# CITY OF PICO RIVERA

## (Pico Rivera Water Authority)

## 2010 Urban Water Management Plan

Adopted July 26, 2011

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# Abbreviations

| | |
|---|---|
| Act | Urban Water Management Planning Act |
| AF | Acre-Feet |
| AFY | Acre-Feet per Year |
| APA | Allowed Pumping Allocation |
| BMP | Best Management Practice |
| CBMWD | Central Basin Municipal Water District |
| CII | Commercial/Industrial/Institutional |
| CIMIS | California Irrigation Management Information System |
| City | City of Pico Rivera |
| CUWCC | California Urban Water Conservation Council |
| CDPH | California Department of Public Health |
| District | Pico Water District |
| DMM | Demand Management Measures |
| DWR | California Department of Water Resources |
| ETo | evapotranspiration |
| FY | Fiscal Year |
| gpd | gallons per day |
| gpcd | gallons per capita per day |
| GIS | Geographical Information System |
| HCF | hundred cubic feet |
| HEW | High-Efficiency Washer |
| LACSD | Los Angeles County Sanitation Districts |
| MCL | Maximum Contaminant Level |
| Metropolitan | Metropolitan Water District |
| mgd | million gallons per day |
| mg/L | milligrams per liter |
| PRWA | Pico Rivera Water Authority |
| RWQCB | Regional Water Quality Control Board |
| SB | Senate Bill |
| SWP | State Water Project |
| ULFT | Ultra Low Flow Toilet |
| UMWP | Urban Water Management Plan |
| WSCP | Water Shortage Contingency Plan |

# 1.0 Introduction

Since 1984, California's Urban Water Management Planning Act (Act) has required each urban water supplier in the state to prepare an urban water management plan (UWMP). The requirement applies to each urban water supplier that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet (AF) of water annually. These agencies must update their UWMP at least once every five years on or before December 31, in years ending in five and zero. The deadline for submittal of the 2010 UWMP for retail water purveyors is July 31, 2011 as a result of recent legislation. Sections 10610 through 10657 of the California Water Code detail the information that must be included in these plans. In accordance with the Act, the Pico Rivera Water Authority (PRWA) is required to update and adopt its plan for submittal to the California Department of Water Resources (DWR) by July 1, 2011. **Appendix A** contains the text of the Act.

The PRWA utilized DWR's "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" and Senate Bill 7-7 (SBX 7-7). SBX 7-7 was passed in November 2009 with the goal of reducing California's urban per capita water use by 20 percent by December 31, 2020 with an incremental goal of reducing per capita water use by 10 percent by December 31, 2015. This report includes projections of PRWA's future demands and supplies, based on estimates of future growth in the PRWA service area. It also discusses the steps PRWA has taken to promote water conservation and ensure water is being used wisely. The strategies outlined in this report are intended to allow PRWA to continue to provide a safe and reliable water supply to its customers.

PRWA maintains its records of water use on a fiscal year (FY) that runs from July 1 through June 30. For example, FY 2010 runs from July 1, 2009 through June 30, 2010. In this document, projections of water demand over the course of a year are reported for fiscal years. For estimates that are based on an instantaneous value and not a year-long accumulation (for example, the service area population), values are assumed to be valid on January 1 of the corresponding year.

## 1.1 Changes to the California Urban Water Management Planning Act

Major amendments made to the Act since preparation of the PRWA's 2005 UWMP Plan include the following:

- Water Code Section 10631.1 requires a plan by retail water suppliers to include water use projections for single and multi-family residential housing needed for lower income and affordable households, to assist with compliance with the existing requirement under Section 65589.7 of the Government Code, that suppliers grant a priority for the provision of service to housing units affordable to lower income households.
- Water Code Section 10621(b) clarifies that every urban water supplier preparing a plan must give at least 60 days advanced notice to any city or county prior to the public hearing on the plan within which the supplier provides water supplies to allow for consultation on the proposed plan.
- Water Code Section 10631(j) deems water suppliers that are members of the California Urban Water Conservation Council (CUWCC) and comply with the Memorandum of Understanding (MOU), as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its UWMP.

- Water Code Section 10631.7 required DWR, in consultation with the CUWCC, to convene a technical panel, no later than January 1, 2009, to provide information and recommendations to DWR and the Legislature on new demand management measures, technologies, and approaches. The panel and DWR were to report to the Legislature on their findings no later than January 1, 2010 and each five years thereafter.
- Water Code Section 10633(d) clarifies that the "indirect potable reuse" of recycled water should be described and quantified in the plan, including a determination regarding the technical and economic feasibility of serving those uses.
- Water Code Section 10644(c) requires DWR to recognize exemplary efforts by water suppliers by obligating DWR to identify and report to the technical panel, described above, and "exemplary elements" of individual water suppliers' plans, meaning any water demand management measures adopted and implemented by specific urban water suppliers that achieve water savings significantly above the levels required to meet the conditions to state grant or loan funding.
- Water Code Section 10631.5 was amended to address conditions of eligibility for grants or loans from DWR. DWR will consider whether the urban water supplier has submitted an updated plan when determining eligibility for funds made available pursuant to any program administered by [DWR].

According to Water Code Section 10610.2(2), "[t]he conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level." **Appendix A** contains the text of the Act.

## 1.2 Senate Bills 610 and 221

Senate Bills (SB) 610 and 221 are the common names for Water Code Sections 10910 through 10914 and Government Code Sections 65867.5, 66455.3, and 66473.7. These bills amend state law to improve the link between water supply planning and land use decisions made by cities and counties. SB 610 requires that the water purveyor of the public water system prepare a water supply assessment to be included in the environmental documentation of certain large proposed projects. SB 221 requires a written verification from the water purveyor that sufficient water supplies are available for certain large residential subdivisions prior to approval of a tentative map. PRWA's UWMP provides information that will be used in future assessments and verifications prepared to meet the requirements of these bills.

## 1.3 Senate Bill 7 of the Seventh Extraordinary Session of 2009

In addition to changes in the Act listed above, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session on November 10, 2009, which became effective February 3, 2010. This new law was the water conservation component to the Delta legislation package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. Specifically, SBX 7-7 from this Extraordinary Session requires each urban retail water supplier to develop urban water use targets to help meet the 20 percent reduction goal by 2020 (20x2020), and an interim water reduction target by 2015.

The SBX 7-7 target setting process includes the following: (1) baseline daily per capita water use; (2) urban water use target; (3) interim water use target; (4) compliance daily per capita water use, including technical bases and supporting data for those determinations. In order for

an agency to meet its 2020 water use target, each agency can increase its use of recycled water to offset potable water use and also step up its water conservation measures. The required water use targets for 2020 and an interim target for 2015 are determined using one of four "Target" methods – each method has numerous methodologies. The 2020 urban water use target may be updated in a supplier's 2015 UWMP. **Appendix A** also contains the text of SBX 7-7.

Four methods are stipulated for calculating the water use target. Three of the methods are listed in Water Code Section 10608.20(a)(1). The fourth method was developed by DWR. The four methods are:

- Method 1 – Eighty percent of the water supplier's baseline per capita potable water use.
- Method 2 – Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscape area water use, and commercial, industrial, and institutional uses.
- Method 3 – Ninety-five percent of the applicable state hydrologic region target as stated in the state's draft 20x2020 Water Conservation Plan.
- Method 4 – Draft Provisional Target Method 4 (January 2011).

In 2015, urban retail water suppliers will be required to report interim compliance followed by actual compliance in 2020. Interim compliance is halfway between the baseline water use and 2020 target. Baseline, target, and compliance-year water use estimates are required to be reported in gallons per capita per day (gpcd). For consistent application of the Act, DWR produced Methodologies for Calculating Baseline and Compliance Urban Water Per Capita Use in October 2010. Discussion on the PRWA's baseline and target 2020 demands are discussed in more detail in Section 3.0.

Failure to meet adopted targets will result in the ineligibility of a water supplier to receive grants or loans administered by the State unless one (1) of two (2) exceptions is met. Exception one (1) states a water supplier may be eligible if they have submitted a schedule, financing plan, and budget to DWR for approval to achieve the per capita water use reductions. Exception two (2) states a water supplier may be eligible if an entire water service area qualifies as a disadvantaged community.

## 1.4 Resource Maximization

Water management tools have been used by PRWA to maximize water resources. To help maximize water resources, PRWA has developed and implemented various policies and plans, which are referenced throughout this UWMP. The various components of the 2010 UWMP include evaluation and descriptions of the various sources of water supply, efficient water uses, water service efficiency, demand management measures, implementation strategy, and schedule. Information in this UWMP was developed from various sources, including the draft 2010 UWMP by the Central Basin Municipal Water District (CBMWD).

## 1.5 Agency Coordination and Public Participation

PRWA coordinated the preparation of this UWMP with the appropriate agencies. PRWA is a member of the CBMWD, a water wholesaler, and information from CBMWD's draft 2010 UWMP was used.

In accordance with the Act, PRWA provided a 60-day notice to CBMWD and the District that they were reviewing and considering amendments or changes to the UWMP.

Also, in accordance with the Act, PRWA notified the land use jurisdictions (City of Pico Rivera) within its service area that it was preparing the 2010 UWMP. Copies of the draft UWMP were made available for public inspection at the PRWA office, located at 6615 Passons Boulevard, Pico Rivera, California. The 2010 UWMP will be circulated for public review for 30-days following adoption of the Draft 2010 UWMP. The adopted 2010 UWMP will also be circulated to the County of Los Angeles Department of Regional Planning.

PRWA encouraged community and public interest involvement in the UWMP update through public hearings and inspection of the draft document. A Public Hearing regarding the 2010 UWMP was held on July 26, 2011. Public hearing notifications were distributed through utility bills and published in local newspapers. A copy of the published Notice of Public Hearing is included in **Appendix B**. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to PRWA's plans for providing a reliable, safe, high-quality water supply. These coordination efforts are summarized in Table 1.

**Table 1 Coordination with Appropriate Agencies**

| Coordinating Agencies | Participated in developing the plan | Commented on the draft | Attended public meetings | Was contacted for assistance | Was sent a copy of the draft plan | Was noticed of intention to adopt | Not involved / No information |
|---|---|---|---|---|---|---|---|
| Central Basin Municipal Water District | | | | | X | X | |
| Pico Water District | | | | | X | X | |
| Citizens of Pico Rivera | X | | X | | | X | |
| Los Angeles County Public Works/Planning | | | | | | X | |

## 1.6 Adoption of the UWMP

This Urban Water Management Plan was adopted by the City of Pico Rivera (City) Council on July 26, 2011. A copy of the adoption resolution (11-27) is attached in **Appendix B**. The PRWA/City will shall implement its plan adopted pursuant to Water Code Section 10643 in accordance with the information set forth in this UWMP.

# 2.0 Service Area

This section of the report provides an overview of PRWA's service area, climate, and water supply facilities.

## 2.1 Appropriate Level of Planning

PRWA's service area has not experienced significant growth in the past five years. In fact, according to the results of the 2010 Census, Pico Rivera's population as actually decreased to 62,942 persons in recent years – in 2000, Pico Rivera's population was 63,428. Current estimates show an expected increase of an additional 7,628 people by 2035. All of PRWA's potable demands are currently met with local groundwater.

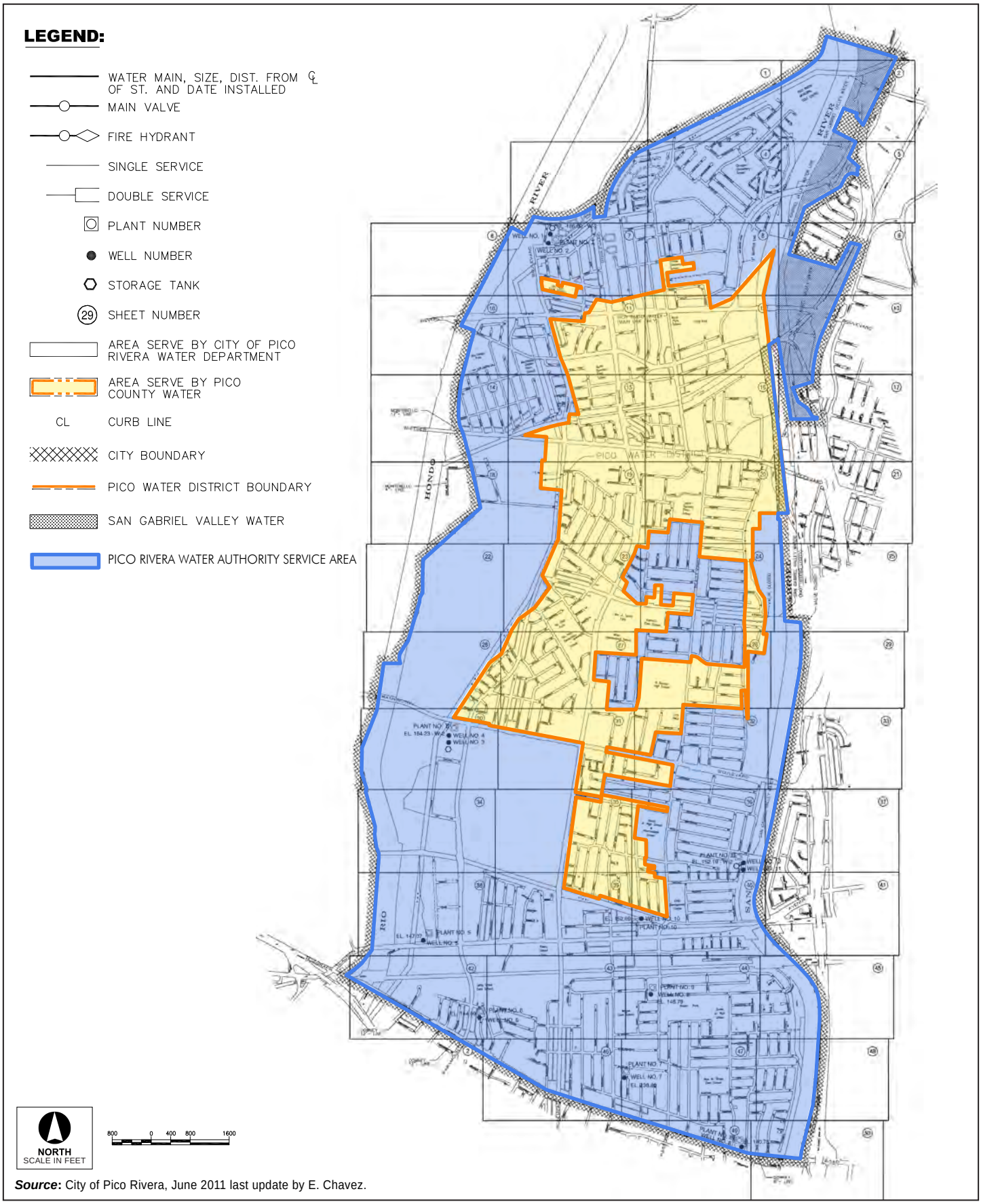
## 2.2 Service Area Description

The City of Pico Rivera (City) is located approximately eleven (11) miles southeast of downtown Los Angeles, on the eastern edge of the Los Angeles Basin, and on the southern edge of the San Gabriel Valley. The towns of Pico and Rivera, from which the City of Pico Rivera originated, were incorporated as one municipality and as a general law city on January 29, 1958. The City boundary is depicted on Figure 1.

The City is one of twenty-four (24) cities in southeast Los Angeles County and is included in CBMWD's 227-mile service area. Historically, the City's primary source of potable water supply has been groundwater extracted from the Central Basin groundwater aquifer. With naturally occurring recharge, enhanced by recharging efforts, groundwater supplies have generally been sufficient to meet water demands. Recycled water is used on the City's golf course and at the Pico Rivera sports arena.

The Pico Rivera Water Authority (PRWA) is one of two (2) independent water purveyors that provide water service to the residents of the City. All of the PRWA's customers live in the City of Pico Rivera. PRWA was formed as successor to the City's former Water Department in May 1999 to finance water system improvements. PRWA remains a division of the City and operates through a joint agreement with the City's Redevelopment Agency. PRWA currently provides drinking water to approximately 70 percent of the City's incorporated area and includes 9,400 water customers. Each purveyor maintains an independent water distribution system and operates several water supply wells used to extract the local groundwater from the Central Basin aquifer. Currently there are no inter-connections between the two agencies. Figure 1 illustrates the service area for each water purveyor. The other supplier is the Pico Water District - formed in 1926 as a County Water District under the State Water Act of 1913. The District serves approximately 30 percent of the City's incorporated area and has prepared its own draft UWMP. As such, this report addresses only the PRWA service area, demands, and supplies.

Currently, there are no inter-connections between the two agencies. Each water purveyor maintains an independent water distribution system and operates several water supply wells used to extract the local groundwater from the Central Basin aquifer. Figure 1 illustrates the service area for each water purveyor.




***Source:*** City of Pico Rivera, June 2011 last update by E. Chavez.

Figure 1

**PRWA Water Service Area**

ATKINS

As the City does not have the ability to take imported water directly into its system, imported water is used for groundwater recharge through a replenishment assessment on each acre foot of groundwater extracted from the Central Basin. The City also purchases a small amount of recycled water from Central Basin Municipal Water District (CBMWD) and Upper San Gabriel Valley Water District for irrigation uses (Pico Rivera golf course and Sports Arena). CBMWD is a member agency of the Metropolitan Water District of Southern California (Metropolitan) and is responsible for providing imported and recycled water supply within its service area. CBMWD receives imported potable water from the aqueduct systems owned and operated by Metropolitan.

## 2.3 Climate Data

The source of PRWA's groundwater supply is influenced by climate. Climatic conditions within the service area are characteristically Mediterranean, with mild, dry summers and cool winters. Most of the region's rainfall occurs between December and March. Average annual rainfall is approximately 14.8 inches per year.

Historic climate data were obtained from the Western Regional Climate Center for Station 045790 (Montebello). This station was selected because its annual temperature variation is representative of most of PRWA's service area. Evapotranspiration data were obtained from the California Irrigation Management Information System (CIMIS) for Zone 6 (Upland Central Coast and Los Angeles Basin). Climate and evapotranspiration data are summarized in Table 2.

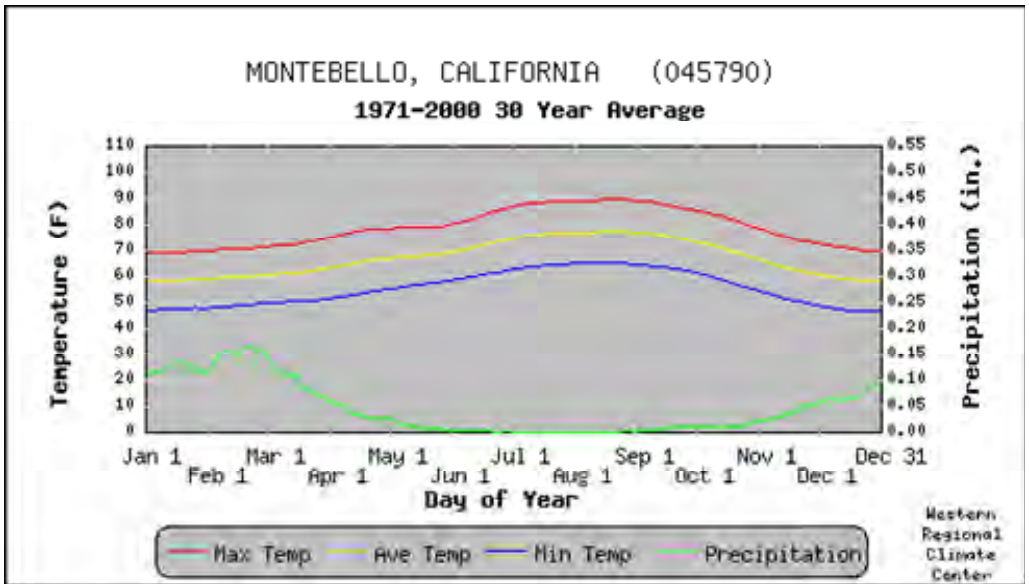
**Table 2 Climate Data**

| Month | Monthly Average Evapotranspiration (inches) | Average Rainfall (inches) | Average Temperature (Fahrenheit) |
|---|---|---|---|
| January | 1.86 | 3.69 | 58.6 |
| February | 2.24 | 3.56 | 60.0 |
| March | 3.41 | 2.82 | 61.7 |
| April | 4.80 | 0.78 | 65.4 |
| May | 5.58 | 0.19 | 68.3 |
| June | 6.30 | 0.06 | 72.3 |
| July | 6.51 | 0.01 | 76.4 |
| August | 6.20 | 0.02 | 77.5 |
| September | 4.80 | 0.17 | 75.8 |
| October | 3.72 | 0.28 | 70.5 |
| November | 2.40 | 1.26 | 63.4 |
| December | 1.86 | 1.94 | 59.0 |
| Annual | 49.7 | 14.78 | 67.4 |

Source: CIMIS for Zone 6 (Upland Central Coast And Los Angeles Basin) and Western Regional Climate Center for Station 045790 (Montebello).

The typical annual distribution for temperature and precipitation are shown in Figure 2.

**Figure 2 Average Temperature and Precipitation**




## 2.4 PRWA Water System Overview

PRWA's water service area encircles the District's service area and also overlies the Central Basin within the San Gabriel River watershed. As shown above on Figure 1, PRWA's service area encompasses approximately 10 square-miles and includes approximately 9,400 customers, and 98 miles of water distribution system.

Since 2006, the PRWA has augmented its water supply with treated water originating from CBMWD's Water Quality Protection Project (WQPP) wells. The WQPP is a federally funded project developed to protect the Central Basin from the migration of a contaminant plume containing volatile organic compounds (VOCs) from the San Gabriel Valley into the Central Basin's local ground water supply. The contaminated water is treated to meet drinking water standards at a treatment facility located on the City of Whittier's treatment facility site. The treated water is sold and distributed via the potable water distribution systems to the cities of Pico Rivera, Santa Fe Springs, and Whittier for residential, commercial, and industrial uses. Federal funding has currently run out and contract cities must pay operation and maintenance cost. However, continued Federal Funding has been recommended to be extended and is being considered by the Appropriations Committee in 2009. Additionally, PRWA has an emergency interconnection with the City of Whittier and the San Gabriel Valley Water Company.

