table>
**Single Dry Year**

Cal Water projects no decrease in total supply available and that it will meet projected demands. As noted in the previous section, groundwater and recycled water are expected to be available in the quantities projected and are not affected by a single dry year. MWDSC’s 2010 Regional Urban Water Management Plan indicates sufficient supplies of imported water will be available in single dry years to meet all of its projected demands. MWDSC indicates that the policies in its 2010 Integrated Resources Plan update will insure this reliability. Therefore, the supply is projected to be fully meet demand during a single dry year as shown in Table 13.

<table>
<thead>
<tr>
<th>Water Supply Sources</th>
<th>2010 Actual</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
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</tr>
</tbody>
</table>

**Multiple Dry Year Period**

Because of adequate existing groundwater basin storage and ongoing regional groundwater recharge programs to maintain storage, groundwater supply is considered reliable. Therefore, Cal Water anticipates it will be able pump up to its annual APA based on need and well production capacity. The quantity of recycled water to be delivered in the Dominguez system during a multiple dry year period is expected to be the same as that delivered during a normal hydrologic year.

MWDSC’s 2010 Regional Urban Water Management Plan indicates that sufficient supplies of imported water will be available during multiple dry years to meet all projected demands. MWDSC believes that the policies in the 2010 IRP update will ensure reliability.

Since California is in the fourth year of a severe drought, Governor Brown issued an executive order on April 1, 2015 mandating urban water users achieve a 25% reduction in demand over at least the next year. The specifics of how that order will be implemented by the state, MWDSC, WBMWD and Cal Water will be developed in the coming months.

A supply reduction of 15% was announced on April 10, 2015, by MWDSC to be implemented on July 1, 2015. It is assumed that the 15% reduction will apply to years 2016 and 2017. Table 14 presents this water supply scenario for an assumed continued dry year period from 2015 - 2017. It is noted that during dry years when deliveries from the Colorado River Aqueduct and the State Water Project are reduced, MWDSC can draw water from other storage areas established through groundwater banking and transfer agreements made with other agencies. These agreements are described in MWDSC’s Water Surplus and Drought Management Plan (WSDM Plan).

HR system demand is assumed to decrease by 15% of the estimated baseline demand for 2015. So revised demand for 2015, 2016 and 2017 is assumed to be: 0.85 x 13,417 = 11,400 AFY.
The quantity of groundwater to be pumped and recycled water used is the same as shown in Table 11. Groundwater pumping and recycled water are not expected to be affected by a multiple dry year period.

Table 14 shows that with cut backs in MWDSC supply of 15 percent for two more years, HR system supplies would be adequate to meet a projected demand reduced by 15%. In fact, if needed, Cal Water could set and pursue lower demand targets as spelled out in the section on Water Demand Management.

In 2015, supply surplus is estimated to be 1,239 AFY. In 2016, supply surplus is estimated to be 464 AFY and in 2017, it is estimated to be 466 AFY.

**Table 14: Multiple Dry Year Period Scenario - AF**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Purchased</td>
<td>10,372</td>
<td></td>
<td>9,594</td>
<td>8,816</td>
<td>8,816</td>
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<tr>
<td>Recycled</td>
<td>155</td>
<td></td>
<td>155</td>
<td>158</td>
<td>160</td>
</tr>
<tr>
<td>Groundwater</td>
<td>2,890</td>
<td></td>
<td>2,890</td>
<td>2,890</td>
<td>2,890</td>
</tr>
<tr>
<td>Total Supply</td>
<td>13,417</td>
<td></td>
<td>12,639</td>
<td>11,864</td>
<td>11,866</td>
</tr>
<tr>
<td>Estimated Drought Demand</td>
<td>11,400</td>
<td></td>
<td>11,400</td>
<td>11,400</td>
<td>11,400</td>
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</tbody>
</table>

Because of existing severe drought conditions, Cal Water will be implementing more aggressive water conservation program measures during the period from 2015 to 2017 and possibly beyond. Therefore, it is reasonable to project an additional 10% reduction in demand resulting in a total reduction of the 2015 estimated baseline demand by 25% or from 13,417 AFY to 10,062 AFY.