The Central Basin contains millions of acre feet of storage and is the principal source of water for the overlying cities and water districts, including the PRWA. The Central Basin groundwater comprises a number of sources: 1) natural recharge from precipitation and runoff from regional/local watersheds; 2) artificial recharge supplied through purchased imported water; and 3) treated effluent from regional wastewater treatment facilities. As stated above, the WRD manages the ongoing artificial recharge activities within the Central Basin groundwater area. Ongoing negotiations amongst the Central Basin groundwater users may eventually allow each Central Basin member agency to extract up to 20 percent over its APA, provided the over-extraction can made up the following year. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused

APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease on purchases each year.

The PRWA's water distribution system includes a total of twelve (12) wells, some of which are no longer active. In conjunction with the wells, the supply system includes three (3) booster pump stations and three (3) reservoirs with a combined storage of approximately 1 million gallons. In early 2009, Well Nos. 5, 7, 9, and 10 were all inactive and/or inoperable and not currently being used due to various forms of contamination including excessive bacteria, iron and sand detected in the water supply.

PRWA operates its water system under the authority of Water Supply Permit No. 04-070PA-000, issued by DPH on February 2, 2000, which was an amendment to Water Supply Permit No. 77-014. Permit-approved sources for domestic water supply of the system include groundwater from and treatment at Wells 1, 2, 3, 4, 11, and 12. Groundwater production averaged 5,659 AFY over 1991 through 2007, but has decreased slightly in the last few years. In years that PRWA exceeds its APA, the PRWA has leased groundwater rights from other Central Basin users to meet customer demands.

Currently, customers use potable water for landscape irrigation. CBMWD's Rio Hondo water reclamations program supplies a local golf course with 60 AFY, which has a projected demand of up to 200 AFY.

## 2.5 Service Area Population

PRWA's residents are employed in a variety of professions ranging from professional and administrative to laborer and warehouse positions. The median age of City residents is 30.6 years, and the median family income is estimated at about $45,422 per year. The average residence has 3.8 persons per-dwelling unit. PRWA's service area is built-out, with land use being 41 percent facilities, 36 percent residential, 14 percent manufacturing, 4 percent commercial, and 3 percent public parks. The projected growth is based on anticipated densification within the existing residential areas. The City's Population is served by PRWA and the District. The estimated service area population is shown in Table 3.

**Table 3 Population – Current and Projected**

| | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| PRWA Service Area | 39,002 | 39,957 | 40,934 | 41,936 | 42,963 | 44,014 |
| City of Pico Rivera | 62,942 | 64,482 | 66,061 | 67,677 | 69,334 | 70,570 |
| Compound Annual Growth Rate | 0.484% | 0.484% | 0.484% | 0.484% | 0.484% | 0.484% |

Notes:
a. PRWA 2009 Water System Master Plan
b. Derived by Atkins for 2010 UWMP Update based on 2010 US Census population counts within the City of Pico Rivera that reflects changes in population (a Citywide decline in between 2000 and 2010) due to a downturn in economic conditions

# 3.0 Service Area Demand

Water use and production records, combined with projections of population, employment, and urban development, provide the basis for estimating future water demands. This section presents information regarding regional demographics, customer based unit water use, total historical water use, and projections of future PRWA water demands.

## 3.1 Water Use by Type for Past, Current and Future Deliveries

PRWA maintains records of its water consumption and its number of customers by customer type. Historic water use data from FY 2005 is summarized in Table 4.

**Table 4 Water deliveries — actual, 2005**

| Water Use Sectors | 2005 Metered | |
|---|---|---|
| | # of accounts | Volume (AF) |
| Single-family residential | 8,963 | 3,776 |
| Multi-family residential | | |
| Commercial / Industrial | 384 | 1,729 |
| Institutional/ Governmental | 11 | 224 |
| Landscape | 40 | |
| Other | 0 | 0 |
| Total | 9,398 | 5,729 |

Source: PRWA 2005 UWMP and PRWA 10-Year Water Use data

PRWA distributes retail water supply directly to its customers, which include residential (single- and multi-family), commercial, and landscape irrigation users. FY 2010 data are summarized in Table 5. No water sales are made by PRWA to other water agencies, and additional water uses are identified and quantified in Table 10.

**Table 5 Water deliveries — actual, 2010**

| Water Use Sectors | 2010 Metered | |
|---|---|---|
| | # of accounts | Volume (AF) |
| Single-family residential | 8,810 | 3,361 |
| Multi-family residential | 40 | 261 |
| Commercial / Institutional/Governmental | 402 | 945 |
| Landscape | 38 | 223 |
| Other | 111 | 6 |
| Total | 9,401 | 5,300 |

Source: DWR Water Report for PRWA

In 2009, a 3-year water supply shortage coinciding with an economic recession required PRWA to impose mandatory conservation. In 2010 mandatory conservation continued and the economic recession became more severe. This resulted in FY 2010 water use decreasing by 16 percent from FY 2005 levels. Over 90 percent of PRWA's customers are single-family residences. The relative composition of PRWA's customers is expected to remain consistent.

Customer sectors, such as commercial, governmental, and institutional, are expected to grow at the same rate to support the residential development. PRWA's projected water consumption is shown in Table 6.

**Table 6 Water deliveries — projected 2015, 2020, 2025, 2030, and 2035 (AF)**

| Water Use Sectors | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Single-family residential | 3,463 | 3,463 | 3,461 | 3,545 | 3,632 |
| Multi-family residential | 269 | 269 | 269 | 275 | 282 |
| Commercial / Institutional/Governmental | 974 | 974 | 973 | 997 | 1,021 |
| Landscape | 230 | 230 | 230 | 235 | 241 |
| Other | 6 | 6 | 6 | 6 | 6 |
| Total | 5,461 | 5,461 | 5,457 | 5,590 | 5,727 |

Note: A one-percent increase per five years was applied to both the number of accounts and the total deliveries.

The City of Pico Rivera is currently undergoing a comprehensive update of its General Plan, as part of this effort; the City of Pico Rivera anticipates land use changes due to redevelop projects within the city limits. Future growth within PRWA's service area is likely to be impacted by these redevelopment projects, as such the estimated growth in number of customers is shown in Table 7 and projected over the twenty-five (25) year planning horizon.

**Table 7 Customer Growth — projected 2015, 2020, 2025, 2030, and 2035**

| Water Use Sectors | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Single-family residential | 8,898 | 8,987 | 9,077 | 9,168 | 9,259 |
| Multi-family residential | 40 | 41 | 41 | 42 | 42 |
| Commercial / Institutional/Governmental | 406 | 410 | 414 | 418 | 423 |
| Landscape | 38 | 39 | 39 | 40 | 40 |
| Other | 112 | 113 | 114 | 116 | 117 |
| Total | 9,495 | 9,590 | 9,686 | 9,783 | 9,881 |

Note: A one-percent increase per five years was applied to both the number of accounts and the total deliveries

## 3.2 Low-Income Water Demand Projections

The requirements for the 2010 UWMP call for projections of water demands for low-income customers. PRWA reviewed the Housing Element from the City Pico Rivera General Plan, which forecasts projections out to 2035. It is estimated that up to 808 low income units remain to be constructed within the city limits; of this a percentage could be built within the PRWA's service area. This 2010 UWMP assumed up to 500 units (62 percent of 808 units) would be constructed over the next 20 to 25-years – for planning purposes, it is assumed that construction of these dwelling units would be spread equally over the 25-year planning horizon. With these assumptions, this UWMP estimated approximately 12 units per year would be built or 61 units every five years.[1] Demands for the projected low-income housing projects were estimated using the PRWA's planning demand criteria in their 2009 WSMP at 3.5 persons person per dwelling unit and approximately 530 gallons per day per residential dwelling unit (or 265,000 gpd). Projected water demands were then distributed equally throughout 2015 and

1 Consistent with Housing Element - 47 new units were constructed between 2006 and 2010.

2030. These demands as shown in Table 8 have been assumed as part of the general growth within PRWA and have been included in the PRWA's residential potable water demand projections.

**Table 8 Low-income projected water demands (AF)**

| Low Income Water Demands | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Residential[a] | 59 | 59 | 59 | 59 | 59 |
| Total | 59 | 59 | 59 | 59 | 59 |

Notes:
a. Assumes multiple family units would be constructed as redevelopment occurs over 20 years. Source: Estimated as percentage of City of Pico Rivera Population – information taken from Source data from forthcoming Pico Rivera 2010 General Plan Update, SCAG or RHNA numbers Pico Rivera 2010 General Plan Update

## 3.3 Service Area Sales and System Losses

As shown in Table 9, PRWA does not sell any water to other agencies.

**Table 9 Sales to other water agencies (AF)**

| Water Distributed | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| None | 0 | 0 | 0 | 0 | 0 | 0 |

System losses are the total difference between the total PRWA delivered water and the total amount pumped from groundwater wells. Generally system losses are associated with leaks, pipeline breaks, illegal connections, and unmetered fires. Average unmetered water since 2005 has ranged from about 4 to 10 percent, which is consistent with industry standards of approximately 10 percent. System losses have not been included in Table 6 so they have been included as a line item in Table 10. Based on historic data for PRWA, system losses for future years were estimated to be 5 percent of total water use. Use of recycled water by PRWA customers is not included in the consumption values in Table 6, so it has been included as a line item in Table 10.

**Table 10 Additional water uses and losses (AF)**

| Water Use | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Recycled water | 60 | 78 | 100 | 200 | 200 | 200 | 200 |
| System losses | 242 | 240 | 546 | 545 | 559 | 580 | 586 |
| Total | 302 | 318 | 646 | 745 | 759 | 780 | 786 |

TBD – application of gpcd will be used to determine projected demand and its influence on losses over 25-year planning horizon

**Table 11 Total water use (AF)**

| Water Use | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Total water deliveries | 5,729 | 5,191 | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| Sales to other water agencies | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Additional water uses and losses | 302 | 318 | 546 | 545 | 559 | 580 | 586 |
| Total | 6,032 | 5,509 | 6,007 | 6,002 | 6,149 | 6,307 | 6,453 |

## 3.4 Wholesale Water

PRWA does not receive water from a wholesale supplier, so no projections were provided to a wholesale agency and this is reflected in Table 12.

**Table 12 PRWA demand projections provided to wholesale supplier (AF)**

| Wholesale Sources | Contracted Volume | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| None | | 0 | 0 | 0 | 0 | 0 | 0 |

PRWA does not plan to participate or receive water from any planned wholesale agency water supply projects.

**Table 13 Wholesale supplies — existing and planned sources of water (AF)**

| Wholesale Sources | Contracted Volume | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| None | | 0 | 0 | 0 | 0 | 0 |

## 3.5 Baselines and Targets

This 2010 UWMP also includes the detailed description of how an urban water supplier calculates its baseline and targets, following the technical methods and methodologies described in DWR's Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use For the Consistent Implementation of the Water Conservation Bill of 2009. Background information and the approach used to develop baselines and targets are also to be included. A description of each of these elements follows:

- Baseline daily per capita water use — how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.
- Urban water use target — how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are and plan to be implemented.
- Interim urban water use target — the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

Following requirements provided in the DWR Methodologies for Calculating Baseline and Compliance Urban Water Per Capita Use document, the PRWA has calculated baseline per capita water use, an urban use target for 2020, and an interim water use target for 2015. Reporting compliance daily per capita water use is not required until the 2015 UWMP cycle as it compares the interim target to actual water use in 2015.

Two baseline periods are to be determined during the calculation of the base daily per capita water use. The legislation provides some flexibility in what actual periods of time are used to establish these baselines. This accounts for short-term water demand variations resulting from weather influences, as well as acknowledging the advances of water suppliers that have already begun using recycled water to reduce potable demands. The two baseline periods are:

- 10- to 15-year base period. This is a 10-year or 15-year continuous period used to calculate baseline per capita water use;
- 5-year base period. This is a continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirements of at least a 5 percent reduction per capita water use.

A 10-year period from 2001 to 2010 provides a baseline of 126 gpcd, and a 5-year average of 126 as shown in Table 14. As instructed in the Guidebook to confirm the 2020 daily water use target meets the minimum threshold, 95 percent of the 5-year average is 120 gpcd.

**Table 14 Results 20x2020 Baseline Calculations**

| 20x2020 Requirement | gpcd |
|---|---|
| **Baseline gpcd water use** | |
| 10-year average (baseline period 2001-2010) | 126 |
| 5-year average (period 2004-2008) | 126 |
| 95 percent of 5-year average | 120 |

Source: Derived by Atkins with PRWA Water Use and estimated population data

Methods 1, 2, 3, and 4 have been evaluated for PRWA. The analysis of the four methods is described below:

- Method 1 requires setting the 2020 water use target to 80 percent of baseline per capita water use target as provided in the State's Draft 20x2020 Water Conservation Plan. Using the methodology in the Guidebook, Table 15 shows the interim 2015 gpcd target and the 2020 gpcd target. The PRWA's 2015 target is 113 gpcd and the 2020 gpcd target at 80 percent of baseline is 101 gpcd.
- Method 2 requires use of Performance Standards and actual data for indoor residential, landscaped areas and CII to produce values for calculating GPCD (fairly complex Method unless an agency has substantial water use and billing records for the last 10-15 years). PRWA does not have the detailed data on irrigated landscaped area at this time in order to calculate the Method 2 target for 2020. PRWA can choose to investigate Method 2 prior to preparing their 2015 UWMP, if they begin preparing estimates of landscaped area as defined by DWR. The DWR methodology restricts the landscaped area to include only landscape irrigated through dedicated or residential meters. The methodology also requires that the target be based on the water supplier's estimate of 2020 landscaped areas.

- Method 3 sets its target as 95 percent of the state hydrologic region target. The PRWA is within the South Coast Hydrologic Unit, whose 2020 target is 149 gpcd. Ninety-five percent of the region's 2020 target is 142 gpcd, with an interim 2015 target of 157 gpcd. As such, Method 3 sets a 2020 water use target of 142 gpcd and an interim 2015 target water use of 157 gpcd.
- SBX 7-7 Provisional Method 4 Target Calculator Method 4 Calculates total savings subtracted from baseline water use. For this target method, savings are assumed between the baseline period and 2020 due to metering of unmetered water connections and achieving water conservation measures in three water use sectors. These savings include metering savings in the following sectors: residential savings, commercial, industrial, institutional savings, landscape and water loss savings. Water Code Section 10608.20(d) provides that DWR will update Target Method 4 by December 31, 2014. It is anticipated that improvements will be made to the target method based on new data and analytical techniques in the update. Provisional Target Method 4 described here will be in effect until the update by 2014. Using the SBX 7-7 Provisional Method 4 Target Calculator provided by DWR and the default indoor residential savings, the Method 4 target for 2020 is 119 gpcd, with an interim 2015 target of 122 gpcd.

**Table 15 20x2020 Water Conservation Target Method 1**

| 2020 Daily Water Use Target (Method 1) | |
|---|---|
| 2015 Interim Daily Water Use Target | 113 |
| 2020 Daily Water Use Target (80% of baseline) | 101 |

Source: Derived by Atkins with PRWA, Water Historical Water Use Data adapted by Atkins, May 2011.

In order to confirm that PRWA's 20x2020 urban water use target meets the minimum water savings, it compares the 5-year baseline daily per capita water use value to the 20x2020 daily per capita urban water use target. If necessary, adjustments are made to ensure conformance. To accomplish this comparison, the Guidebook uses the following steps, first, determine if the 5-year base daily per capita water use value is less than or equal to 100 gpcd. If not, a second step is necessary. This step requires, calculating 95 percent of the 5-year average base daily per capita water use and then comparing the results to the 2020 daily per capita target. No adjustment is required since the 10-year baseline target is less than 95 percent of the 5-year baseline.

The PRWA's recent per capita water use has been declining to the point where current water use is slightly above the 2015 target for Method 1. In 2010, water use within the PRWA service area was 134 gpcd and in 2009, PRWA observed 131 gpcd. This recent decline in per capita water use is largely due to dry climate conditions, drought water use restrictions, and poor economic conditions. Tables 16, 17 and 18 present the results of the baseline and target methodology calculations, in accordance with the Act.

Pursuant to SBx7-7, baseline per capita water use is 142 gpcd using a 10-year average beginning in Fiscal Year 2001 and ending on December 31, 2010 and 142 gpcd using a 5-year average beginning in Fiscal Year 2004 and ending on December 31, 2008.

## Table 16 Base period ranges

| Base | Parameter | Value | Units |
|---|---|---|---|
| 10- to 15-year base period | 2008 total water deliveries | 5,700 | AFY |
| | 2008 total volume of delivered recycled water | 28 | AFY |
| | 2008 recycled water as a percent of total deliveries | 0.49 | percent |
| | Number of years in base period[1] | 10 | years |
| | Year beginning base period range | 2001 | |
| | Year ending base period range[2] | 2010 | |
| 5-year base period | Number of years in base period | 5 | years |
| | Year beginning base period range | 2004 | |
| | Year ending base period range[3] | 2008 | |

Source: PRWA 10-Year Water Use data
[1]If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period.
[2]The ending year must be between December 31, 2004 and December 31, 2010.
[3]The ending year must be between December 31, 2007 and December 31, 2010.

## Table 17 Base daily per capita water use — 10-year range

| Base period year | | Distribution System Population | Daily system gross water use (AFY) | Annual daily per capita water use (gpcd) |
|---|---|---|---|---|
| Sequence Year | Calendar Year | | | |
| Year 1 | 2001 | 39,382 | 5,235,470 | 132.93 |
| Year 2 | 2002 | 39,460 | 5,371,783 | 136.12 |
| Year 3 | 2003 | 39,539 | 5,078,857 | 128.44 |
| Year 4 | 2004 | 39,617 | 4,804,347 | 121.26 |
| Year 5 | 2005 | 39,696 | 5,002,250 | 126.01 |
| Year 6 | 2006 | 39,775 | 5,114,879 | 128.59 |
| Year 7 | 2007 | 39,581 | 4,879,659 | 123.27 |
| Year 8 | 2008 | 39,388 | 5,088,516 | 129.18 |
| Year 9 | 2009 | 39,195 | 4,547,889 | 116.02 |
| Year 10 | 2010 | 39,002 | 4,634,280 | 118.81 |
| **Base Daily Per Capita Water Use** | | | | **126** |

Source: Derived by Atkins with PRWA Water Use and estimated population data

**Table 18 Base daily per capita water use — 5-year range**

| Base period year | | Distribution System Population | Daily system gross water use (mgd) | Annual daily per capita water use (gpcd) |
|---|---|---|---|---|
| Sequence Year | Calendar Year | | | |
| Year 1 | 2004 | 39,617 | 4,804,347 | 121.26 |
| Year 2 | 2005 | 39,696 | 5,002,250 | 126.01 |
| Year 3 | 2006 | 39,775 | 5,114,879 | 128.59 |
| Year 4 | 2007 | 39,581 | 4,879,659 | 123.27 |
| Year 5 | 2008 | 39,388 | 5,088,516 | 129.18 |
| **Base Daily Per Capita Water Use** | | | | **126** |

Source: Derived by Atkins with PRWA Water Use and estimated population data.

## 3.6 Water Use Reduction (compliance with Water Conservation Bill of 2009)

Pursuant to Water Code Section 10608.26 retail water suppliers are to develop an implementation plan for compliance with the Water Conservation Bill of 2009. The plan should provide a general description of how the supplier intends to reduce per capita water use to meet its urban water use target. In developing the implementation plan, suppliers should avoid placing a disproportionate burden on any customer sector. The plan should also discuss any potential economic impacts that may result from the water use reduction program.

Water conservation programs have been developed and conducted on the premise that water conservation increases the water supply by reducing the demand on available supply, which is vital to the optimal operation of the PRWA's water system. As a member agency of the CBMWD, the PRWA also participates in many water conservation programs designed and conducted as a shared-cost participation program among the member agencies.

Pursuant to Water Code Section 10608.26, PRWA will continue to implement its current programs to reduce water demand throughout its service area and ultimately meet or surpass its gpcd targets in 2015 and 2020. Section 8.0 lists a number of the PRWA's on-going water conservation programs – these programs in combination with the initiatives and future programs described herein will provide means for the PRWA to comply with the Water Conservation Bill of 2009 and reach its gpcd targets.

## 3.7 Water Use Reduction – the approach to achieving 20x2020

The PRWA fully expects to meet its gpcd targets in 2015 and 2020 primarily because of its efforts to reduce unaccounted-for water losses to approximately 5 percent, promote maintain efficient water use and conservation savings at residences, and if feasible, increasing use of recycled water to offset existing irrigation demands. Furthermore, the PRWA is currently exploring development of a formal water conservation plan that would formalize the PRWA's water use reduction plan.

In addition, the PRWA customers are responding to the increasing cost of water by reducing their demand. Since 2008 its customers have continued to lower their demand, mainly, in response to rate increases that were required to cover the increased cost to obtain, convey, distribute potable water and then also pay replenishment costs within the Central Basin.

The PRWA anticipates that new development projects would incorporate green building performance standards or would seek Leadership in Energy and Environmental Design (LEED) certifications to lower water consumption. Incorporation of CALGREEN[2] (Title 24, Part 11, Division 4.3 – Water Efficiency and Conservation) standards in residential homes would reduce indoor per capita consumption within the PRWA service area and further contribute to a lower PRWA-wide gpcd. The City of Pico Rivera's landscape water conservation Ordinance 1061 will result in more efficiently designed and irrigated landscapes (See **Appendix F**). City of Pico Rivera Ordinance No. 1061 is briefly described below:

The purpose of this Water Efficient Landscape Ordinance is:

a) That this Ordinance be at least as effective in conserving water as the model ordinance adopted pursuant to Government Code § 65595;

b) To assure beneficial, efficient, and responsible use of water resources for all users within the City of Pico Rivera;

c) To retain the land's natural hydrological role and promote the infiltration of surface water into the groundwater;

d) To acknowledge that landscape water use accounts for more than 60% of all domestic water use in the City;

e) To recognize that landscapes enhance the aesthetic appearance of developments and communities;

f) To encourage the appropriate design, installation, maintenance, and management of landscapes so that water demand can be decreased, runoff can be retained, and flooding can be reduced without a decline in the quality or quantity of landscapes;

g) To preserve existing natural vegetation and the incorporation of native plants, plant communities, and ecosystems into landscape design, where possible;

h) To promote and encourage the use of low water use plants;

i) To minimize the use of cool season turf;

j) To promote the conservation of potable water by maximizing the use of recycled water and other water conserving technology for appropriate applications;

k) To promote public education about water conservation and efficient water management;

l) To reduce or eliminate water waste.

The PRWA may also offer incentives when feasible. This may include the following: a rebate toward the replacement of existing turfgrass with waterwise landscape materials.

### 3.7.1 Ongoing Water Conservation Programs and Communication Efforts:

As presented in Section 8.0, the PRWA will continue its outreach efforts to educate its customers regarding water smart landscapes through its website, articles within its quarterly newsletter, regular bill inserts, and it presence at outreach events throughout the community.

2 2010 California Building Standards Code – Title 24 Part 11; (Effective January 2011); Section 4.303.1 20% Water savings. Requires a 20% reduction of indoor water use. Provides a prescriptive and performance method. Statewide mandatory construction code; statutorily enforced by local enforcing agencies; does not require outside inspection, review or certification by any entity other than the enforcing agencies.

# 4.0 Service Area Supplies

PRWA distributes water to its end users. Water from PRWA is distributed via pipelines and pump stations, and is used by PRWA customers to meet their water demands. This section describes the groundwater sources, quantities, supply constraints, and the water quality of the water supply sources. In addition, this section discusses desalination and water supply reliability.

## 4.1 Surface Water

PRWA relies entirely on groundwater, and therefore does not currently utilize surface water. PRWA is a member agency of CBMWD and a member is entitled to purchase imported water from Metropolitan through CBMWD. However, PRWA remains without any direct connection CBMWD, as the nearest feeder is about two miles west of PRWA, and there are no current plans to construct a connection to the Metropolitan/CBMWD system. If this is reconsidered in the future, the PRWA may assess feasibility of this surface water connection and other options that would make this connection viable.

## 4.2 Groundwater

Within the region, there are two primary groundwater basins: the Central Basin and the West Coast Basin. The PRWA receives all its groundwater from the Central Basin. Twenty-nine (29) public and private water agencies are supplied by the Central Basin, for which DWR is the Watermaster. The Central Basin is a large alluvial groundwater basin which lies beneath the southeastern portion of the Los Angeles Coastal Plain. The Central Basin is enclosed on the north by Merced Hills, Whittier Narrows, and Puente Hills, on the east by Orange County, and on the southwest by the Newport Inglewood Uplift. A more detailed description of the Basin is included in **Appendix C**.

As stated previously, the PRWA obtains its potable water supply from the underlying Central Basin groundwater basin that is recharged by local streamflow, imported water, and recycled water. A summary of the water supply sources provided and managed by varying agencies and available to the PRWA are summarized below.

### 4.2.1 Central Basin Groundwater Basin

The Central Basin contains millions of acre feet of storage and is the principal source of water for the overlying cities and water districts, including the PRWA. The Central Basin groundwater comprises a number of sources: 1) natural recharge from precipitation and runoff from regional/local watersheds; 2) artificial recharge supplied through purchased imported water; and 3) treated effluent from regional wastewater treatment facilities. As stated above, the WRD manages the ongoing artificial recharge activities within the Central Basin groundwater area. Central Basin groundwater users have the ability to extract up to 20 percent above their APA, provided the over-extraction can made up the following year. In addition, WRD allows Central Basin users to carryover up to 20 percent of their APA into the next year. In other words, the carryover supply is only available in the following year and cannot be added to previous carryover supplies. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease purchases each year.

#### 4.2.1.1 Description

Groundwater has for many years been the primary supply of water within Central Basin's service area. In fact, it was the sole source of water supply until the Central Groundwater Basin was overdrafted beginning in the late 1940s and throughout the 1950s. Today, the average retail customer agency in Central Basin relies on groundwater production for about 61 percent of its water supply. Although, there still remain many agencies in Central Basin's service area that rely exclusively on groundwater to meet all current water needs.

Ultimately, the continuous and extensive overpumping of the Basin caused critically low groundwater levels. This overpumping of the Basin resulted in a legal judgment, or adjudication, that limited the allowable extraction that could occur in any given year and assigned water rights to basin pumpers. The adjudicated water rights were greater than the Basin's yield. In essence, the Basin was operating with an annual overdraft. In order to address the overdraft, a strategy was required to purchase imported and recycled water sources. The Central Groundwater Basin Judgment is included as Appendix D of the Central Basin 2010 UWMP.

#### 4.2.1.2 Water Replenishment District of Southern California

The groundwater producers (pumpers) in the area, which are members of the Central Basin Water Association, facilitated the creation of the WRD. The purpose of the WRD is to act as a financial mechanism that purchases imported and recycled water to replenish the Central Groundwater Basin. In 1959, the State Legislature enacted the Water Replenishment Act, enabling the water associations to secure voter approval for the formation of the “Central and West Basin Water Replenishment District.” The WRD has the statutory responsibility to acquire sufficient revenues through an assessment on each acre-foot of water pumped from the groundwater basin to purchase water from other sources to replenish the groundwater supplies within its boundaries for the beneficial use of the approximately 3.5 million residents and water users who rely upon those groundwater resources to satisfy all or a portion of their water needs.

#### 4.2.1.3 Groundwater Rights

Although the water rights have been bought, sold, exchanged or transferred through the years, the total amount of allowable extraction rights within the entire groundwater basin has remained virtually the same. The adjudicated pumping rights from the Central Groundwater Basin are 217,367 AFY. However, not all holders of these rights are within the Central Basin service area. Those rights holders within Central Basin's service area total 161,836 AF. Some of the groundwater rights holders are nurseries, businesses, schools, cemeteries and private entities that make up about 7 percent (16,679 AF) of the total water rights. Of the remainder, 127,237 AF is the water pumped by Central Basins service area cities and water agencies and 55,531 AF is pumped by cities and agencies not affiliated with Central Basin Municipal Water District. The adjudicated pumping rights in the Central Groundwater Basin are presented in Table 3-2 of the CBMWD 2010 UWMP.

#### 4.2.1.4 Main Basin

Although most of the groundwater supply is extracted from the Central Basin, there are a number of water retailers that retain groundwater rights within the Main San Gabriel Basin (Main Basin) that are extracted and utilized within their Central Basin service area. Main Basin underlies most of the San Gabriel Valley, north of the Central Groundwater Basin. It is bounded by the San Gabriel Mountains to the north, the San Jose Hills to the east, the Puente Hills to the south and by the Raymond Fault and a series of other hills to the west. The total amount of

water extracted from the Main Basin and utilized within the Central Basin service area over the last five years averages to approximately 31,500 AFY. The CBMWD 2010 UWMP (Table 3-3) displays the water retailers and the amount produced from the Main Basin and from the Central Groundwater Basin for the last five fiscal years.

The total amount of groundwater produced in the Central Basin and the Main Basin has remained fairly consistent over the last five years. This is due mainly to the fact that both basins are adjudicated, so groundwater extractions in any given year are limited. The total amount of groundwater projected to be extracted during the next 25 years will also be fairly consistent as shown in the CBMWD 2010 UWMP (Table 3-4). The economic costs to pump groundwater versus the purchases of imported water will continue to pressure water retailers to maximize their groundwater rights.

#### 4.2.1.5 Groundwater Recharge

The WRD reports annually on its replenishment operations and groundwater management activities. The following information was excerpted from WRD's March 2011 Engineering Survey and Report (ESR). The complete ESR can be found in **Appendix G**.

> The Central and West Coast Basins have an annual overdraft because more groundwater is pumped out than is replaced naturally. The CBMWD purchases supplemental water (artificial replenishment water) each year to help offset this overdraft through managed aquifer recharge. The purchased water enters the groundwater basins at the Montebello Forebay spreading grounds, at the seawater barrier injection wells, and through the District's In-Lieu Program. The purpose of this Chapter is to determine the quantities of water needed for purchase in the ensuing year and to determine the availability and cost of that water. The WRD currently has available to it recycled and imported water sources for use as artificial replenishment water. These two sources are described below:
>
> ***Recycled Water****: Recycled water is wastewater from the sewer systems that is reclaimed through extensive treatment at water reclamation plants ("WRP"s). The water is treated to high quality standards so that it can be reused safely. Some agencies and businesses use recycled water for non-potable purposes, such as for irrigation of parks, golf courses, and street medians, or for industrial purposes. WRD has used recycled water for groundwater recharge since 1962. In semi-arid areas such as Southern California where groundwater and imported water are in short supply, recycled water has proven to be a safe and reliable additional resource to supplement the water supply. Recycled water is used at the spreading grounds and the seawater barrier wells. Although recycled water is high quality, relatively low cost, and a reliable supply all year long, the WRD is limited by regulatory agencies in the amount it can use for replenishment. Therefore, imported water is also used for recharge.*
>
> ***Imported Water****: River water from northern California (State Water Project) and the Colorado River is imported into Southern California by the Metropolitan Water District of Southern California ("MWD" or "Met"). MWD then sells this water to their member agencies for multiple uses, including potable water and recharge water. WRD uses raw (untreated) imported water at the spreading grounds and potable (treated) imported water at the seawater intrusion barriers and for the in-*

*lieu program for groundwater recharge. Because of treatment and transportation costs, it is the most expensive source for recharge water. The supply is under full upstream control, and its availability at the spreading grounds is limited and variable, especially during drought years. In fact, since May 2007 MWD has stopped delivery of its historically available discounted surplus replenishment and In-Lieu waters due to reduced supply, environmental issues and judicial decisions. As a result, the WRD purchased the more expensive but more available untreated Tier 1 water from CBMWD and Long Beach in 2010/2011 for spreading. Because it is questionable that the discounted replenishment water will be available anytime soon, the District plans on purchasing the Tier 1 water in the ensuing year as well.*

**Recommended Quantities of Replenishment Water** With information presented in the preceding chapters regarding the basins' pumping demands and the overall condition of the groundwater basins, WRD can estimate its projected need for replenishment water in the ensuing year.
Spreading

Groundwater recharge through surface spreading occurs in the Montebello Forebay Spreading Grounds adjacent to the Rio Hondo and the San Gabriel River, within the unlined portion of the San Gabriel River, and behind the Whittier Narrows Dam in the Whittier Narrows Reservoir. Owned and operated by the Los Angeles County Department of Public Works ("LACDPW"), they were originally constructed in 1938 for flood control and conservation of local storm water, but have been used since the 1950s to replenish the basins with imported water and since 1962 with recycled water.

Since recycled water is a high quality, less expensive, and available year-round source of replenishment water, the District maximizes its use within established regulatory limits. These limits are discussed below under "Expected Availability of Replenishment Water". In general, the District plans on purchasing 50,000 AF in the ensuing year to maximize the amount under regulatory limits, unless lack of dilution water (storm water and imported water) causes a reduction in the recycled water amounts.

Additional replenishment water is needed beyond the 50,000 AFY of recycled water and will have to come from imported water. In 2003, the WRD Board adopted the long term average of 27,600 AFY of imported water to purchase for spreading. This value was based on long-term (30 year) averages of the overall water budget of the basins using the USGS computer model.

The 2003 ESR discusses the derivation of this value in more detail.

Since that time, the District has invested in cooperative projects with the LACDPW to capture more storm water and to lessen the need for imported water as part of WRD's Water Independence Now program, or WIN. Improvements to the Whittier Narrows Conservation Pool are expected to conserve an additional 3,000 AFY of storm water on average. Two new rubber dams were built in the San Gabriel River near Valley Boulevard and are expected to conserve an additional 3,600 AFY on average. Therefore, the new Long Term Average for imported spreading demands is 21,000 AFY. This amount plus the recycled

demand cited earlier brings the total WRD basic spreading needs for the ensuing year to 71,000 AF (50,000 AF recycled and 21,000 AF imported). This is the amount planned for the ensuing year for spreading.

In addition, supplemental water may be needed to make up the deficit in the Optimum Quantity discussed at the end of Chapter 3. Per the Board's policy in 2006, the District would attempt to make up the Optimum Quantity deficit over a 20-year period. Much of this deficit, however, could be made up by rainfall if a few extremely wet years would occur. Therefore, focus is placed on making up the imported spreading water shortage which exists due to the District's inability to purchase planned amounts in recent years. Factors such as MWD ceasing to offer traditional replenishment water in May 2007 and construction and maintenance projects at the spreading grounds have been impedances to purchasing imported water for spreading. Between WY 2003/2004 and 2008/2009, the District was short 29,968 AF of planned imported water purchases for the spreading grounds. In 2009/2010 the District for the first time purchased untreated Tier 1 water for replenishment since the historical replenishment water was not available, including an extra 5,286 AF to help make-up some of the deficit. In the current year 2010/2011, the District has plans to purchase the normal 21,000 AF of spreading water plus an additional 3,500 AF to help makeup the deficit. This water will also be untreated Tier 1 water since discounted water remains unavailable. The deficit at the start of ensuing year 2011/2012 will be 21,282 AF and the District will be considering reducing this amount by some margin in that year.

Injection

Another way of replenishing the groundwater supply is to inject water at the three seawater intrusion barriers owned and operated by the LACDPW, including the West Coast Basin Barrier, Dominguez Gap Barrier, and Alamitos Barrier. Although the primary purpose of the barriers is for seawater intrusion control, groundwater replenishment also occurs as the freshwater is injected into the CWCB aquifers and then moves inland towards pumping wells.

To determine the amount of barrier water estimated for the ensuing year, WRD under an Agreement with LACDPW gets annual estimates from the expected demand at the barriers. WRD reviews these estimates and makes adjustments as necessary. For 2010/2011, no adjustments were made to estimates provided by the LACDPW, with the exception that their original 20,000 AF estimate for the West Coast Barrier was reduced to 18,000 AF based on current operating conditions.

For the West Coast Basin Barrier Project, 18,000 AF of demand is estimated, of which 10,000 AF is imported water and 8,000 AF is recycled water from WBMWD based on current delivery capabilities. For the Dominguez Gap Barrier Project, 7,400 AF are estimated, with 50% recycled water and 50% imported water. For the Alamitos Barrier on the WRD-side of the barrier, 6,200 AF are estimated with 50% recycled water and 50% imported water.

The total barrier demand for the ensuing year is estimated at 31,600 AF, including 14,800 AF recycled water (47%) and 16,800 AF imported water (53%).

In-Lieu Replenishment Water

The basic premise of WRD's In-Lieu Program is to offset the pumping in the basin to lower the annual overdraft and reduce the artificial replenishment needs. It helps provide an alternate means of replenishing the groundwater supply by encouraging basin pumpers to purchase surplus imported water when available instead of pumping groundwater. This can help raise water levels in areas that are otherwise more difficult to address. Since May 2007, the In-Lieu water has not been made available by MWD due to water shortages. However, WRD has planned for it in case the water became available. If monies raised go unspent, they are placed in a water purchase reserve for subsequent year water purchases. This concept was approved by the pumper's Technical Advisory Committee ("TAC") for the District in 2010 and will continue for ensuing year 2011/2012 at the same amount of 10,303 AF (6,000 AF in the Central Basin and 4,303 AF in the West Coast Basin).

**Expected Availability of Replenishment Water** The availability of water supplies for the ensuing water year has been taken into account when determining how funds should be raised. If a particular resource is expected to be unavailable during a given year, money can still be raised to fund the purchase of that quantity of water in a succeeding year.

Recycled Water

Recycled water is reliable all year round but its use is capped by regulatory limits. The current limits for recycled water spreading in the Montebello Forebay are established by the California Regional Water Quality Control Board (RWQCB) and are detailed in Order No. 91-100 adopted on September 9, 1991 with amendments on April 2, 2009 under Order No. R4-2009-0048. The District is limited to spreading 35% recycled water over a 5-year period based on the total inflow of all waters into the Montebello Forebay, meaning that at least 65% of the waters entering the forebay must be dilution waters such as storm water, underflow, rainfall, and imported water. As these dilution sources become scarce due to dry years or continued lack of imported replenishment water, the amount of recycled water will have to be reduced to maintain the 35% regulatory cap.

The Sanitation Districts of Los Angeles County (SDLAC) provides the recycled water to WRD for spreading by LACDPW. This water comes from the Whittier Narrows Water Reclamation Plant ("WNWRP"), San Jose Creek Water Reclamation Plant ("SJCWRP"), and Pomona Water Reclamation Plant ("PWRP"). WRD purchases water from the WNWRP and SJCWRP, whereas the water from the PWRP is considered incidental recharge and is not purchased. For planning purposes, the District assumes purchasing 50,000 AFY of recycled water each year to meet the regulatory cap.

Recycled water for injection into the seawater barrier wells comes from different agencies depending on the specific barrier. At the WCBBP, the water is provided by WBMWD's Edward C. Little Water Recycling Facility. Per regulatory limits, this resource can provide up to 75% of the water injected into the West Coast Basin Barrier with an increase up to 100% being planned. Because of recent

operational issues at the treatment, only about 40% to 60% recycled water has been available to the barriers with imported water making up the difference. Since 18,000 AF is anticipated for the total barrier demand in the ensuing year, and 8,000 AF appears to be the current maximum capability for recycled water, imported demand is estimated at 10,000 AF.

Recycled water for the DGBP is available from the City of Los Angeles' Terminal Island Treatment Plant (Harbor Recycled Water Project). The plant is permitted to provide the barrier with up to 5 million gallons per day (mgd) or 5,600 AFY, or 50% of the total barrier supply, whichever is less. Since 7,400 AF is anticipated for the ensuing year, 3,700 AF will be recycled water and 3,700 AF will be imported water.

Recycled water for the ABP is available from WRD's Leo J. Vander Lans Water Treatment Facility. This treatment plant is permitted to provide up to 50% of barrier water with recycled water with the remainder being imported. Since 6,200 AF is anticipated for the ensuing year, 3,100 AF will be recycled water and 3,100 AF imported water.

Imported Water

All indications from MWD are that seasonal discounted spreading water and In-Lieu water will once again not be available in the ensuing year due to drought, environmental issues, and judicial decisions on the Bay Delta. As imported deliveries are cut back during dry years or with climate change or extended periods of drought, WRD may need to look at other sources for replenishment water, such as increased used [*sic*] of recycled water and storm water, or purchasing more expensive but more available imported water such as untreated Tier 1 (firm delivery) water. The purchase of untreated Tier 1 water occurred for the first time in 2009/2010 and continued into 2010/2011 due to the continued unavailability of surplus water, and is expected to occur in the ensuing year.

For the imported water used for injection at the seawater barrier wells, the District pays the premium price for "non-interruptible" treated Tier 1 water meaning that it will be available all year long. Because of the increasing water costs at the barriers, the District is looking at ways to minimize costs such as reduction of pumping near the barriers, increased recycled water to offset imported water, or banking water at lower seasonal rates. At the ABP, the City of Long Beach and WRD have entered into an agreement to bank seasonal treated water and Tier 1 water through inland injection wells and then extract the water for injection at the barriers when needed, thus saving considerable costs on barrier water. In 2009/2010, the 2,000 AF of Tier 1 water banked in 2008/2009 was utilized. The seasonal water banked in 2004/2005 through 2006/2007 has 2,160 AF remaining and can be called at any time that serves the District most effectively.

**Projected Cost of Replenishment Water** WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

### 4.2.2 Central Basin Municipal Water District

CBMWD normally acquires approximately 89,000 AFY of imported water from Metropolitan's State Project and Colorado River sources. About 21,000 AFY of this imported water is used for groundwater replenishment with the remaining 68,000 AFY sold to retail agencies for direct use.

### 4.2.3 PRWA Well Supply System

PRWA's water distribution system includes a total of twelve (12) wells, some of which are no longer active, which draw potable water directly from the Central Basin. In conjunction with the wells, the supply system includes three (3) booster pump stations and three (3) reservoirs with a combined storage of approximately 1 million gallons. PRWA's wells are generally located along the outer City boundary. The well pumps are operated to maintain a constant system pressure of 62 to 65 psi.

In early 2009, Well Nos. 5 and 7 were inactive and/or inoperable and not currently being used to supply the water to the distribution system due to various forms of contamination including excessive bacteria, iron and sand detected in the in the water supply. Specifically, Well Nos. 5 and 7 were inactive due to various forms of contamination including excessive quantities of bacteria and iron respectively. Table 19 provides a summary of PRWA's wells, including location, date drilled, well depth, production of each well and whether the well is currently operational.