**WSA Summary and Conclusion**

Based on:
- Adequacy of existing and planned supplies from MWDSC and WBMWD,
- Plans to construct new wells and maintain existing wells in order to fully utilize its adjudicated groundwater rights,
- Continued use of recycled water from WBMWD,
- In-place, ongoing and planned expanded water conservation programs and best management practices for reducing demand during normal and single and multiple dry years,
- Continuing participation in regional supply programs sponsored by WBMWD and MWDSC,
- Proven record in obtaining further reductions in water use during multiple dry years by implementing its four-stage water demand reduction program, and
- Over 85 years of experience in continuously providing an adequate supply to meet demands during normal, single and multiple dry years in the Hermosa-Redondo service area,

Cal Water concludes that for the next 20 years (2015 – 2035), the Hermosa-Redondo district or system will have adequate water supplies to meet projected demands associated with the proposed
WFP and those of all existing customers and other anticipated future customers for normal, single dry year and multiple dry year conditions.

References

   https://www.calwater.com/conservation/uwmp/rd/

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   Metropolitan Water District of Southern California, Water Resource Management Group  
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4. THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA WATER SURPLUS AND DROUGHT MANAGEMENT PLAN Report No. 1150, August1999  

5. City of Redondo Beach Draft EIR The Waterfront Project, March 2015

Appendix A

Groundwater Basin and Adjudicated Rights

The Hermosa Redondo system is situated over the following areas:

- South Coast Hydrologic Region
- Coastal Plain of Los Angeles Basin
- Central Coast Subbasin: groundwater basin number: 4-11.04
- West Coast Subbasin: groundwater basin number: 4-11.03

The West Coast Subbasin is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills. The surface of the sub-basin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay.

The Central Coast Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Basin. This subbasin is bounded on the north by a surface divide called the La Brea High and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the
Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift. The Los Angeles and San Gabriel Rivers drain inland basins and pass across the surface of the Central Basin on their way to the Pacific Ocean.

In 1965, the Central Coast Basin was adjudicated, and in 1961 the West Coast Subbasin, with the Department of Water Resources as Watermaster. The adjudication orders are attached in the UWMP document as Appendices J and K for each basin. The Department of Water Resources' Annual Summary of Watermaster Service reports on groundwater status in the basin. This summary includes historical fluctuations of water level elevations in wells throughout the basin. These references indicate that, since the reduction in pumping began in 1954 and the adjudication was implemented in 1961, groundwater levels in the West Coast Basin have risen approximately twenty feet. However, most groundwater elevations in the basin remain below sea level, requiring the maintenance of seawater intrusion barriers.

The West Coast Basin is a pressurized aquifer groundwater basin with three primary aquifers: the 200-foot Sands, the Silverado Aquifer, and the Lower San Pedro Aquifer. These aquifers have continuity with the Pacific Ocean in Santa Monica Bay. Overdraft of the basin was caused by excessive pumping due to population growth and rapid industrialization of the Los Angeles Coastal Plain beginning in the 1930s. This overdraft caused lowering of the piezometric head of the aquifers, which increased pumping cost and resulted in seawater intrusion. The adjudication of the West Coast Basin began in 1945 when California Water Service Company, along with the City of Torrance and the Palos Verdes Water Company, filed a lawsuit in Superior Court, Los Angeles County, to quiet title to the groundwater rights and control pumping in the basin. As part of the effort to resolve the overdraft condition, the West Basin Municipal Water District was formed in 1947 to distribute supplemental water to the major water purveyors that was imported into the region by the Metropolitan Water District of Southern California. In 1955 when pumpers realized the severity of the overdraft, groundwater pumping was limited under an interim agreement. In 1961, the Court rescinded the interim agreement and signed the West Coast Basin Judgment.