**Table 19 PRWA Well Summary**

| Well # | Address | Date Drilled | Depth (Ft) | Production | | Operational |
|---|---|---|---|---|---|---|
| | | | | AFY | gpm | |
| 1 | 8739 Gallatin Road | 1950 | 304 | 2,495 | 1,547 | Yes |
| 2 | | 1956 | 400 | 2,900 | 1,798 | Yes |
| 3 | 8316 Washington Blvd. | 1955 | 586 | 3,100 | 1,922 | Yes |
| 4 | | 1960 | 600 | 2,600 | 1,612 | Yes |
| 5 | 8305 Slauson Avenue | 1970 | 630 | 1,800 | 1,116 | Inactive from 2008-April 2009 due to Excessive Bacteria |
| 6 | 8231 Elmont Avenue | 1950 | 492 | 718 | 445 | Yes, standby |
| 7 | 8523 Ceylon Avenue | 1948 | 302 | 1,000 | 620 | Inactive due to Excessive Iron |
| 8 | 9623 Telegraph Road | 1968 | 627 | 600 | 372 | Yes, standby |
| 9 | 9403 Myron Road | 1954 | 514 | 900 | 558 | Inactive due to Excessive Sand |
| 10 | 9249 Bermudez | 1934 | 464 | 1,500 | 930 | Inactive since 1980 |
| 11 | 9732 Lundahl Drive | 1952 | 520 | 2,800 | 1,736 | Yes |
| 12 | | 1948 | 468 | 2,400 | 1,488 | Yes |

Source: PRWA 2009 Water System Master Plan

Well No. 5 is located along Rio Hondo Spreading Grounds. In the last several years, the spreading bed has been deepened by excavation with the base lowered by approximately ten (10) feet in elevation. This has reduced the thickness of the soil between the spreading bed and the aquifer which serves to filter the surface water as it penetrates the soil to replenish the aquifer. In April 2009, Well No. 5 passed its bacteria tests and was placed back in to service after being out of service for over one year.

Historically, groundwater supplies have been sufficient to meet the PRWA's water demands. In the last several years, PRWA has supplemented its groundwater production with WQPP water purchased from CBMWD.

Table 20 summarizes the PRWA's groundwater pumping from the Central Basin over the last five (5) years. As shown in the table, production has decreased to about 5,000 AFY. In 2007-2008, demand increased as result of low-precipitation in the region.

**Table 20 Groundwater — volume pumped (AF)**

| Basin Name(s) | Metered or Unmetered | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Central Water Basin | Metered | 5,544 | 5,412 | 5,497 | 5,076 | 5,004 |
| Groundwater as a percent of total water supply | | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Source: City of Pico Rivera 10-Year Total Water Use data

Table 21 shows the projected supplies within PRWA's service area. The Central Basin is expected to be reliable in all years and over the 25 year planning horizon. Groundwater supplies are expected to remain constant and stable due to the adjudication of the Central Basin – if the PRWA can continue to access recycled water from CBMWD, then in most years, use of additional recycled water would reduce the groundwater pumping pressure within the basin.

**Table 21 Groundwater — volume projected to be pumped (AF)**

| Basin Name(s) | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Central Water Basin (facilities and consumptive only) | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| Percent of total water supply | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Since PRWA's annual pumping allocation from CBMWD is limited to 5,579 AFY, PRWA is projected to require a modest quantity of water from other supply sources to meet future demands. The only legal constraints to groundwater supply are the APA, as provided under the adjudication of the Central Basin. As stated above, the WRD manages the ongoing artificial recharge activities within the Central Basin groundwater area. Central Basin groundwater users have the ability to extract up to 20 percent above their APA provided the over-extraction can made up the following year. In addition, WRD allows Central Basin users to carryover up to 20 percent of their APA into the next year. In other words, the carryover supply is only available in the following year and cannot be added to previous carryover supplies. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease purchases each year. The WRD also allows for increased pumping under specific (dry year) conditions as discussed in its 2011 ESR. (**Appendix G**). Historically when additional supplies beyond the base allotment of 5,579 AFY are required to meet demand, the PRWA has been able to lease groundwater water rights from other Central Basin groundwater users that have surplus supplies available.

## 4.3 Transfer or Exchange Opportunities

Currently, the PRWA does not transfer and/or exchange any water supply to or from other entities and this report does not anticipate that transfers or exchanges will occur in the future. In the future, within the Gateway Authority IRWMP there could be opportunities created that would allow transfer or exchanges within interested parties. The PRWA will need to monitor the progress on these opportunities in the coming years.

**Table 22 Transfer and exchange opportunities (AF)**

| Transfer Agency | Transfer or exchange | Short term or long term | Proposed Volume |
|---|---|---|---|
| None | 0 | 0 | 0 |

## 4.4 Desalination

Desalinated water is not currently perceived to be a viable option for PRWA, and neither brackish nor impaired groundwater is pumped.

## 4.5 Recycled Supply

CBMWD operates a large regional recycled water system. PRWA currently received recycled water from CBMWD. In order to continually optimize the use of recycled water to offset demands on the potable water system, PRWA coordinated as needed with local agencies responsible for water supply and wastewater collection and distribution. Table 23 lists these agencies and their responsibilities.

**Table 23 Participating Agencies**

| Agency Type | Agency Name | Plan Development Role |
|---|---|---|
| Local water wholesaler | Central Basin Municipal Water District | Provided recycled water supply and demand information |
| Wastewater agency | Los Angeles County Sanitation Districts (2,18) | Provided recycled water supply and demand information |
| Other | Public Constituencies | Provided recycled water supply and demand information |

### 4.5.1 Wastewater Collection & Treatment

The estimated sewer service population is approximately the same as the number of water customers. Within PRWA's service area, the City is responsible for wastewater collection and conveyance to the Los Angeles County Sanitation District (LACSD) San Jose Creek Water Reclamation Plant (WRP), located in unincorporated Los Angeles County, next to the City of Whittier. LACSD also treats wastewater from several other municipalities. LACSD discharges treated effluent into the ocean, and provides recycled water for use in groundwater recharge and irrigation of parks, schools, and greenbelts.

PRWA does not maintain any records of sewage, so the volumes in Table 24 are calculated assuming 55 percent of residential water and 80 percent of commercial water used is returned to the sewer system.

**Table 24 Recycled water — wastewater collection and treatment (AF)**

| Type of Wastewater | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Wastewater collected & treated in service area | 3,460 | 2,813 | 2,841 | 2,870 | 2,899 | 2,928 | 2,957 |
| Volume that meets recycled water standard | 3,460 | 2,813 | 2,841 | 2,870 | 2,899 | 2,928 | 2,957 |

Note: Estimated wastewater flow based on 55 percent of residential and 80 percent of commercial potable water demands.

Within PRWA's service area, discharge of treated wastewater is regulated by the Regional Water Quality Control Board (RWQCB). In general, the majority of the wastewater generated and treated during the summer months is used for alternative beneficial uses such as wetland habitat and restoration and irrigation for golf courses. The use of the recycled water helps supply part of the water demand of other agencies during the peak summer months.

Wastewater collected by LACSD and sent to the San Jose Creek WRP as shown in Table 25, including discharges of PRWA wastewater, is treated to a blend of advanced primary, secondary levels, and tertiary treatment. Of the 82,600 AFY of wastewater the plant processes, approximately 34,800 are reused at 17 different sites, one of which is the Pico Rivera Municipal Golf Course.

**Table 25 Recycled water — non-recycled wastewater disposal (AF)**

| Method of Disposal | Treatment Level | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Los Angeles County Sanitation District | Secondary/advanced primary/tertiary | 47,800 | 47,800 | 47,800 | 47,800 | 47,800 |

Source: http://www.lacsd.org/info/water_reuse/refy0405/default.asp

### 4.5.2 Recycled Water Uses

In an effort to conserve potable water the Rio Hondo water reclamation program is being completed. Currently, only one PRWA customer, the Pico Rivera Municipal Golf Course, is using recycled water for landscape irrigation. The golf course recycled water use is expected to increase to 100 AFY in 2015 and then to 200 AFY in 2020. PRWA's 2010 recycled water use compared to the 2005 UWMP projection is summarized in Table 26.

**Table 26 Recycled water — 2005 UWMP use projection compared to 2010 actual (AF)**

| Use type | 2010 actual use | 2005 Projection for 2010 |
|---|---|---|
| Landscape irrigation | 78 | 100 |

### 4.5.3 Potential Uses of Recycled Water

Potential recycled water users are locations where recycled water could replace potable water use. These potential users are typically landscape irrigation systems, or possibly some types of industrial or commercial water users.

CBMWD currently provides recycled water to the Pico Rivera Golf Course which is located within the PRWA service area. It is recommended that PRWA continue discussions with CBMWD regarding future opportunities, as CBMWD plans to expand recycled water across the

north end of the City to complete a recycled water loop through the City of Commerce. Potential recycled water customers within the northern portion of PWRA would include Streamland Park and Rio Hondo Park. In addition, Pico Park could be served recycled water through an extension into the PWD service area along Beverly Boulevard.

The identified potential uses for recycled water are shown in Table 27. Future customers, such as Streamland Park or Rio Hondo Park have not been included as a feasible potential customer at this time.

**Table 27 Recycled water — potential future use (AF)**

| User Type | Description | Feasibility | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Landscape irrigation | Pico Rivera Municipal Golf Course | Current customer | 100 | 200 | 200 | 200 |
| Total | | | 100 | 200 | 200 | 200 |

### 4.5.4 Proposed Actions to Encourage Use of Recycled Water

One of the primary means of promoting recycled water is the fact that it is mandated by law when available at a reasonable price and is of acceptable quality. There is the potential for additional incentives such as pricing discounts, financing of retrofitting costs, and assistance with any technical, regulatory, or institutional issues that might arise.

**Table 28 Recycled water — Methods to encourage recycled water use (AF)**

| Actions | Projected Results | | | | | |
|---|---|---|---|---|---|---|
| | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
| Financial incentives | NA | TBD | TBD | TBD | TBD | TBD |

Note: TBD = updated in future updates of the PRWA's UWMPs.

## 4.6 Planned Water Supply Projects and Programs

PRWA has not identified any future water supply projects that are considered viable at this point. As mentioned above, one possible option for the PRWA to consider is connecting to surface water supplies from Metropolitan via CBMWD if use of surface water is advantageous in under certain hydrologic conditions.

**Table 29 Future water supply projects (AF)**

| Project name | Projected start date | Projected completion date | Potential project constraints | Normal-year supply | Single-dry year supply | Multiple-dry year first year supply | Multiple-dry year second year supply | Multiple-dry year third year supply |
|---|---|---|---|---|---|---|---|---|
| Not Planned | Not necessary | ~ | ~ | ~ | ~ | ~ | ~ | ~ |

PRWA's total current and planned supplies are shown in Table 30. The purchased water will meet PRWA's current and planned future water demands.

## Table 30 Water supplies — current and projected (AF)

| Water purchased from: | Wholesaler supplied volume (yes/no) | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Central Basin Municipal Water District | Yes | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplier-produced groundwater | No | 5,004 | 5,579 | 5,579 | 5,579 | 5,579 | 5,579 |
| Transfers | | 0 | 0 | 0 | 0 | 0 | 0 |
| Recycled Water (some potential) | | 26 | 100 | 200 | 200 | 200 | 200 |
| Other (additional groundwater through one-time lease) | | 84 | 0 | 0 | 0 | 0 | 0 |
| Total | | 5,029 | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |

Note:
a. Actual water sales

# 5.0 Water Service Reliability

## 5.1 Reliability of Supply

The Act states that every urban water supplier shall include, as part of its plan, an assessment of the reliability of its water supplies. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 25 years in 5-year increments. This reliability assessment is required for normal, single dry-year and multiple dry water years.

PRWA uses deep groundwater exclusively, and has 100 percent reliability regardless of droughts. During short-term periods of water supply reductions, PRWA would implement its water shortage contingency plan, which is presented in **Appendix D**.

The tables presented in this Section show projected demand and supply during normal years, dry years, and multiple dry years. The projected supply in these tables is equal to the projected demand. If PRWA's future demands are slightly more or less than currently projected, it is anticipated that the supply portfolio maintained by PRWA will be flexible enough to continue to meet the demands.

For the purposes of estimating demands, base water years are defined in Table 31. The "Normal Water Year" used in this plan is based on the average rainfall year FY 2009·10. According to the National Weather Service, the recorded rainfall in FY 2009·10 was 16.36 inches at the Los Angeles Civic Center. One of the closest years to the historical average of 15.38 inches. The "Single Dry Year" is based on the lowest rainfall year,·FY 2006·07. The recorded rainfall in FY 2006·07 was only 3.21 inches, the lowest recorded year in Los Angeles history. The three "Multiple Dry Water Years" used below were based upon the most recent multiple dry-year period FY 2006·07 (3.21 inches), FY 2007·08 (13.53 inches), and FY 2008·09 (9.08 inches).[3]

**Table 31 Basis of water year data**

| Water Year Type | Base Year(s) |
|---|---|
| Normal Water Year | 2009-2010 |
| Single-Dry Year | 2006-2007 |
| Multiple-Dry Years | 2006-2009 |

Notes: Central Basin MWD, Draft 2010 UWMP Table 4-1.

Recycled water demands are to be met with recycled water from CBMWD. During dry periods, many conservation measures are focused on reducing outdoor water use, which does not contribute to wastewater flow. In addition, because both of these plants are scalping plants, the recycled water output is limited by the treatment capacity and not by the supply of raw wastewater. Therefore, PRWA's recycled supply is not expected to be subject to reduction during dry periods.

For the purposes of estimating demands, base water years are defined in Table 31. Water supply reliability based on an average water year is summarized in Table 32.

3 Central Basin MWD, Draft 2010 UWMP, page 4-6.

**Table 32 Supply reliability — historic conditions (AF)**

| Average / Normal Water Year | Single Dry Water Year | Multiple Dry Water Years | | | |
|---|---|---|---|---|---|
| | | Year 1 | Year 2 | Year 3 | Year 4 |
| Groundwater | 5,579 | 5,579 | 5,579 | 5,579 | 5,579 |
| Percent of Average/Normal Year: | 100% | 100% | 100% | 100% | 100% |

**Table 33 Factors resulting in inconsistency of supply**

| Water supply sources | Specific source name, if any | Limitation quantification | Legal & Environmental | Water quality | Climatic | Additional information |
|---|---|---|---|---|---|---|
| Central Basin (groundwater) | Central Basin | APA | APA | See Section 4 | N/A | |
| Leased water rights (groundwater) | Central Basin | Lease Agreements | Lease Agreements with Other Central Basin water suppliers | See Section 4 | N/A | N/A |
| Recycled Water | 0 | 0 | None | None | None | N/A |

**Table 34 Supply reliability — current water sources (AF)**

| Water supply sources | Average / Normal Water Year Supply | Multiple Dry Water Year Supply | | |
|---|---|---|---|---|
| | | Year 2011 | Year 2012 | Year 2013 |
| Central Basin (groundwater) | 5,579 | 5,579 | 5,579 | 5,579 |
| Leased water rights (groundwater) | 200 | 200 | 200 | 200 |
| Recycled Water | 100 | 100 | 100 | 100 |
| Percent of normal year: | | 100.0% | 100.0% | 100.0% |

## 5.2 Projected Normal Water Year Supply and Demand

PRWA's potable water supply is expected to continue to be supplied by groundwater from the Central Basin. Recycled water will provide additional supply.

In 2010, PRWA's demand was 5,191 acre-feet. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 25 years in 5-year increments. This reliability assessment is required for normal, single dry-year and multiple dry water years. The Central Basin groundwater is expected to be reliable in all years and over the 25 year planning horizon. Groundwater supplies are expected to remain constant and stable due to the adjudication of the Central Basin. Furthermore, groundwater is assumed to be drought-resistant and can be relied on under all hydrologic conditions.

The projected supply and demand under normal, single and multiple dry years conditions are shown in Table 35. The results of the comparison show a projected surplus in all years beginning in 2015 and extending to 2030. As projected, a shortfall may occur on or after 2033. Supply exceeds demand in all years prior to 2033. A supply surplus is projected and PRWA will likely remain under its APA. As projected, demand could exceed supply on or after 2033.

However, carryover storage would allow additional pumping without penalties. This long-term projection may not hold true.

**Table 35 Supply and demand comparison — normal year (AF)**

| Water supply sources | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Groundwater | 5,579 | 5,579 | 5,579 | 5,579 | 5,579 |
| Recycled Water | 100 | 200 | 200 | 200 | 200 |
| Supply totals | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |
| Demand totals | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| Difference | +218 | +322 | +189 | +52 | -88 |
| Difference as % of Supply | 103% | 105% | 103% | 101% | 98% |
| Difference as % of Demand | 97% | 95% | 97% | 99% | 102% |

Note:
TBD – application of gpcd will be used to determine projected demand over 25-year planning horizon

## 5.3 Projected Single-Dry-Year Supply and Demand Comparison

Changes in weather can lead to changes in water use. During dry years, water demands can be expected to increase. PRWA has elected to use normal year demands to estimate its dry-year demands. PRWA's recycled water supply was assumed to be "drought-proof" and not subject to reduction during dry periods. The results of the comparison show a projected surplus in all years beginning in 2015 and extending to 2030. As projected, a shortfall may occur on or after 2033. Supply exceeds demand in all years prior to 2033. A supply surplus is projected and PRWA will likely remain under its APA. As projected, demand could exceed supply on or after 2033. However, carryover storage would allow additional pumping without penalties. This long-term projection may not hold true. The projected dry-year supplies and demands are compared in Table 36.

**Table 36 Supply and demand comparison — single dry year (AF)**

| | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| Groundwater | 5,579 | 5,579 | 5,579 | 5,579 | 5,579 |
| Recycled Water | 100 | 200 | 200 | 200 | 200 |
| Supply totals | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |
| Demand totals | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| Difference | +218 | +322 | +189 | +52 | -88 |
| Difference as % of Supply | 103% | 105% | 103% | 101% | 98% |
| Difference as % of Demand | 97% | 95% | 97% | 99% | 102% |

Note:
TBD – application of gpcd will be used to determine projected demand over 25-year planning horizon

## 5.4 Projected Multiple-Dry-Year Supply and Demand Comparison

The Act requires water agencies to project demands and supplies during multiple dry years. Projections were prepared for five time frames: five-year periods ending in 2010, 2015, 2020, 2025, and 2030. Normal-year demands for intermediate years were interpolated between the demand values in Table 35. Dry-year demands were assumed to be the same as normal

demands. PRWA's recycled water supply was assumed to be "drought-proof" and not subject to reduction during dry periods.

The results of the comparison show a projected surplus in all years beginning in 2015 and extending to 2030. As projected, a shortfall may occur on or after 2033. Supply exceeds demand in all years prior to 2033. A supply surplus is projected and PRWA will likely remain under its APA. As projected, demand could exceed supply on or after 2033. However, carryover storage would allow additional pumping without penalties. This long-term projection may not hold true. The estimated supply and demand for five dry years ending in 2010 are summarized in Table 37.

**Table 37 Supply and demand comparison — multiple dry-year events (AF)**

| | | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| Multiple-dry year first year supply | Supply totals | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |
| | Demand totals | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| | Difference | +218 | +322 | +189 | +52 | -88 |
| | Difference as % of Supply | 103% | 105% | 103% | 101% | 98% |
| | Difference as % of Demand | 97% | 95% | 97% | 99% | 102% |
| Multiple-dry year second year supply | Supply totals | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |
| | Demand totals | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| | Difference | +218 | +322 | +189 | +52 | -88 |
| | Difference as % of Supply | 103% | 105% | 103% | 101% | 98% |
| | Difference as % of Demand | 97% | 95% | 97% | 99% | 102% |
| Multiple-dry year third year supply | Supply totals | 5,679 | 5,779 | 5,779 | 5,779 | 5,779 |
| | Demand totals | 5,461 | 5,457 | 5,590 | 5,727 | 5,867 |
| | Difference | +218 | +322 | +189 | +52 | -88 |
| | Difference as % of Supply | 103% | 105% | 103% | 101% | 98% |
| | Difference as % of Demand | 97% | 95% | 97% | 99% | 102% |

# 6.0 Water Shortage Contingency Plan and Drought Management

This section describes PRWA's water shortage planning efforts. Water shortages may result from weather variations and catastrophes such as pipeline failures, supply contamination, and earthquakes. During periods of drought, PRWA will utilize its Water Shortage Contingency Plan (WSCP), as adopted in 1992.

City Ordinance No. 826 stipulates the use of a four-stage rationing plan to be used in case of water shortage. The rationing plan utilizes both voluntary and mandatory water rationing depending on the severity of the water shortage.

It is highly unlikely that PRWA's ability to pump groundwater would be impeded by natural disasters for more than several days as studies indicate that groundwater wells would probably be back in operation within five days of a severe earthquake. Refer to WRD Technical Bulletin Volume 12 – Summer 2007 (**Appendix H**).

PRWA storage reservoirs hold treated potable water capable of providing all PRWA customers with 45 gpcd for 12 hours, in case of emergency. Therefore, if well site production was stopped due to electrical failure or transmission line malfunctions, these reservoirs would be the key water supply sources to the PRWA service area.

## 6.1 Stages of Action

The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their 2010 UWMP. In 1992, PRWA adopted its WSCP in response to California Assembly Bill Number 11. The WSCP is intended to conservatively manage PRWA water resources to provide water to its customers on an equitable and business-sound basis, in the event of a curtailment of deliveries of up to 50 percent. Table 38 shows the water supply stages and conditions for PRWA.

**Table 38 Water shortage contingency — rationing stages to address water supply shortages**

| Stage No. | Water Use Restrictions | Water Supply Reduction Goal | Percent of Supply Shortage |
|---|---|---|---|
| 1 - Water Supply Warning | Voluntary | 15% reduction | Up to 15% |
| 2 - Water Shortage Alert | Voluntary and/or Mandatory | 25% reduction | 15-25% |
| 3 - Water Shortage Crisis | Mandatory | 35% reduction | 25-35% |
| 4 - Water Shortage Emergency | Mandatory | Up to 50% reduction | 35-50% |

## 6.2 Estimate of Minimum Supply for Next Three Years

The Act requires an estimate of the minimum supply available during the next three years (2011 – 2014). It is suggested that the estimate be based on the driest three-year historic sequence for the water supply (as shown in Table 38 and consistent with CBMWD's multiple dry year scenario FY 2006-2009). PRWA's supply of potable water comes from their groundwater wells. Central Basin is expected to provide sufficient water to its member agencies even during dry

years. Table 39 shows the estimated minimum supply the PRWA could expect to have in the event of as supply reduction in the Central Basin.

PRWA's recycled supply is currently provided by CBMWD. During a drought event, reduced water consumption could lead to reduced raw wastewater flows. However, much of the reduction in water use is expected to come through a reduction in outdoor use, which should not impact wastewater flows. The supply of recycled water is considered to remain constant during multiple dry years.

**Table 39 Water shortage contingency**

| Water supply sources | Normal Water Year Supply 2011 | Minimum Supply for Next Three Years | | |
|---|---|---|---|---|
| | | Year 2012 | Year 2013 | Year 2014 |
| Central Basin (groundwater) | 5,579 | 5,579 | 5,579 | 5,579 |
| Recycled Water (via CBWMD) | 200 | 200 | 200 | 200 |
| Percent of normal year | | 100.0% | 100.0% | 100.0% |

Notes:
a. Contract agreements determine quantities of leased extractions.

## 6.3 Catastrophic Supply Interruption Plan

Catastrophic events such as earthquakes or regional power outages can impact water supply. PRWA developed its Emergency Response Plan (ERP) (included in **Appendix E**) to meet emergencies within its service area and has updated the plan as necessary. The ERP provides information on PRWA operations, assigns responsibilities, and establishes general policies and procedures associated with operations during natural disasters, technological incidents, and nuclear defense emergencies.

PRWA has storage reservoirs to provide water during an interruption to supply. These reservoirs hold treated potable water capable of providing all PRWA customers with 45 gpcd for 12 hours. PRWA has also established minor emergency interconnections with the City of Whittier and the San Gabriel Valley Water Company for use during short-term outages. These minor interconnections are intended for emergencies. During an extended outage or drought, these neighboring agencies may not have sufficient supply at these minor interconnections to share significant amounts with PRWA.

Table 40 summaries various possible catastrophes and a summary of the actions that would be taken in response.

**Table 40 Preparation Actions for a Catastrophe**

| Possible Catastrophe | Summary of Actions |
|---|---|
| Fire | For motors and switchgear (including well facilities, pumps, or control centers), staff are not allowed to enter the site. Staff will notify the fire authority and be available to assist as necessary. For fires in the motor or switchgear, where possible, the main electrical breaker should be turned off. |
| Earthquake | Staff will take appropriate defensive measures until the earthquake has passed. After an earthquake, pumps, wells, control cabinets, reservoirs, and pipelines will be inspected for damage. Preparation will be initialized for the isolation of the reservoir water supply and prepared for emergency distribution. |

| Possible Catastrophe | Summary of Actions |
|---|---|
| Flooding | Sandbagging will be used, where feasible, to protect PRWA facilities. Motors or electrical switchgears that could come in contact with floodwaters will be turned off, and the main breakers will be deactivated. After a flood, well and distribution system samples will be taken to ensure water quality has not been compromised. If contamination is present, immediate action will be taken, including additional chlorination, flushing, activation of interconnections, public notification, and/or boil water orders. |
| Sabotage of Water Supplies | If there is evidence of tampering, such as an open or damaged reservoir hatch, apparent tampering with wells or pumps, suspicious containers left on site, or water having a strange odor or color, the following steps must be taken:<br>• Isolate the affected system<br>• Immediately notify your supervisor and management<br>• Isolate the area and notify local law enforcement officials<br>• Collect water samples for analysis.<br>• Notify the Health Department.<br>• Notify the public, as appropriate<br>• Flush and chlorinate, as appropriate<br>The system will be returned to service only after testing has deemed it safe. |
| System Contamination | For contamination within the distribution system, reservoir, or wells, the procedures in the Emergency Chlorination Plan will be followed. |
| Disruption of Supply | In the event of supply due to issues such as well failure, commercial power failure, and pipeline failure, emergency generators will be activated. If the problem involves the operation of a well, a well/pump repair company will be contacted for assistance. |
| Civil Disorder | In the event of civil disorder, PRWA facilities will remain locked and, as practical, staffed by PRWA staff. Additional private security guards will be hired as required. |
| Disruption of Distribution Pumping | For disruptions in distribution pumping, such as a fire at a well site, staff will first contact his or her superintendent to inform the superintendent of the situation. After calling for assistance, the site will be shut down, and an alternate well will be activated, after which the chlorine residual will be checked. |
| Main Breaks | Repairs of main breaks will be immediately initiated and repaired by PRWA staff, unless the General Manager or the field superintendent deems that assistance is necessary. A PRWA representative will monitor the repair activity to insure that all repair work is in accordance with AWWA and PRWA standards. |
| Damaged or Sheered Fire Hydrant | Damaged/sheered hydrants shall be isolated by closing the hydrant lateral valve, and repairs will be made thereafter. If repairs cannot be made, the area will be delineated and secured, and a bag will be placed over the hydrant to prevent usage. Staff will immediately notify the local fire authority of the hydrant's location, and that it is out of service. |
| Commercial Power Outages | Staff will contact the Southern California Edison (SCE) to determine the anticipated outage duration. Two diesel-powered generators are permanently installed at two well sites to provide power for distribution pumping, and two other well sites are equipped with a natural gas engines that are designed to run in the case of a power outage. Currently, the City is in the design phase to add backup generators for use at other City well sites. Once power has been restored, time will be allowed to let the SCE system stabilize, and then the generator and natural gas engine will be stopped. |
| Building Evacuation | For a building evacuation, staff shall follow the posted evacuation route to the assigned staging area. The evacuation commander will sound the evacuation alarm and oversee the evacuation. If it is safe to do so, gas and electrical service to the building will be shut off. |
| Bomb Threats | All bomb threats are taken seriously. For an occupied building, the building must be evacuated until the threat is alleviated. PRWA management, local police, and local fire authorities must be immediately notified of the threat. PRWA employees are not allowed to try to disable a suspected bomb or suspicious device, and the area will be secured, allowing access only to authorized personnel. |
| Emergency Water Disbursement | If it is impossible to distribute water through the normal distribution system, emergency water distribution is possible from the reservoir. PRWA staff will create a distribution center to supply water requests from reservoir taps. |
| Emergency Notification | For emergency events requiring public notification, PRWA will follow the directions ascribed by the state health department. As necessary, electronic media, radio and television, and print media (in both English and Spanish) will be utilized. Two vehicles with loudspeakers will also be available to notify residents of the emergency and any special circumstances such as water conservation requests. This should be accomplished within 2.5 hours. |

## 6.4 Prohibitions, Penalties and Consumption Reduction Methods

PRWA has established a water shortage management plan that becomes effective during different stages of water shortage. Mandatory prohibitions on water usage during water shortages apply to all PRWA customers. The mandatory prohibitions are shown in Table 41.

**Table 41 Water shortage contingency — mandatory prohibitions**

| Prohibitions | Stage When Prohibition Becomes Mandatory |
|---|---|
| Installed landscape must be native to Pico Rivera climate. | I |
| No loss of water from user's property when irrigating landscape. | I |
| Irrigation during morning and evening hours to avoid evaporation loss. | I |
| All leaks must be repaired. | I |
| Use of a broom or other non-water means to clean hardscape. | I |
| Use of reclaimed water where and when available. | I |
| Potable water used to irrigate grass, lawns, ground cover, shrubbery, vegetation, and trees shall not result in runoff of more than five minutes. | II |
| Potable water shall not be used to wash sidewalks, walkways, driveways, parking lots, open ground, or other hard-surfaced areas, except where necessary for public health or safety. | II |
| Potable water shall not be allowed to escape from breaks within the customer's plumbing system for more than twenty-four hours after the customer is notified or discovers the break. | II |
| Washing cars, boats, trailers, aircraft, or other vehicles by hose shall not be done without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment. | II |
| No restaurant, hotel, café, cafeteria, or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested. | III |
| Cleaning, filling, or maintaining decorative fountains, lakes, or ponds with potable water is prohibited. | III |
| Where non-potable or recycled water is sufficient, potable water may not be used for construction, compaction, dust control, street or parking lot sweeping, or building washdown. | III |
| City Manager must issue prior approval for the use of potable water for sewer system maintenance or fire protection training. | III |

In addition to the prohibitions above, PRWA has identified a number of methods to reduce water consumption during a drought. Public information notices will be used to inform and persuade customers to reduce water demand levels. These methods are summarized in Table 42.

**The PRWA may impose surcharges or other penalties for noncompliance with the requirements or prohibitions in accordance with Section 39 of its Code of Ordinance. PRWA's current rate structure consists of a fixed monthly rate (based on meter size) plus a consumption charge based on actual water delivered. Each PRWA customer has an allotment based on seasonal patterns and each customer shall be notified of their classification and allotment by mail before the water shortage emergency takes effect. New customers and connections will be notified at the commencement of service. For all PRWA customers, an excess use penalty per HCF of water will be applied for water used beyond the applicable allocation. After one written warning, PRWA may install a flow-restricting device on the service line of any customer observed by RWA staff to be using water for any non-essential or unauthorized use. These penalties are summarized in**

## Table 42 Water shortage contingency — consumption reduction methods

| Consumption Reduction Method | Stage When Method Takes Effect | Projected Reduction |
|---|---|---|
| Voluntary best efforts in general water use<br>- Reduce general use by 10%<br>- Water-efficient landscaping is encouraged<br>- No runoff from irrigation<br>- Cease irrigation between 11 a.m. and 4 p.m. | 1 | 10% |
| Voluntary and mandatory restriction in general water use (same as Stage I restrictions plus):<br>- Reduce general use by 20%<br>- Cease irrigation between 6 a.m. and 6 p.m., except with hand-held hose or using reclaimed water<br>- Irrigation only 3 times per week | 2 | 20% |
| Mandatory restrictions<br>(same as Stage II restrictions plus):<br>- Reduce general use by 35%<br>- Commercial car washing using recycled water only<br>- No golf course water unless reclaimed water is used<br>- Irrigation only 2 times per week. | 3 | 35% |
| Mandatory restrictions(same as Stage III restrictions plus):<br>- Reduce general use by 50%<br>- Water rationing by customer class<br>- Irrigation only 1 time per week | 4 | 50% |

Table 43.

## Table 42 Water shortage contingency — consumption reduction methods

| Consumption Reduction Method | Stage When Method Takes Effect | Projected Reduction |
|---|---|---|
| Voluntary best efforts in general water use<br>- Reduce general use by 10%<br>- Water-efficient landscaping is encouraged<br>- No runoff from irrigation<br>- Cease irrigation between 11 a.m. and 4 p.m. | 1 | 10% |
| Voluntary and mandatory restriction in general water use (same as Stage I restrictions plus):<br>- Reduce general use by 20%<br>- Cease irrigation between 6 a.m. and 6 p.m., except with hand-held hose or using reclaimed water<br>- Irrigation only 3 times per week | 2 | 20% |
| Mandatory restrictions<br>(same as Stage II restrictions plus):<br>- Reduce general use by 35%<br>- Commercial car washing using recycled water only<br>- No golf course water unless reclaimed water is used<br>- Irrigation only 2 times per week. | 3 | 35% |
| Mandatory restrictions(same as Stage III restrictions plus):<br>- Reduce general use by 50%<br>- Water rationing by customer class<br>- Irrigation only 1 time per week | 4 | 50% |

**Table 43 Water shortage contingency — penalties and charges**

| Penalty | Situation when Penalty May Take Effect |
|---|---|
| Excess use charge assessed | 3 |
| Installation of flow restrictor | 4 |

## 6.5 Revenue Impacts of Reduced Sales During Shortages

Anticipated shortfalls in projected revenue due to water supply shortages would need to be covered through increased water rates and/or an advance from funds set aside by PRWA. PRWA receives 93 percent of its normal annual revenues from monthly charges. Surplus revenues are used to fund the water system capital improvements. Anticipated shortfalls in projected revenue due to water supply shortages are covered through an emergency fund, which is maintained at 75 percent of normal PRWA annual revenue. However, a rate increase could still be needed during a prolonged water shortage. Recommended percent increases during Stages 1 through 4 are 15, 25, 50, and 100 percent, with the maintenance of a fifteen (15) percent increase over pre-shortage rates to recover lost revenues. The impacts of such a reduction on the PRWA's revenue are shown in Table 44.

Measures to overcome expenditure impacts and estimated dollar savings are provided in Table 45.

**Table 44 Actions and Conditions that Impact Revenues**

| Measure | Summary of Effects |
|---|---|
| Emergency Fund | PRWA has an emergency fund to be used in times of drought and emergencies to offset the loss of revenue. PRWA could also advance funds from its General Fund for the loss of essential revenue. |
| Rate adjustment | In January 2009, PWRA adopted a new water rate case to increase operating revenues to fund continuing escalating operational and water costs and to fund capital improvement projects. In periods of a prolonged water shortage a short-term rate increase could still be needed to recover lost revenues. Recommended percent increases during Stages 1 through 4 are 15, 25, 50, and 100 percent, with the maintenance of a fifteen (15) percent increase over pre-shortage rates. |

**Table 45 Actions and Conditions that Impact Expenditures**

| Measure | Summary of Effects |
|---|---|
| Curb all discretionary spending | Discretionary spending is not considered to be a significant budget item. |
| Defer Capital Improvement Program | Certain non-essential projects (including scheduled facility replacement and refurbishments) could be delayed without having an adverse effect. |

## 6.6 Mechanism to Determine Reductions in Water Use

Mechanisms to determine reductions in water use include daily production and distribution record reviews and water meter auditing. PRWA's mechanisms for monitoring water use are summarized in Table 46.

**Table 46 Water Use Monitoring Mechanisms**

| Mechanisms for determining actual reductions | Type and quality of data expected |
|---|---|
| Daily production and distribution records | Daily production and distribution records would be monitored, enabling PRWA staff to determine if reduction goals are being met. Customers would be alerted to actual water use (increase/decrease). |
| Water meter auditing | Monitoring of excessive water use with frequent meter readings of high-volume users. |

# 7.0 Water Quality Impacts on Reliability

PRWA is committed to providing high-quality water to its customers. PRWA's supply is not considered subject to reduction due to poor water quality.

The quality of PRWA's water deliveries is regulated by the California Department of Health Services (DHS), which requires regular collection and testing of water samples and tests to ensure that the quality meets state and national regulatory standards and does not exceed MCLs. Through its approved laboratory contracts, PRWA performs water quality testing, which has consistently yielded results within the acceptable regulatory limits. Overall, PRWA's water is of high quality.

The quality of PRWA's groundwater supply over the next 25 years is expected to continue to exceed DHS standards. Groundwater will continue to be treated to meet drinking water standards, and no impacts to groundwater supplies due to water quality deficiencies are foreseen to occur in the next 25 years. Table 47 summarizes the current and project water supply changes due to water quality.

**Table 47 Water quality — current and projected water supply impacts**

| Water source | Description of condition | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Groundwater | None | 0 | 0 | 0 | 0 | 0 | 0 |
| Recycled Water | None | 0 | 0 | 0 | 0 | 0 | 0 |

Groundwater in the Central Basin is continually monitored because of its susceptibility to seawater intrusion, potential contamination from adjacent basins and migration of shallow contamination into deeper aquifers. The Alamitos Barrier, located in the southwest portion of Central Basin's service area, provides a buffer between the groundwater basin and seawater intrusion. The available supply of replenishment water to physically recharge the Basin includes local and imported water. The local water that recharges the groundwater basin comes from storm flows from the San Gabriel Valley and flow obligations under the San Gabriel River Judgment with the Upper Area of the Central Basin. This water is defined as "Make-Up Water." Imported Water is purchased from Metropolitan to be used for surface spreading at the Montebello Forebay and for seawater barrier injection at the Alamitos Barrier. Recycled water is purchased from the County Sanitation Districts of Los Angeles County (CSDlAC) for spreading and injection. As mentioned in the overview, the Central Groundwater Basin has very good water quality overall. However, there are several contaminants (Perchlorate, Manganese, and the Volatile Organic Compounds [PCE and TCE]) in isolated areas that are still a concern.[4]

As the groundwater replenishment agency for the Central Groundwater Basin, the WRD has programs to monitor groundwater levels and quality. WRD's Regional Groundwater Monitoring Program consists of a network of about 200 WRD and USGS installed monitoring wells at 45 locations throughout the Central Basin region. Monitoring well data is supplemented with information from production wells to capture the most accurate information available. WRD staff provides the in-house capability to collect, analyze and report groundwater data. This information is stored in a GIS database and provides the basis to better understand the characteristics of the Central Groundwater Basin. WRD makes this information available

4 Central Basin MWD, 2010 Draft UWMP, page 5-2.

through an annual Regional Groundwater Monitoring Report which documents groundwater production, groundwater levels, and groundwater quality conditions throughout the Central Basin.

# 8.0 Demand Management Measures

Water conservation is a critical part of the PRWA's 2010 UWMP and its long-term strategy for meeting the water needs of its customers. The PRWA implements some water conservation demand management measures (DMMs).

The unpredictable water supply and ever-increasing demand on California's complex water resource system resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban DMMs for conserving water. The California Urban Water Conservation Council (CUWCC) was created to assist in increasing water conservation through partnerships among urban water agencies, public interest organizations, and private entities. This consensus-building effort resulted in a Memorandum of Understanding, as amended September 16, 1999, which formalizes an agreement to implement DMMs and provide a cooperative effort to reduce the consumption of California's water resources.

The goals of the PRWA's water conservation program are to:

- demonstrate continued commitment to the DMMs or if applicable, Best Management Practices (BMPs)[5]
- ensure a reliable water supply

The PRWA is not a signatory to the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, which created the CUWCC in 1991. However, the PRWA has voluntarily agreed to implement the fourteen water conservation DMMs.

In 2009, the CUWCC reorganized the BMPs and grouped them into five categories. Two categories, Operations and Education, are Foundational BMPs because they are considered to be essential water conservation activities by any utility and are 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. Agencies can comply with the Programmatic BMPs through one of three compliance options: 1) traditional approach to BMP compliance; 2) the Flex Track Compliance Option; or, 3) the gallons per capita per day (GPCD) Compliance approach (this approach provides a reporting mechanism)

Water utilities throughout California are implementing water conservation programs and providing services to their customers to promote water use efficiencies and water savings.

## 8.1 Foundational BMPs

- Utility Operations Programs - According to the CUWCC, this practice consists of several key actions that utilities shall take to better enable conservation program implementation, to supplement conservation incentives with regulations where appropriate, and to assist one another through the wholesaler-retailer relationship.
- Education Programs - California water agencies have played a major role in stressing the need for their customers to conserve water through both public information and school education programs. The specifics of how these programs are to be implemented are detailed below.

5 MOU Signatories only.

- Public Information Programs present opportunities to use public information programs as an effective tool to inform customers about the need for water conservation and ways they can conserve, and to influence customer behavior to conserve.
- School Education Programs have been implemented to reach the youngest water users at an early age and enforce the need to engage in water conservation as a life-long behavior.

## 8.2 Programmatic BMPs

According to the CUWCC, as stated above each signatory has the option of implementing and complying with each of the Programmatic BMPs through one of three (3) approaches: 1) the traditional approach to BMP Compliance; 2) the Flex Track alternative included in each Programmatic BMP or the GPCD Compliance Option. Table 48 presents the CUWCC's Foundational and Programmatic BMPs and DMMs.

- Residential - Residential water users throughout California depend on a reliable and safe supply of water for their homes. This BMP defines the best and most proven water conservation methods and measures those residents, working in conjunction with water agencies, can implement. By implementing these methods and measures homeowners, multi-family property owners, and tenants will increase water use efficiency and improve regional or local reliability.
- Commercial, Industrial, and Institutional (CII) - CII water demands make up a large percentage of total demand for California. CII water use varies dramatically between business sectors as well as within a given water agency's territory as is the case with the PRWA. The goal of this BMP is to implement comprehensive yet flexible BMPs, allowing the PRWA to tailor the implementation of each practice to fit local needs, opportunities and businesses in its service area. The end result is a practice that is successful and will produce the greatest amount of cost-effective water savings.
- Landscape - Outdoor irrigation accounts for a large portion of urban water use. Irrigation water use varies dramatically depending on water pricing and availability, plant choice, geographic locations, seasonal conditions, and the level of commitment to sound water efficiency practices. The goal of this BMP is that irrigators, with assistance from MOU signatories, will achieve a higher level of water use efficiency consistent with the actual irrigation needs of the plant materials. Achieving this goal would ultimately reduce overall demands for water, especially during the peak summer months when temperatures are high and irrigation is essential for plant life.

The PRWA has limited resources including staffing and currently lacks the necessary funding to completely support each of the DMMs completely. However, similar to many water utilities throughout California, the PRWA, to the best of its abilities is committed to implementing water conservation programs and providing services to its customers to promote water use efficiencies and water savings.

## Table 48 Demand Management Measures

| Demand Mgt Measures/Best Management Practices for Urban Water Conservation in California | | | | | | |
|---|---|---|---|---|---|---|
| DMMs/CUWCC BMPs by Type, Organization and Compliance Measure | | | | | | |
| **Type** | **Category** | **BMP** | **Description** | **DMM** | | **Compliance** |
| **Foundation** | Operations Practices | 1.1.1 | Conservation Coordinator | **L** | Water Conservation Coordinator | **Pending/18 mth Schedule** |
| | | 1.1.2 | Water Waste Prevention | **M** | Water Waste Prevention | **YES** |
| | | 1.1.3 | Wholesale Agency Assistance Programs | **J** | Wholesale Agency Programs | **YES** |
| | | 1.2 | Water Loss Control (System Water Audits, Leak Detection and Repair) | **C** | System Water Audits, Leak Detection and Repair | **YES** |
| | | 1.3 | Metering with Commodity rates for all New Connections and Retrofit of Existing Connections | **D** | Metering with Commodity rates for all New Connections and Retrofit of Existing Connections | **YES** |
| | | 1.4 | Retail Conservation Pricing | **K** | Conservation Pricing | **YES** |
| | Education Programs | 2.1 | Public Information Programs | **G** | Public Information Programs | **Pending/18 mth Schedule** |
| | | 2.2 | School Education Programs | **H** | School Education Programs | **Pending/18 mth Schedule** |
| **Programmatic** | Residential | 3.1 | Residential Assistance Program | **A** | Water Survey Programs for Single-Family and Multi-Family Residential Customers[1] | **YES** |
| | | | (Plumbing Retrofit) | **B** | Residential Plumbing Retrofit | **YES** |
| | | 3.2 | Landscape Water Survey | **A** | Water Survey Programs for Single-Family and Multi-Family Residential Customers[1] | **YES** |
| | | 3.3 | High-Efficiency Washing Machine Rebate - Financial Assistance Programs | **F** | High-Efficiency Washing Machine Rebate Programs | **YES** |
| | | 3.4 | WaterSense Specification (WSS) Toilets | **N** | Residential ultra-low flush toilet replacement programs | **Pending/18 mth Schedule** |
| | CII | 4 | Commercial, Industrial, Institutional (CII) | **I** | Conservation Programs for Commercial, Industrial, Institutional (CII) | **Pending/18 mth Schedule** |
| | Landscape | 5 | Landscape | **E** | Large Landscape conservation programs and incentives | **Pending/18 mth Schedule** |

Source: Adapted from Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 UWMP, February 2011.