The Dominguez Water Company was identified as a party to the judgment and granted water rights. Now California Water Service Company, as a result of the merger with Dominguez, owns 10,417.45 acre-feet of adjudicated rights in the West Coast Basin, or 16.15 percent of the total basin annual adjudicated rights of 64,486.25 acre-feet. This amount is in addition to the 4,070 acre-feet held by Cal Water’s Hermosa-Redondo District. As a result of the reduction in pumping ordered by the adjudication and increased recharge via the injection wells of the seawater intrusion barrier, in-lieu replenishment and improved underflow from Central Basin, the water levels in the West Coast Basin have slowly recovered to near 1940 levels.

The development of the deep well turbine in 1909 made efficient, economic water wells widely available. With the enhancement this technology provided to the water supply available to the Los Angeles Coastal Plain, rapid expansion of the industrial and agricultural water uses occurred and was accompanied with a corresponding population growth. In Central Basin, between the years 1934-35 and 1960-61, as a response to a doubling in the population, both the overall water use and the use of groundwater increased more than 100 percent. Groundwater use during that period went from 169,000 acre-feet to 358,000 acre-feet per year. The increase in groundwater use resulted in overdraft of the Central Basin.

The adjudication of the Central Basin began not out of litigation as in the West Coast Basin, but out of the collective concern expressed by the major pumpers regarding the impacts that reduced groundwater quantity and quality would have on the future of their communities. The Central Basin Municipal Water District was formed in 1952 to distribute supplemental water to the major water purveyors. In 1954 it was annexed to the Metropolitan Water District of Southern California, so that access to the imported water supplies was available to the region. The groundwater basin's Watermaster is the Department of Water Resources.

The Water Replenishment District was created in 1959, largely out of cooperation between the West Coast Basin Water Association and the Central Basin Water Association, with the directive to facilitate artificial replenishment of the two basins as a means of eliminating the overdraft and halting seawater intrusion. To quiet the title to and limit production of the groundwater in Central Basin, the Replenishment District filed a
lawsuit in Superior Court, Los Angeles, in 1962 against more than 700 parties. Later that year after a vast majority of the pumpers approved of the approach, the Court adopted an interim agreement to limit the production from the basin. In 1965, following extensive meetings by the parties to work out a settlement, which was supported by pumpers representing over 75 percent of the basin’s anticipated water rights, the court approved the stipulated judgment for the Central Basin.

This judgment established an adjudicated water right for each party, but limited the allowable pumping allocation to 80 percent of the water rights, which equals 217,214 acre-feet annually. The Dominguez Water Company was identified as a party to the judgment and granted water rights. Now California Water Service Company, as a result of the merger with Dominguez, owns 6,480 acre-feet of adjudicated right in the Central Basin, or 2.9 percent of the total basin annual adjudicated right of 217,214 acre-feet. This amount is in addition to the 11,774 acre-feet held by Cal Water’s East Los Angeles District.

The principle mechanisms for recharge in the West Coast Basin are the injection of water into the seawater intrusion barriers, in-lieu replenishment, and inflow to the West Coast Basin from the Central Basin. The Central Basin is recharged through percolation of water applied to surface spreading basins in the Montebello Forebay, in-lieu replenishment, and inflow to the Central Basin from the San Gabriel Valley.

The Los Angeles County Department of Public Works owns and operates all groundwater recharge facilities as a county-funded activity through a longstanding inter-agency agreement. As a result, the costs associated with the capture and recharge of storm runoff water is not directly accountable in the cost of water replenishment. All other water used for replenishing the groundwater of the Central and West Coast Basins is funded by the WRDSC through the Replenishment Assessment. Additionally, the WRDSC manages various groundwater quality cleanup programs. To finance its designated responsibilities, the WRDSC levies a Replenishment Assessment on every acre-foot of groundwater produced in the Central and West Coast Basins.