Note:

1. Components of DMM A (Water survey programs for single-family residential and multifamily residential customers) applies to both BMP 3.1 (Residential assistance program) and BMP 3.2 (Landscape water survey)

## 8.3 Demand Management Measures

### 8.3.1 DMM A – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

PRWA encourages the use of residential water use surveys, which look at all the water-using devices inside the home, such as toilets, faucets, and showerheads. Upon request, a PRWA employee checks for leaks and tests the flow indoors and outdoors. Once the survey is completed, recommendations are provided for retrofitting certain water use devices, and educational materials are supplied to the resident. Support for this is provided by CBMWD, with funding for residential survey devices from Metropolitan.

### 8.3.2 DMM B – Residential Plumbing Retrofit

PRWA encourages its customers to use ultra-low flush (ULF) toilets, and PRWA coordinates its efforts with the CBMWD to distribute waterless urinals to various schools within the El Rancho Unified School PRWA and some commercial customers.

PRWA also participated in CBMWD's program to distribute low-flow showerheads and aerators. This program is administered by the CBMWD and the West Basin Municipal Water District with financial assistance from Metropolitan. Low-flow showerhead programs have been and will continue to be promoted.

### 8.3.3 DMM C – System Water Audits, Leak Detection, and Repair

Over the last ten years, PRWA has implemented water audits (conducted up to 3 water audits in last 10 years) and leak detection and repair. This service has resulted in the reduction of unaccounted water losses of approximately 5 percent per year. Due to PRWA being located in an active earthquake zone, the system water audit and leak detection and meter calibration programs have been permanently integrated into the utility operations, which enable continuous monitoring of all mains, laterals, and meters. Additionally, in order to ensure that all valves and meters are working properly, PRWA services both its largest and most compound customer meters annually. PRWA also replaces its meters as needed, exercises the valves throughout the year, and flushes the water mains throughout the year.

### 8.3.4 DMM D – Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

PRWA's service area is fully metered, and meters are required for all new connections. All of PRWA's water connections are billed a fixed service charge plus commodity usage.

### 8.3.5 DMM E – Large Landscape Conservation Programs and Incentives

Other than city-owned parks, there is no significant landscaping within PRWA's service area. However, the City of Pico Rivera has adopted a Water Efficient Landscape Ordinance, which requires water-efficient landscaping and is applied to City-wide industrial, commercial, and residential projects. In addition, with the completion of CBMWD's Rio Hondo water reclamation program, recycled water is used by the Pico Rivera Municipal Golf Course.

### 8.3.6 DMM F – High-Efficiency Washing Machine Rebate Programs

PRWA incorporates information about high-efficiency appliances, including washing machines, into its public information programs. At present there are several residential and commercial

toilet and washer rebates offered by CBMWD, and PRWA will continue to monitor and promote the availability of these and other rebate programs to its customers.

### 8.3.7 DMM G – Public Information Program

PRWA coordinates its efforts with CBMWD and energy utilities to educate the public on water conservation. Council members regularly promote water conservation at public functions, community groups, and schools, and PRWA is expanding its public information program to include bill inserts and brochures.

### 8.3.8 DMM H – School Education Programs

PRWA and its Board members work in coordination with the El Rancho School District to educate students about the importance of water conservation, and grade-appropriate materials are distributed. See **Appendix I** for a list of CBMWD school education programs.

### 8.3.9 DMM I – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

PRWA does not currently have any conservation programs for commercial, industrial, and institutional accounts. However, PRWA can take advantage of programs offered by CBMWD and Metropolitan that offer rebates to business, schools, and other facilities for items such as commercial clothes washers, waterbrooms, cooling tower conductivity controllers, pre-rinse spray nozzles, x-ray machine recirculating devices, and commercial toilets and urinals. In addition, PRWA is considering passing a resolution to require the future construction projects to use water conservation methods for plumbing fixtures, including ULFTs, low-flow showerheads, and waterless urinals.

### 8.3.10 DMM J – Wholesale Agency Assistance Program

Coordination with CBMWD for regional water conservation programs. Most recently, CBMWD As a part of Central Basin's "Shut Your Tap!" Conservation Campaign. CBMWD hosts a bimonthly event called the "Shut Your Tap! Roundtable". The Roundtable provides a forum for cities, water agencies, and interested parties to share ideas and information on conservation trends and issues. The setting provides a great forum for interaction and networking among water stakeholders. In an effort to provide Central Basin cities with support for their marketing, outreach, and enforcement of local mandatory water conservation ordinances, a "Water Use Efficiency Ordinance Tool Kit" was developed and provided to each city. The Tool Kit included a cover letter, sample ordinances, a sample staff report template, sample violation notices, and ordinance enforcement collateral. To add to the advertising opportunities of our campaign partners, a Conservation Messaging Tool Kit was also provided to cities and water retail agencies. Each kit includes water conservation tip sheets, door hangers, bill inserts, local cable TV announcements, countertop tent cards, and sample newsletter articles.

CBMWD has a host of grant programs that are specifically established to promote water conservation. See **Appendix I** for list of this programs that could provide the funding and the materials needed to improve the PRWA's water conservation programs.

Furthermore, the CBMWD has five-year Conservation Master Plan to expand long-term water saving efforts and introduce new regionally tailored programs. The PRWA will track its involvement with these future programs and can engage on a case-by-case basis according to the PRWA's current operations, funding and staff resources.

### 8.3.11 DMM K – Conservation Pricing

PRWA has implemented a tiered water rate structure which was designed to discourage excessive water use. All users pay a minimum monthly service charge plus a three-tiered commodity rate that increases with increased water consumption.

### 8.3.12 DMM L – Water Conservation Coordinator [Water Use Efficiency Practitioner]

Currently, the PRWA does not have a designated conservation coordinator; however, over the next two years the PRWA expects to develop a comprehensive water conservation program to address to this issue. Because staff resources have been reduced, the PRWA has one City staff member to advocate for its conservation programs.

### 8.3.13 DMM M – Water Waste Prohibitions

Prohibitions against wasteful use of water are followed, as set forth in the California Constitution. PRWA has also adopted Resolution 3945 and codified in Title 13.70.040 (included in **Appendix F**), which establishes prohibitions regarding the wasteful use of water. Some of these include:

1) Limits on Water Hours and Duration.
2) No Excessive Water Flow or Runoff.
3) No Washing Down Hard or Paved Surfaces.
4) Obligation to Fix Leaks, Breaks or Malfunctions.
5) Limits on Washing Vehicles
6) Drinking Water Served Upon Request Only.
7) Commercial Lodging Establishments Must Provide Option to Not Launder Linen Daily.
8) No Installation of Nonrecirculating Commercial Car Wash and Laundry Systems.
9) Restaurants Required to Use Water Conserving Dish Wash Spray Valves.

### 8.3.14 DMM N – Residential ULFT Replacement Program

PRWA has previously participated with CBMWD in its ULFT replacement program, which supplied ULFTs free of charge to PRWA customers. CBMWD continues to partner with local water purveyors like PRWA, offering both a $50 rebate for the purchase and installation of ULFTs and a $70 rebate for the purchase and installation of dual-flush toilets, and PRWA is committed to participating again in this program.

## 8.4 Determination of Implementation

Currently, the PRWA has not completely implemented all of the necessary DMMs. During development of this 2010 UWMP the PRWA has specifically identified the DMMs that are lacking complete implementation and has initiated a process to develop a comprehensive water conservation program over the next 18 months. The following DMMs that are lacking 100 percent compliance; however, all DMMs including those listed below will be encapsulated in the PRWA's in a comprehensive water conservation program.

DMM E – Large Landscape Conservation Programs and Incentives

DMM G – Public Information Program

DMM H – School Education Programs

DMM I – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

DMM L – Conservation Coordinator [Water Use Efficiency Practitioner]

DMM N – Residential ULFT Replacement Program

# 9.0 Climate Change

## 9.1 Climate Change

Climate change adds its own new uncertainties to the challenges of planning. Changes in weather significantly affect water supply planning, irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses. Typically, water supplies that are dependent on natural hydrology are vulnerable to climate change, especially if the water source originates from mountain snow pack. In addition to water supply impacts, changes in local temperature and precipitation are expected to alter water demand patterns. PRWA is committed to performing its due diligence with respect to climate change.

## 9.2 Potential Impacts

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in increased risk of damage from storms, high-tide events, and the erosion of levees.

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater;
- Changes in urban and agricultural demand levels and patterns;
- Impacts to human health from waterborne pathogens and water quality degradation;
- Declines in ecosystem health and function; and
- Alterations to power generation and pumping regimes.

# Appendix A
# Text of Urban Water Management Planning Act

# Section K: California Water Code, Division 6, Part 2.6: Urban Water Management Planning

The following sections of California Water Code Division 6, Part 2.6, are available online at http://www.leginfo.ca.gov/calaw.html.


| | |
|---|---|
| **Chapter 1. General Declaration and Policy** | §10610-10610.4 |
| **Chapter 2. Definitions** | §10611-10617 |
| **Chapter 3. Urban Water Management Plans** | |
| Article 1. General Provisions | §10620-10621 |
| Article 2. Contents of Plans | §10630-10634 |
| Article 2.5. Water Service Reliability | §10635 |
| Article 3. Adoption And Implementation of Plans | §10640-10645 |
| **Chapter 4. Miscellaneous Provisions** | §10650-10656 |


## Chapter 1. General Declaration and Policy

**10610.** This part shall be known and may be cited as the "Urban Water Management Planning Act."

**10610.2.**

(a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

**10610.4.** The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

## Chapter 2. Definitions

**10611.** Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

**10611.5.** “Demand management” means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

**10612.** “Customer” means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

**10613.** “Efficient use” means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

**10614.** “Person” means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

**10615.** "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

**10616.** "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

**10616.5.** "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

**10617.** "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

## Chapter 3. Urban Water Management Plans

### Article 1. General Provisions

**10620.**

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

**10621.**

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

## Article 2. Contents of Plans

**10630.** It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

**10631.** A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of

water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(A) An average water year.

(B) A single dry water year.

(C) Multiple dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.

(B) Multifamily.

(C) Commercial.

(D) Industrial.

(E) Institutional and governmental.

(F) Landscape.

(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the “Memorandum of Understanding Regarding Urban Water Conservation in California,” dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

**10631.1.**

(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code,

as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

**10631.5.**

(a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the

department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, “not locally cost effective” means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit annual reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

**10631.7.** The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the

Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

**10632.** The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

**10633.** The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water

supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

**10634.** The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

## Article 2.5. Water Service Reliability

**10635.**

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand

assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

## Article 3. Adoption and Implementation of Plans

**10640.** Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

**10641.** An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

**10642.** Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

**10643.** An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

**10644.**

(a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

**10645.** Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

## Chapter 4. Miscellaneous Provisions

**10650.** Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

**10651.** In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

**10652.** The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

**10653.** The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

**10654.** An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the “Memorandum of Understanding Regarding Urban Water Conservation in California” is deemed to be reasonable for the purposes of this section.

**10655.** If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or

applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

**10656.** An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

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# Section L: California Water Code, Division 6, Part 2.55: Water Conservation

The following sections of California Water Code Division 6, Part 2.55, are available online at http://www.leginfo.ca.gov/calaw.html.

| | |
|---|---|
| **Chapter 1. General Declarations and Policy** | §10608-10608.8 |
| **Chapter 2. Definitions** | §10608.12 |
| **Chapter 3. Urban Retail Water Suppliers** | §10608.16-10608.44 |

## Legislative Counsel's Digest

**Senate Bill No. 7**
**Chapter 4**

An act to amend and repeal Section 10631.5 of, to add Part 2.55 (commencing with Section 10608) to Division 6 of, and to repeal and add Part 2.8 (commencing with Section 10800) of Division 6 of, the Water Code, relating to water.

[Approved by Governor November 10, 2009. Filed with Secretary of State November 10, 2009.]

**Legislative Counsel's Digest**

SB 7, Steinberg. Water conservation.

(1) Existing law requires the Department of Water Resources to convene an independent technical panel to provide information to the department and the Legislature on new demand management measures, technologies, and approaches. "Demand management measures" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

This bill would require the state to achieve a 20% reduction in urban per capita water use in California by December 31, 2020. The state would be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. The bill would require each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements. The bill would require agricultural water suppliers to implement efficient water management practices. The bill would require the department, in consultation with other state agencies, to develop a single standardized water use reporting form. The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill. The bill would repeal, on July 1, 2016, an existing requirement that conditions

eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

(2) Existing law, until January 1, 1993, and thereafter only as specified, requires certain agricultural water suppliers to prepare and adopt water management plans.

This bill would revise existing law relating to agricultural water management planning to require agricultural water suppliers to prepare and adopt agricultural water management plans with specified components on or before December 31, 2012, and update those plans on or before December 31, 2015, and on or before December 31 every 5 years thereafter. An agricultural water supplier that becomes an agricultural water supplier after December 31, 2012, would be required to prepare and adopt an agricultural water management plan within one year after becoming an agricultural water supplier. The agricultural water supplier would be required to notify each city or county within which the supplier provides water supplies with regard to the preparation or review of the plan. The bill would require the agricultural water supplier to submit copies of the plan to the department and other specified entities. The bill would provide that an agricultural water supplier is not eligible for state water grants or loans unless the supplier complies with the water management planning requirements established by the bill.

(3) The bill would take effect only if SB 1 and SB 6 of the 2009–10 7th Extraordinary Session of the Legislature are enacted and become effective.

The people of the State of California do enact as follows:

SECTION 1. Part 2.55 (commencing with Section 10608) is added to Division 6 of the Water Code, to read:

## Part 2.55. Sustainable Water Use and Demand Reduction

### Chapter 1. General Declarations and Policy

**10608.** The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

**10608.4.** It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

**10608.8.**

(a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water

use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

## Chapter 2. Definitions

**10608.12.** Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) “Agricultural water supplier” means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. “Agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include the department.

(b) “Base daily per capita water use” means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) “Baseline commercial, industrial, and institutional water use” means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) “Commercial water user” means a water user that provides or distributes a product or service.

(e) “Compliance daily per capita water use” means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) “Disadvantaged community” means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) “Gross water use” means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) “Industrial water user” means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) “Institutional water user” means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) “Interim urban water use target” means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(l) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

## Chapter 3. Urban Retail Water Suppliers

**10608.16.**

(a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

**10608.20.**

(a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan required pursuant to Part 2.6 (commencing with Section 10610) due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies

available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) An urban retail water supplier shall be granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

**10608.22.** Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

**10608.24.**

(a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

**10608.26.**

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the United States Department of Defense military installation's requirements under federal Executive Order 13423.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

**10608.28.**

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

**10608.32.** All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

**10608.36.** Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

**10608.40.** Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

**10608.42.** The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

**10608.43.** The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for

commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

**10608.44.** Each state agency shall reduce water use on facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

# Appendix B
# Adoption Resolution and Related Documentation

**RESOLUTION NO. 11-27**

**A RESOLUTION OF THE PICO RIVERA WATER AUTHORITY OF THE CITY OF PICO RIVERA, CALIFORNIA, ADOPTING THE WATER AUTHORITY'S 2010 URBAN WATER MANAGEMENT PLAN TO COMPLY WITH SB X7-7, THE WATER CONSERVATION ACT OF 2009**

**WHEREAS**, the Urban Water Management Planning Act (California Water Code Division 6, Part 2.6, Sections 10610 through 10656) requires that all urban water suppliers providing water for municipal purposes, either directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually, must prepare and submit an urban water management plan at least every five years; and

**WHEREAS**, Senate bill X7-7, also known as the Water Conservation Act of 2009, extended the deadline for adoption of the 2010 Urban Water Management Plan from December 31, 2010 to July 1, 2011 to allow urban retail water suppliers additional time to comply with the requirements of Senate Bill X7-7 and incorporate the adopted per capita water use targets required by Senate Bill X7-7 into the 2010 Urban Water Management Plan; and

**WHEREAS**, the Pico Rivera Water Authority ("Water Authority") has prepared its 2010 Urban Water Management Plan as a coordinated plan to ensure the availability and reliability of the Water Authority's water supplies through the year 2035; and

**WHEREAS**, consistent with Section 6066 of the Government Code, said plan was made available for public review, and notice of the Public Hearing was posted on May 24, 2011 at the Pico Rivera City Hall and published on July 11, 2011 in *The Whittier Daily news*; and

**WHEREAS**, the Water Authority held a Public Hearing on the City's 2010 Urban Water Management Plan on July 26, 2011;

**WHEREAS**, no later than 30 days after submittal of the adopted plan to the State of California Department of Water Resources, a copy will be provided to the California State Library and the Authority Secretary's office as required by the California Water Code;

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PICO RIVERA DOES HEREBY RESOLVE AS FOLLOWS:**

**SECTION 1.** The above recitals are all true and correct.

**SECTION 2.** The Water Authority of the Pico Rivera Water Authority hereby adopts that Water Authority's 2010 Urban Water Management Plan attached hereon as Exhibit A as promulgated by the State of California Department of Water Resources as the Urban Water Management Plan for the Pico Rivera Water Authority in accordance with Section 10642 of the California Water Code.

**SECTION 3.** The Deputy Director of Public Works/City Engineer is hereby directed to make a copy of the Water Authority's adopted 2010 Urban Water Management Plan available for public review at the Authority Secretary's office no later than 30 days after submittal to the California Department of Water Resources in accordance with Section 10645 of the California Water Code.

**SECTION 4.** The Deputy Director of Public Works/City Engineer is hereby directed to provide an adopted copy of the 2010 Urban Water Management Plan to other agencies as required by law.

**SECTION 5.** The Authority Secretary shall certify to the adoption of the Resolution which shall be effective upon its adoption.

**APPROVED AND ADOPTED this** 26th **day of** July **, 2011.**

**David W. Armenta, President**

**ATTEST:**

**Daryl A. Betancur, CMC**
**Authority Secretary**

**APPROVED AS TO FORM:**

**Arnold M. Alvarez-Glasman**
**Authority General Counsel**

| | |
|---|---|
| **AYES:** | Camacho, Contreras Rapisarda, Salcido, Archuleta, Armenta |
| **NOES:** | None |
| **ABSENT:** | None |
| **ABSTAIN:** | None |

**CITY OF PICO RIVERA**
**PICO RIVERA WATER AUTHORITY**
**NOTICE OF PUBLIC HEARING FOR**
**URBAN WATER USE TARGETS AND**
**URBAN WATER MANAGEMENT PLAN UPDATE**

**NOTICE IS HEREBY GIVEN** that a public hearing will be held before the City of Pico Rivera Water Authority to consider the adoption of and accept public comments on its draft 2010 Urban Water Management Plan, which was prepared by Atkins Consultants for the City of Pico Rivera Water Authority describing and specifying the proposed urban water use target. This Urban Water Management Plan was developed in compliance with the State of California's Urban Water Management Planning Act, which is codified under the California Water Code Section 10610 et seq.

The information for the public hearing is as follows:

**WHEN:** July 26, 2011 - 6:00 p.m.

**WHERE:** City Hall Council Chambers
6615 Passons Boulevard
Pico Rivera, CA 90660

**MAIL:** PO Box 1016 **TELEPHONE:** (562) 801-4415.

**PERSONS INTERESTED IN THIS MATTER** are invited to attend this hearing to express their opinion on the above matter. Written comments may also be submitted to the City of Pico Rivera City Clerks' Office from the date of this notice until July 26, 2011 at 5:00 p.m. Copies of all relevant material are available for inspection upon request in the Office of the City Clerk in the City of Pico Rivera at 6615 Passons Boulevard, Pico Rivera, California.

If a challenge is made by any party in court from actions arising out of the public meeting and the public hearing, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City of Pico Rivera City Clerk at, or prior to, the public hearing.

Daryl A. Betancur, CMC
City Clerk
**Hrg date:** Tuesday, July 26, 2011 at 6:00 p.m.
**********
In compliance with the Americans with Disabilities Act of 1990, the City of Pico Rivera is committed to providing reasonable accommodations for a person with a disability. Please contact the City Clerk's Office at (562) 801-4390 if special program accommodations are necessary and/or if program information is needed in an alternative format. Special requests must be made in a reasonable amount of time in order that accommodations can be arranged.

**Publish: July 11, 2011** **Whittier Daily News** **Ad#201308**

# City of Pico Rivera
## PUBLIC WORKS DEPARTMENT

6615 Passons Boulevard · Pico Rivera, California 90660
**(562) 801-4415**
*Web: www.pico-rivera.org · e-mail: lgaray@pico-rivera.org*

Art Cervantes
Deputy Director



**City Council**
David W. Armenta
*Mayor*
Bob J. Archuleta
*Mayor Pro Tem*
Gustavo V. Camacho
*Councilmember*
Barbara Contreras Rapisarda
*Councilmember*
Gregory Salcido
*Councilmember*


May 24, 2011

Mr. Leo Barrera, Customer Service Manager
San Gabriel Valley Water Company
11142 Garvey Avenue
El Monte, CA 91733

SUBJECT: NOTICE OF INTENTION TO ADOPT 2010 URBAN WATER MANAGEMENT PLAN

Dear Mr. Barrera:

The Pico Rivera Water Authority is in the process of reviewing and revising its 2005 Urban Water Management Plan. We are informing you of this revision because the San Gabriel Valley Water Company serve water within The City of Pico Rivera boundaries.

The revised 2010 Urban Water Management Plan is required to be adopted by July 1, 2011, and to be submitted to the Department of Water Resources by August 1, 2011. The City will be holding a public hearing on this matter at the July 26, 2011 Pico Rivera Water Authority board meeting, persons interested are invited to attend this hearing to express their opinion on the above matter. Written comments must be submitted to the office of the Deputy Director of Public Works before or at the Public Hearing. Drafts are available for public review in the Office of the City Clerk at 6615 Passons Boulevard, Pico Rivera, CA 90660.

If a challenge is made by any party in court from actions arising out of the public meeting and the public hearing, person/persons may be limited to raising those issues at the public hearing described in this notice, or in written correspondence delivered to the Pico Rivera Water Authority Secretary at or prior to the public hearing.

We welcome your participation in the revision of the Urban Water Management Plan. Please contact Mr. Adrian Diaz, Chief Water Operator if you would like to participate in the urban water management planning process or if there is another individual within your jurisdiction who should be our primary point of contact.

If you need additional information regarding this matter, please contact Mr. Adrian Diaz, Chief Water Operator at (562) 801-4221. Thank you for your consideration in this matter.

Sincerely,

Art Cervantes, P.E.
Deputy Director of Public Works

AC:AD:lg

# City of Pico Rivera
## PUBLIC WORKS DEPARTMENT

6615 Passons Boulevard · Pico Rivera, California 90660
**(562) 801-4415**
*Web: www.pico-rivera.org · e-mail: lgaray@pico-rivera.org*

Art Cervantes
Deputy Director



**City Council**
David W. Armenta
*Mayor*
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Contreras Rapisarda
*Councilmember*
Gregory Salcido
*Councilmember*


May 24, 2011

Mark Grajeda, General Manager
Pico Water District
4843 Church Street
Pico Rivera, CA 90660

SUBJECT: NOTICE OF INTENTION TO ADOPT 2010 URBAN WATER MANAGEMENT PLAN

Dear Mr. Grajeda:

We are in the process of updating the Pico Rivera Water Authority Urban Water Management Plan. The revised 2010 Urban Water Management Plan is required to be adopted by July 1, 2011 submitted to the Department of Water Resources. Drafts are available for public review in the Office of the City Clerk at 6615 Passons Boulevard, Pico Rivera, CA 90660.

The City will be holding a public hearing and adopting the Urban Water Management Plan at the July 26, 2011 Pico Rivera Water Authority board meeting. You are invited to attend this hearing to express your opinion on this matter. Alternatively, you may wish to submit written comments in advance of or during the Public Hearing.

If a challenge is made by any party in court from actions arising out of the public meeting and the public hearing, person/persons may be limited to raising those issues at the public hearing described in this notice, or in written correspondence delivered to the Pico Rivera Water Authority Secretary at or prior to the public hearing.

If you need additional information regarding this matter, please contact Mr. Adrian Diaz, Chief Water Operator at (562) 801-4221. Thank you for your consideration in this matter.

Sincerely,

Art Cervantes, P.E.
Deputy Director of Public Works

AC:AD:lg

# City of Pico Rivera
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Art Cervantes
Deputy Director



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*Councilmember*
Gregory Salcido
*Councilmember*


May 24, 2011

Steve Maguin, Chief Engineer
County Sanitation Districts of Los Angeles
PO Box 4998
Whittier, CA 90607-4998

SUBJECT: NOTICE OF INTENTION TO ADOPT 2010 URBAN WATER MANAGEMENT PLAN

Dear Mr. Maguin:

The Pico Rivera Water Authority wishes to inform you that we are in the process of reviewing and revising our 2005 Urban Water Management Plan. We are informing you of this revision because the County' services recycled water within the Pico Rivera Water Authority's district.

The revised 2010 Urban Water Management Plan is required to be adopted by July 1, 2011, and to be submitted to the Department of Water Resources by August 1, 2011. The City will be holding a public hearing on this matter at the July 26, 2011 Pico Rivera Water Authority board meeting, persons interested are invited to attend this hearing to express their opinion on the above matter. Written comments must be submitted to the office of the Deputy Director of Public Works before or at the Public Hearing. Drafts are available for public review in the Office of the City Clerk at 6615 Passons Boulevard, Pico Rivera, CA 90660.

If a challenge is made by any party in court from actions arising out of the public meeting and the public hearing, person/persons may be limited to raising those issues at the public hearing described in this notice, or in written correspondence delivered to the Pico Rivera Water Authority Secretary at or prior to the public hearing.

We welcome your participation in the revision of the Urban Water Management Plan. Please contact Mr. Adrian Diaz, Chief Water Operator if you would like to participate in the urban water management planning process or if there is another individual within your jurisdiction who should be our primary point of contact.

If you need additional information regarding this matter, please contact Mr. Adrian Diaz, Chief Water Operator at (562) 801-4221. Thank you for your consideration in this matter.

Sincerely,

Art Cervantes, P.E.
Deputy Director of Public Works

AC:AD:lg

# City of Pico Rivera
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Contreras Rapisarda
*Councilmember*
Gregory Salcido
*Councilmember*



Art Cervantes
Deputy Director


May 24, 2011

Art Aguilar, General Manager
Central Basin Municipal Water District
6252 Telegraph Road
Commerce, CA 90040-2512

SUBJECT: NOTICE OF INTENTION TO ADOPT 2010 URBAN WATER MANAGEMENT PLAN

Dear Mr. Aguilar:

The Pico Rivera Water Authority is in the process of reviewing and revising its 2005 Urban Water Management Plan. We are informing you of this revision because we serve water within Central Basin Municipal Water District boundaries.

The revised 2010 Urban Water Management Plan is required to be adopted by July 1, 2011, and to be submitted to the Department of Water Resources by August 1, 2011. The City will be holding a public hearing on this matter at the July 26, 2011 Pico Rivera Water Authority board meeting, persons interested are invited to attend this hearing to express their opinion on the above matter. Written comments must be submitted to the office of the Deputy Director of Public Works before or at the Public Hearing. Drafts are available for public review in the Office of the City Clerk at 6615 Passons Boulevard, Pico Rivera, CA 90660.

If a challenge is made by any party in court from actions arising out of the public meeting and the public hearing, person/persons may be limited to raising those issues at the public hearing described in this notice, or in written correspondence delivered to the Pico Rivera Water Authority Secretary at or prior to the public hearing.

We welcome your participation in the revision of the Urban Water Management Plan. Please contact Mr. Adrian Diaz, Chief Water Operator if you would like to participate in the urban water management planning process or if there is another individual within your jurisdiction who should be our primary point of contact.

If you need additional information regarding this matter, please contact Mr. Adrian Diaz, Chief Water Operator at (562) 801-4221. Thank you for your consideration in this matter.

Sincerely,

Art Cervantes, P.E.
Deputy Director of Public Works

AC:AD:lg

# Appendix C
# Groundwater Bulletin 118, Central Basin 4-11.04 Description

# Coastal Plain of Los Angeles Groundwater Basin, Central Subbasin

- Groundwater Basin Number: 4-11.04
- County: Los Angeles
- Surface Area: 177,000 acres (277 square miles)

## Basin Boundaries and Hydrology

The Central Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the "Central Basin" and 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. Average precipitation throughout the subbasin ranges from 11 to 13 inches with an average of around 12 inches.

## Hydrogeologic Information

### *Water Bearing Formations*

Throughout the Central Basin, groundwater occurs in Holocene and Pleistocene age sediments at relatively shallow depths. The Central Basin is historically divided into forebay and pressure areas. The Los Angeles forebay is located in the northern part of the Central Basin where the Los Angeles River enters the Central Basin through the Los Angeles Narrows from the San Fernando Groundwater Basin. The Montebello forebay extends southward from the Whittier Narrows where the San Gabriel River encounters the Central Basin and is the most important area of recharge in the subbasin. Both forebays have unconfined groundwater conditions and relatively interconnected aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer system of this subbasin (DWR 1961). The Whittier area extends from the Puente Hills south and southwest to the axis of the Santa Fe Springs-Coyote Hills uplift and contains up to 1,000 feet of freshwater-bearing sediments. The Central Basin pressure area is the largest of the four divisions, and contains many aquifers of permeable sands and gravels separated by semi-permeable to impermeable sandy clay to clay, that extend to about 2,200 feet below the surface (DWR 1961). The estimated average specific yield of these sediments is around 18 percent. Throughout much of the subbasin, the aquifers are confined, but areas with semi-permeable aquicludes allow some interaction between the aquifers (DWR 1961).

The main productive freshwater-bearing sediments are contained within Holocene alluvium and the Pleistocene Lakewood and San Pedro Formations (DWR 1961). Throughout most of the subbasin, the near surface Bellflower aquiclude restricts vertical percolation into the Holocene age Gaspur aquifer and other underlying aquifers, and creates local semi-perched groundwater

conditions. The main additional productive aquifers in the subbasin are the Gardena and Gage aquifers within the Lakewood Formation and the Silverado, Lynwood and Sunnyside aquifers within the San Pedro Formation (DWR 1961). Specific yield of deposits in this subbasin range up to 23 percent in the Montebello forebay, 29 percent in the Los Angeles forebay, and 37 percent in the Central Basin pressure area (DWR 1961). Historically, groundwater flow in the Central Basin has been from recharge areas in the northeast part of the subbasin, toward the Pacific Ocean on the southwest. However, pumping has lowered the water level in the Central Basin and water levels in some aquifers are about equal on both sides of the Newport-Inglewood uplift, decreasing subsurface outflow to the West Coast Subbasin (DWR 1961).

There are several principal aquifers/aquicludes present in this subbasin.

| Aquifers/ Aquiclude | Age | Formation | Lithology | Maximum Thickness (feet) |
|---|---|---|---|---|
| Gaspur | Holocene | | Coarse sand, gravel | 120 |
| Semiperched | Holocene | | Sand, gravel | 60 |
| Bellflower | Pleistocene | Lakewood Formation | Clay, sandy clay | 140 |
| Gardena | Pleistocene | Lakewood Formation | Sand, gravel | 160 |
| Gage | | | Sand | 120 |
| Silverado | Lower Pleistocene | San Pedro Formation | Sandy gravel | 300 |
| Lynwood | | | Coarse sand and gravel | 150 |
| Sunnyside | | | | 350 |

### *Restrictive Structures*

Many faults, folds and uplifted basement areas affect the water-bearing rocks in the Central Basin. Most of these structures form minor restrictions to groundwater flow in the subbasin. The strongest effect on groundwater occurs along the southwest boundary to the Central Subbasin. The faults and folds of the Newport – Inglewood uplift are partial barriers to movement of groundwater from the Central Basin to the West Coast Basin (DWR 1961). The La Brea high is a system of folded, uplifted and eroded Tertiary basement rocks. Because the San Pedro Formation is eroded from this area, subsurface flow southward from the Hollywood Basin is restricted to the Lakewood formation (DWR 1961). The Whittier Narrows is an eroded gap through the Merced and Puente Hills that provides both surface and subsurface inflow to the Central Basin (DWR 1961). The Rio Hondo, Pico, and Cemetery faults are northeast-trending faults that project into the gap and displace aquifers. The trend of these faults parallels the local groundwater flow and do not act as significant barriers to groundwater flow (DWR 1961).

### *Recharge Areas*

Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water; and replenishes the aquifers dominantly in the forebay areas where permeable sediments are exposed at ground surface (DWR 1961). Natural replenishment of the subbasin's groundwater supply is largely from surface inflow through Whittier Narrows (and some underflow) from the San Gabriel Valley. Percolation into the Los Angeles Forebay Area is restricted due to paving and development of the surface of the forebay. Imported water purchased from Metropolitan Water District and recycled water from Whittier and San Jose Treatment Plants are used for artificial recharge in the Montebello Forebay at the Rio Hondo and San Gabriel River spreading grounds (DWR 1999). Saltwater intrusion is a problem in areas where recent or active river systems have eroded through the Newport Inglewood uplift. A mound of water to form a barrier is formed by injection of water in wells along the Alamitos Gap (DWR 1999).

### *Groundwater Level Trends*

Water levels varied over a range of about 25 feet between 1961 and 1977 and have varied through a range of about 5 to 10 feet since 1996. Most water wells show levels in 1999 that are in the upper portion of their recent historical range.

### *Groundwater Storage*

**Groundwater Storage Capacity.** Total storage capacity of the Central Basin is 13,800,000 (DWR 1961).

**Groundwater in Storage.**

### *Groundwater Budget (Type A)*

A complete water budget could not be constructed due to the lack of data available. Recharge to the subbasin is accomplished through both natural and artificial recharge. The Watermaster reported natural recharge for the subbasin to be 31,950 af and artificial recharge to be 63,688 af for 1998 (DWR 1999). Additionally, the subbasin receives 27,000 af/yr of water through the Whittier Narrows from the San Gabriel Valley Basin in the form of subsurface flow (SWRB 1952). Urban extractions for the subbasin were 204,335 af in 1998 (DWR 1999).

### *Groundwater Quality*

**Characterization.** TDS content in the subbasin ranges from 200 to 2,500 mg/l according to data from 293 public supply wells. The average for these 293 wells is 453 mg/l.

**I**

**Impairments.**

## Water Quality in Public Supply Wells

| Constituent Group[1] | Number of wells sampled[2] | Number of wells with a concentration above an MCL[3] |
|---|---|---|
| Inorganics – Primary | 316 | 15 |
| Radiological | 315 | 1 |
| Nitrates | 315 | 2 |
| Pesticides | 322 | 0 |
| VOCs and SVOCs | 344 | 43 |
| Inorganics – Secondary | 316 | 113 |

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

## Well Production characteristics

| | Well yields (gal/min) |
|---|---|
| Municipal/Irrigation | |
| | **Total depths (ft)** |
| Domestic | |
| Municipal/Irrigation | |

## Active Monitoring Data

| Agency | Parameter | Number of wells /measurement frequency |
|---|---|---|
| USGS | Groundwater levels | 90 |
| DWR | Groundwater levels | 87 |
| Los Angeles County Public Works | Groundwater levels | 212 / Bi-monthly |
| USGS | Miscellaneous water quality | 64 |
| Department of Health Services and cooperators | Title 22 water quality | 294 |

## Basin Management

| | |
|---|---|
| Groundwater management: | Central Basin was adjudicated in 1965, and the Department of Water Resources was appointed Watermaster. Every month extractions are reported to the Watermaster by each individual pumper. This allows the Watermaster to regulate the water rights of the subbasin. (DWR 1999) |
| Water agencies | |
| Public | City of Bellflower, Bellflower-Somerset MWC, City of Compton, City of Huntington Park, City of Long Beach, City of Los Angeles DWP, City of Montebello, City of Paramount, City of Pico Rivera, City of Santa Fe Springs, Sativa LA County WD, City of Signal Hill, South Montebello ID, City of South Gate, City of Vernon, City of Whittier. (DWR 1999) |
| Private | California-American Water Company, Montebello Land and Water Company, Bellflower Home Garden Water Co., California Water Service, Lynwood Park MWC, Maywood MWC, Park Water Company, Pearless Water Company, San Gabriel Valley Water Company, Southern California Water Company, Tract No. 180 Water Company, Tract 349 MWC, Western Water Company.(DWR 1999) |

## References Cited

California Department of Water Resources (DWR). 1961. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County. Bulletin No. 104.

____, Southern District. 1999. Watermaster Service in the Central Basin, Los Angeles County, July 1, 1998 – June 30, 1999.

California State Water Resources Board (SWRB). 1952. Central Basin Investigation. Bulletin No. 8.

## Additional References

United States Geological Survey (USGS). 2000. *Analysis of the Geohydrology and Water-management Issues of the Central and West Basins, Los Angeles County, California.* Internet Web Site: http://water.wr.usgs.gov/projects00/ca512.html.

Water Replenishment District of Southern California. 2000. *Annual Report on Results of Water Quality Monitoring Water Year 1998-1999.*

____. 2000. *Engineering Survey and Report.*

## Errata

Changes made to the basin description will be noted here.

# Appendix D
# Water Shortage Contingency Plan

CITY COUNCIL | AGENDA REPORT

**To:** Mayor and City Council

**From:** City Manager

**Meeting Date:** June 9, 2009

**Subject:** WATER CONSERVATION AND WATER SUPPLY SHORTAGE PROGRAM AND REGULATIONS ORDINANCE – REPEAL OF ORDINANCE NO. 826 AND ADOPTION OF NEW ORDINANCE INCORPORATING CALIFORNIA WATER CODE SECTION 315

## Recommendation:

Adopt Ordinance repealing Chapter 13.70 of Division IV of Title 16 of the Pico Rivera Municipal Code and adding Chapter 13.70, Water Conservation and Water Supply Shortage Program and Regulations.

## Background:

By June 30, 2009, all member agencies of the Central Basin Municipal Water District (CBMWD) are expected to have adopted updated Water Conservation Ordinances. This proposed Ordinance has been prepared using CBMWD's model Water Conservation ordinance and meets this expected goal.

Article X, Section 2 of the California Constitution declares that the general welfare requires that water resources be put to beneficial use and a reliable minimum of potable water is essential to the public health, safety and welfare of the people and economy of the Southern California region.

A comprehensive water management program includes active water conservation measures, not only in times of drought, but at all times, and is essential to ensuring a reliable minimum supply of water is available to meet current and future water supply needs. The updated Water Conservation Ordinance is an important component of the City's Water Management Program.

## Discussion:

At its meeting of May 26, 2009, the City Council introduced an Ordinance repealing Chapter 13.70 of Division IV of Title 16 of the Pico Rivera Municipal Code and adding Chapter 13.70, Water Conservation and Water Supply Shortage Program and Regulations.

The month of May was designated National Water Awareness Month and in support of that effort, CBMWD launched their Shut Your Tap! campaign. Their program recently proclaimed Tuesday, May 19th as Shut Your Tap! Day throughout Los Angeles County. To date, 26 cities in Los Angeles County have joined that campaign pledging to work with the District to help their residents conserve.

As a result of the water supply conditions prevailing in any or all of the City and the general welfare requires that the water resources available to the City be put to the maximum beneficial use to the extent to which they are capable. Furthermore, that the unreasonable method of use of water be discouraged and that the conservation of such water be practiced with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The purpose of this Water Conservation Program is to minimize the effect of a shortage of water supplies on City customers during a water shortage emergency.

The following stipulations are recommended for consideration:

The City Council may implement the applicable provisions of this conservation plan and upon its determination that such implementation is necessary to protect the public welfare and safety.

The City Council shall hold a public hearing for the purpose of determining whether a water shortage exists in the City and which measures provided by this ordinance should be implemented. Notice of the time and place of the public hearing shall be published not less than ten (10) days before the hearing in a newspaper of general circulation within the City.

The City Council shall issue its determination of shortage and corrective measures by resolution published in a daily newspaper of general circulation within the affected area. Conservation surcharges assessed shall become effective no sooner than the first full billing period commencing on or after the date of such publication.

Staff is recommending adoption of the proposed Ordinance.

Charles P. Fuentes

CPF:ARC:lg

Enc.

1) Ordinance
2) Registration form, LA County Water Summit
3) LA County Water Summit Program Highlights

CENTRAL BASIN

*SHUT YOUR TAP! WATER ORDINANCE TASK FORCE*

MUNICIPAL WATER ORDINANCE PROGRESS TRACKING

5/13/2009

| MUNICIPALITY | 1ST READING & INTRODUCTION | 2ND READING & ADOPTION | COMMITTEE ASSIGNMENT (Suggestions) | CITY CONTACT NAME | CITY CONTACT TITLE | CITY REP CONTACT INFO |
|---|---|---|---|---|---|---|
| Artesia | April 13, 2009 | May 11,2009 | Sally (Central Basin) | | | |
| Bell | | | Christina (Huntington Park) | | | |
| Bell Gardens | | | Albert (Golden State Water) | | | |
| Bellflower | | | Tammie (Park Water Company) | | | |
| Carson | | | Tana (Compton) | | | |
| Cerritos | | | Adriana (Norwalk) | | | |
| Commerce | April 21, 2009 | May 5, 2009 | Sally (Central Basin) | | | |
| Compton | | | Tana (Compton) | | | |
| Cudahy | | | Christina (Huntington Park) | | | |
| Downey | | | Sally (Central Basin) | | | |
| Hawaiian Gardens | | | Albert (Golden State Water) | | | |
| Huntington Park | | | Christina (Huntington Park) | | | |
| La Habra Heights | | | Adrian (Pico Rivera) | | | |
| La Mirada | | | Daylyn (Suburban Water) | | | |
| Lakewood | | | Josh (Signal Hill) | | | |
| Lynwood | | | Tammie (Park Water Company) | | | |
| Maywood | | | Sally (Central Basin) | | | |
| Montebello | | | Darleen (San Gabriel Water Company) | | | |
| Norwalk | May 19, 2009 | June 2, 2009 | Adriana (Norwalk) | | | |
| Paramount | | | Josh (Signal Hill) | | | |
| Pico Rivera | May 26, 2009 | June 23, 2009 | Adrian (Pico Rivera) | | | |
| Santa Fe Springs | | | Tammie (Park Water Company) | | | |
| Signal Hill | May 5, 2009 | May 19, 2009 | Josh (Signal Hill) | | | |
| South Gate | | | Scott (Vernon) | | | |
| Vernon | | | Scott (Vernon) | | | |
| Whittier | | | Darleen (San Gabriel Water Company) | | | |
| | | | | | | |

Enclosure 1

Public Works

# ORDINANCE NO. 1056

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PICO RIVERA, CALIFORNIA, REPEALING CHAPTER 13.70, ENTITLED, "PROHIBITIONS ON WASTEFUL USE OF WATER" AND ADDING CHAPTER 13.70 ESTABLISHING A WATER CONSERVATION AND WATER SUPPLY SHORTAGE PROGRAM AND REGULATIONS TO THE PICO RIVERA MUNICIPAL CODE**

**WHEREAS,** a reliable minimum supply of potable water is essential to the public health, safety and welfare of the people and economy of the Southern California region;

**WHEREAS,** Southern California is a semi-arid region and is largely dependent upon imported water supplies. A growing population, climate change, environmental concerns, and other factors in other parts of the State and western United States, make the region highly susceptible to water supply reliability issues;

**WHEREAS,** careful water management that includes active water conservation measures not only in times of drought, but at all times, is essential to ensure a reliable minimum supply of water to meet current and future water supply needs;

**WHEREAS,** Article X, Section 2 of the California Constitution declares that the general welfare requires that water resources be put to beneficial use, waste or unreasonable use or unreasonable method of use of water be prevented, and conservation of water be fully exercised with a view to the reasonable and beneficial use thereof;

**WHEREAS,** California Water Code Section 375 authorizes water suppliers to adopt and enforce a comprehensive water conservation program to reduce water consumption and conserve supplies; and

**WHEREAS,** the adoption and enforcement of a water conservation and supply shortage program is necessary to manage the City's potable water supply in the short and long-term and to avoid or minimize the effects of drought and shortage within the City. Such program is essential to ensure a reliable and sustainable minimum supply of water for the public health, safety and welfare.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PICO RIVERA DOES HEREBY ORDAIN AS FOLLOWS:**

**SECTION 1.** Chapter 13.70 is hereby established to the Pico Rivera Municipal Code to read as follows:

**Section 13.70. Water Conservation and Water Supply Shortage Program.**

**13.70.010. Purpose**

a. The purpose of this Chapter is to establish a water conservation and supply shortage program that will reduce water consumption within the City of Pico Rivera 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 to avoid and minimize the effect and hardship of water shortage to the greatest extent possible.

b. This Chapter establishes permanent water conservation standards intended to alter behavior related to water use efficiency for non-shortage conditions and further establishes three 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.

**Section 13.70.020. Definitions.**

The following words and phases whenever used in this chapter shall have the meaning defined in this section:

a. "City" means the City of Pico Rivera.

b. "Person" means any natural person or persons, corporation, public or private entity, governmental agency or institution, or any other use of water provided by the City.

c. "Landscape Irrigation System" means an irrigation system with pipes, hoses, spray heads, or sprinkling devices that are operated by hand or through an automated system.

d. "Large Landscape Areas" means a lawn, landscape or other vegetated area, or combination thereof, equal to more than one (1) acre of irrigable land.

e. "Single Pass Cooling Systems" means equipment where water is circulated only once to cool equipment before being disposed.

f. "Potable Water" means water which is suitable for drinking.

g. "Recycled Water" means the reclamation and reuse of non-potable water for beneficial use.

h. "Billing Unit" means the unit of water used to apply water rates for the purposes of calculating water charges for a person's water usage.

**Section. 13.70.030. Application**

a. The provisions of this Chapter apply to any person in the use of any potable water provided by the City.

b. The provisions of this Chapter do not apply to uses of water necessary to protect public health and safety or for essential government services, such as police, fire or other similar emergency services.

c. The provisions of this Chapter do not apply to the use of water by commercial nurseries and commercial growers to sustain plants, trees, shrubs, crops or other vegetation intended for commercial sale.

d. This Chapter is intended solely to further the conservation of water. It is not intended to implement any provision of federal, state or local statutes, ordinances or regulations relating to protection of water quality or control of drainage or runoff.

**Section 13.70.040. Permanent Water Conservation Requirements – Prohibition Against Waste.**

The following water conservation requirements are effective at all times and shall be permanent. Violations of this section shall be considered waste and an unreasonable use of water.

a. **Limits on Water Hours.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited between the hours of 10:00 a.m. and 4:00 p.m. Pacific Standard Time on any day, except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the express purpose of adjusting or repairing an irrigation system.

b. **Limit on Watering Duration**. Watering or irrigating of lawn, landscape or other vegetated area with potable water using a landscape irrigation system or a watering device that is not continuously attended to is limited to no more than fifteen (15) minutes of water per day per station. This subsection does not apply to landscape irrigation systems that exclusively use very low-flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour and weather based controllers or stream rotor sprinklers that meet a seventy percent (70%) efficiency standard.

c. **No Excessive Water Flow or Runoff.** Watering or irrigating of any lawn, landscape or other vegetated area in a manner that causes or allows excessive water flow or runoff onto an adjoining sidewalk, driveway, street, alley, gutter or ditch is prohibited.

d. **No Washing Down Hard or Paved Surfaces.** Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device or a low-volume, high pressure cleaning machine equipped to recycle any water used.

e. **Obligation to Fix Leaks, Breaks or Malfunctions.** Excessive use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected, and in no event more than fourteen (14) days of receiving notice from the City, is prohibited.

f. **Re-circulating Water Required for Water Fountains and Decorative Water Features.** Operating a water fountain or other decorative water feature that does not use re-circulated water is prohibited after April 1, 2010.

g. **Limits on Washing Vehicles.** Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility.

h. **Drinking Water Served Upon Request Only.** Eating or drinking establishments, including but not limited to a restaurant, hotel, café, cafeteria, bar, club or other public place where food or drinks are sold, served or offered for sale, are prohibited from providing drinking water to any person unless expressly requested.

i. **Commercial Lodging Establishments Must Provide Option to Not Launder Linen Daily.** Hotels, motels and other commercial lodging establishments must provide customers the option of not having towels and linen laundered daily. Commercial lodging establishments shall prominently display notice of this option in each bathroom using clear and easily understood language.

j. **No Installation of Single Pass Cooling Systems.** Installation of single pass cooling systems is prohibited in buildings requesting new water service.

k. **No Installation of Non-re-circulating Commercial Car Wash and Laundry Systems.** Installation of non-re-circulating water systems is prohibited in new commercial conveyor car wash and new commercial laundry systems.

l. **Restaurants Required to Use Water Conserving Dish Wash Spray Valves.** Food preparation establishments, such as restaurants or cafes, are prohibited from using non-water conserving dish wash spray valves.

**Section 13.70.050. Level 1 Water Supply Shortage.**

a. A Level 1 Water Supply Shortage exists when the City determines, in its sole discretion, that due to drought or other water supply reductions, a water shortage exists and a consumer demand reduction is necessary to ensure sufficient supplies will be available to meet anticipated demands. Upon the declaration by the City of a Level 1 Water Supply Shortage condition, the City will implement the mandatory Level 1 conservation measures identified in this section. The type of event that may prompt the City to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider calls for extraordinary water conservation.

b. **Additional Water Conservation Measures.** In addition to the prohibited uses of water identified in Section 13.70.040, the following water conservation requirements apply during a declared Level 1 Water Supply Shortage:

1. **Limits on Watering Days.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to three (3) days per week on a schedule established and posted by the City. During the months of November through March, watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than one (1) day per week on a schedule established and posted by the City. This provision does not apply to landscape irrigation zones that exclusively use very low flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour. This provision also does not apply to watering or irrigating by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the express purpose of adjusting or repairing an irrigation system.

2. **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks, or other malfunctions in the water user's plumbing or distribution system must be repaired within seventy-two (72) hours of notification by the City unless other arrangements are made with the City.

3. **Other Prohibited Uses.** The City may implement other prohibited water uses as determined by the City, after notice to customers.

**Section 13.70.060. Level 2 Water Supply Shortage.**

a. A Level 2 Water Supply Shortage exists when the City determines, in its sole discretion, that due to drought or other supply reductions, a water supply shortage exists and a consumer demand reduction is necessary to ensure sufficient supplies will be available to meet anticipated demands. Upon the declaration by the City of a Level 2 Water Supply Shortage condition, the City will implement the mandatory Level 2 conservation measures identified in this section.

b. **Additional Conservation Measures.** In addition to the prohibited uses of water identified in Sections 13.70.040 and 13.70.050, the following additional water conservation requirements apply during a declared Level 2 Water Supply Shortage:

1. **Watering Days.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to two days per week on a schedule established and posted by the City. During the months of November through March, watering or irrigating of lawn, landscape or other vegetated area with potable water is limited to no more than one day per week on a schedule established and posted by the City. This provision does not apply to landscape irrigation zones that exclusively use very low flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour. This provision also does not apply to watering or irrigating by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the express purpose of adjusting or repairing an irrigation system.

2. **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks or other malfunctions in the water user's plumbing or distribution system must be repaired within forty-eight (48) hours of notification by the City unless other arrangements are made with the City.

3. **Limits on Filling Ornamental Lakes or Ponds.** Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the declaration of a supply shortage level under this ordinance.

4. **Limits on Washing Vehicles.** Using water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not, is prohibited except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, by high pressure/low volume wash systems, or at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water.

5. **Limits on Filling Residential Swimming Pools & Spas.** Re-filling of more than one foot and initial filling of residential swimming pools or outdoor spas with potable water is prohibited.

6. **Other Prohibited Uses.** The City may implement other prohibited water uses as determined by the City, after notice to customers.

d. In addition to the above procedures during a Level 2 Water Supply Shortage, the City may adopt the following procedures:

1. **Water Allocations / Water Budget.** The City will establish a water allocation for property served by the City using a method that does not penalize persons for the implementation of conservation methods of the installation of water saving devices. The City must provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the City customarily mails the billing statement for fees or charges for on-going water service.

   Following the effective date of the water allocation as established by the City, any person that uses water in excess of the allocation will be subject to a citation in accordance with Section 13.70.210. Any monetary penalty for excess water usage may be imposed for violation of this ordinance.

2. **Water Supply Shortage Rates.** During a Level 2 Water Supply Shortage condition, the City may increase water rates by an amount necessary, as determined by the City. The increase in water rates may vary from categories of customers.

3. **Mandatory Percentage Use Reductions.** During a Level 2 Water Supply Shortage condition, all customers will be required to reduce water consumption by a percentage determined by the City.

**Section 13.70.070. Level 3 Water Supply Shortage – Emergency Condition.**

a. A Level 3 Water Supply Shortage condition is also referred to as an "Emergency" condition. A Level 3 condition exists when the City declares a water shortage emergency and notifies its residents and businesses that a significant reduction in consumer demand is necessary to ensure sufficient supplies will be available to meet anticipated demands. Upon the declaration of a Level 3 Water Supply Shortage Emergency condition, the City will implement the mandatory Level 3 conservation measures identified in this section.

b. A Level 3 Water Supply Shortage Emergency exists when the City declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that more than a thirty percent (30%) consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The City must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code Section 350.

c. **Additional Conservation Measures.** In addition to the prohibited uses of water identified in Sections 13.70.040, 13.70.050, and 13.70.060 the following water conservation requirements apply during a declared Level 3 Water Supply Shortage Emergency:

1. **No Watering or Irrigating.** Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited. This restriction shall not apply to the following categories of use unless the City has determined that recycled water is available and may be lawfully applied to the use:

   i. Maintenance of vegetation, including trees and shrubs, that are watered using a hand-held bucket or similar container, hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or a very low-flow drip type irrigation system when no emitter produces more than two (2) gallons of water per hour subject to the hour restrictions in Section 13.70.040;

   ii. Maintenance of existing landscape necessary for fire protection;

   iii. Maintenance of existing landscape for soil erosion control;

   iv. Maintenance of plant materials identified to be rare or essential to the well being of rare animals;

   v. Maintenance of landscape within active public parks and playing fields, day care center, school grounds, cemeteries, and golf course greens, provided that such irrigation does not exceed two (2) days per week.

vi. Public works projects and actively irrigated environmental mitigation projects.

2. **Obligation to Fix Leaks, Breaks or Malfunctions.** All leaks, breaks or other malfunctions in the water user's plumbing or distribution system must be repaired within twenty-four (24) hours of notification by the City unless other arrangements are made with the City.

3. **No New Potable Water Service.** Upon declaration of a Level 3 Water Supply Shortage Emergency condition, no new potable water service may be provided, no new temporary meters or permanent meters may be provided, and no statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) may be issued, except under the following circumstances:

   1. A valid, unexpired building permit has been issued for the project; or

   2. The project is necessary to protect the public's health, safety and welfare;

   3. The applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of the City.

      This provision does not preclude the resetting or turn-on of meters to provide continuation of water service of the restoration of service that has been interrupted for a period of one year or less.

   4. **Discontinue Service:** The City, in its sole discretion, may discontinue service to consumers who willfully violate provisions of this section.

   5. **Other Prohibited Uses:** The City may implement other prohibited water uses as determined by the City, after notice to customers.

**13.70.080. Procedures for Determination and Notification of Water Supply Shortage.**

a. **Declaration and Notification of Level 1 & 2 Water Supply Shortage.** The existence of Level 1 and Level 2 Water Supply Shortage conditions may be declared by resolution of the City adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation requirements applicable to Level 1 or Level 2 conditions shall take effect on the tenth day after the date the shortage level is declared. Within five (5) days following the declaration of the shortage level, the City shall publish a copy of the resolution in a newspaper used for publication of official notices. If the City establishes a water allocation, it shall provide notice of the allocation by including it in the regular billing statement or by any other mailing to the address to which the City customarily mails the billing statement for fees or charges for ongoing water service. A water allocation shall be effective on the fifth day following the date of mailing or at such later date as specified in the notice.

b. **Declaration and Notification of Level 3 Water Supply Shortage:** The existence of a Level 3 Water Supply Shortage Emergency condition may be declared in accordance with the procedures specified in Water Code Sections 351 and 352. The mandatory conservation requirements applicable to the Level 3 conditions shall take effect on the tenth (10) day after the date the shortage level is declared. Within five (5) days following the declaration of the shortage level, the City shall publish a copy of the Resolution in a newspaper used for the publication of official notices. If the City establishes a water allocation, it shall provide notice of the allocation by including it in the regular billing statement or by any other mailing to the address to which the City customarily mails the billing statement for fees or charges for ongoing water service. A water allocation shall be effective on the fifth day following the date of mailing or at such later date as specified in the notice.

**13.70.090. Commercial Car Wash Systems.**

Effective on January 1, 2011, all commercial conveyor car wash systems are required to have installed an operational re-circulating water system, or must have secured a waiver of this requirement from the City.

**13.70.100. Large Landscape Areas – Rain Sensors.**

Large landscape areas, such as parks, cemeteries, golf courses, school grounds and playing fields that use landscape irrigation systems to water or irrigate, must use landscape irrigation systems with rain sensors that automatically shut off such systems during periods of rain or irrigation timers, which automatically use information such as evapotranspiration sensors to set an efficient water use schedule.

**13.70.110. Construction Purposes.** Recycled or non-potable water must be used for construction purposes when available.

**13.70.120. No New Annexations.**

Upon the declaration of a Level 2 Water Supply Shortage condition, the City will suspend consideration of annexations to its service area. This subsection does not apply to boundary corrections and annexations that will not result in any increased use of water.

**13.70.130. Limits on Building Permits.**

Upon the declaration of a Level 3 Water Supply Shortage condition, the City will limit or withhold the issuance of building permits which require new or expanded water service, except to protect the public health, safety and welfare, or in cases which meet the City's adopted conservation offset requirements.

**13.70.140. Water Recycling Required if Alternative Available.**

The use of potable water, other than recycled water, is prohibited for specified uses after the City has provided to the customer an analysis showing that recycled water is a cost-effective alternative to potable water for such uses and the customer has had a reasonable time, as determined by the City Manager, to make the conversion to recycled water.

**13.70.150. Water Recycling – New Service.**

Prior to the connection of any new water service, an evaluation must be done by the City to determine whether recycled water exists to supply all or some of the water needed and recycled water must be utilized to the extent feasible.

**13.70.160. Water Recycling Plan.**

a. The City Manager must prepare a water recycling master plan that contains recommendations to increase the amount of recycled water used and shall report to the City Council annually on progress towards implementing such recommendations.

b. Upon request of the City Manager, City Departments must prepare and submit quarterly reports on their water conservation efforts. The reports will be consolidated by the City Manager and reported to the City Council at a minimum of once a year.

c. The City may, by written request, require all commercial, residential and industrial customer using twenty-five thousand (25,000) or more billing units per year to submit a water conservation plan and to submit quarterly progress reports on such plan. The conservation plan must include recommendations for increased water savings, including increased water recycling based on feasibility, and the reports must include progress to date on implementation of such recommendations.

**13.70.170. Water Conserving Plumbing Standards.**

a. On or after January 1, 2010, no structure shall be sold or transferred unless all existing plumbing fixtures in the structure are retrofitted exclusively with water-conserving plumbing fixtures.

b. On or after January 1, 2010, upon the establishment of new water service or a change in water service from one person to another non-family member, all existing plumbing fixtures are required to be retrofitted exclusively with water-conserving plumbing fixtures.

**13.70.180. Procedural Requirements.**

The Director of Public Works shall periodically review the provisions of this Part and recommend necessary updates to the City Attorney. The review of the provisions and preparation of resulting recommendations, if any shall be performed, at a minimum, every two (2) years following the first review, which shall be completed by December 31, 2010.

**13.70.190. Reporting Mechanism – Hotline.**

The City must establish a method for residents to report violations of this Chapter.

**13.70.200. Hardship Waiver.**

a. **Undue and disproportionate Hardship:** If, due to unique circumstances, a specific requirement of this ordinance would result in undue hardship to a person using water or to property upon which water is used, that is disproportionate to the impacts to water users generally or to similar property or classes of water users, then the person may apply for a waiver to the requirements as provided in this section.

b. **Written Finding:** The waiver may be granted or conditionally granted only upon written finding of the existence of facts demonstrating an undue hardship to a person using water or to property upon which water is used, that is disproportionate to the impacts to water users generally or to similar property or classes of water use due to specific and unique circumstances of the user or the user's property.

1. **Application:** Application for a waiver shall be on a form prescribed by the City and shall be accompanied by a non-refundable processing fee in an amount set by Resolution of the City.

2. **Supporting Documentation:** The application shall be accompanied by photographs, maps, drawings, and other information provided in the application, supporting documents, or such additional information as may be requested, and on water use information for the property as shown by the records of the City or its Agent, all of the following:

   i. That the waiver does not constitute a grant of special privilege inconsistent with the limitations upon other residents and businesses;

   ii. That because of special circumstances applicable to the property or its use, the strict application of this ordinance would have a disproportionate impact on the property or use that exceeds the impacts to residents and businesses generally.

   iii. That the authorizing of such waiver will not be of substantial detriment to adjacent properties, and will not materially affect the ability of the City to effectuate the purpose of this ordinance and will not be detrimental to the public interest; and

   iv. That the condition or situation of the subject property or the intended use of the property for which the waiver is sought is not common, recurrent or general in nature.

4. **Approval Authority:** The City Manager or Water Authority Board shall exercise approval authority and act upon any completed application no later than ten (10) days after submittal and may approve, conditionally approve, or deny the waiver. The applicant requesting the waiver shall be promptly notified in writing of any action taken. Unless specified otherwise at the time a waiver is approved, the waiver applies to the subject property during the term of the mandatory water supply shortage condition.

5. **Appeals to the City:** An applicant may appeal a decision or condition of the City Manager or Water Authority Board on a waiver application to the City Council within ten (10) days of the decision upon written request for a hearing. The request shall state the grounds for appeal. At a public meeting, the City Council shall act as the approval authority and review the appeal *de novo* by following the regular waiver procedure. The decision of the City Council is final.

**13.70.210. Penalties and Violations.**

a. **Misdemeanor.**

Any violation of this ordinance may be prosecuted as a misdemeanor subject to a fine not exceeding five hundred dollars ($500.00).

b. **Civil Penalties.**

Any violation of this Chapter may be subject to a civil penalty. Civil penalties for failure to comply with any provisions of the Ordinance shall be as follows:

1. **First Violation:** The City shall issue a written warning and deliver a copy of this ordinance by mail.

2. **Second Violation:** A second violation within the preceding twelve (12) calendar months is punishable by a fine not to exceed one hundred dollars ($100).

3. **Third Violation:** A third violation within the preceding twelve (12) calendar months is punishable by a fine not to exceed five hundred ($500).

c. **Water Flow Restrictor.**

In addition to any fines, the City may install a water flow restrictor device of approximately one gallon per minute capacity for service up to one and one-half inch size and comparatively sized restrictors for larger services after written notice of intent to install a flow restrictor for a minimum of forty-eight (48) hours.

d. **Termination of Service.**

In addition to any fines and the installation of a water flow restrictor, the City may disconnect and/or terminate a customer's water service.

e. **Cost of Flow Restrictor and Disconnecting Service.**

A person or entity that violates this ordinance is responsible for payment of the City's charges for installing and/or removing any flow restricting device and for disconnecting and/or reconnecting service per the City's schedule of charges then in effect. The charge for installing and/or removing any flow restricting device shall be paid to the City before the device is removed. Nonpayment shall be subject to the same remedies as nonpayment of basic water rates.

f. **Separate Offenses:** Each day that a violation of this ordinance occurs is a separate offense.

g. **Notice and Hearing:**

1. The City shall issue a Notice of Violation by mail or personal delivery at lest ten (10) days before taking enforcement action and said notice shall describe the action to be taken. A customer may appeal the Notice of Violation by filing a written notice of appeal with the City Clerk no later than the close of business on the day before the date scheduled for enforcement action. Any Notice of Violation not timely appealed shall be final. Upon receipt of a timely appeal, a hearing on the appeal shall be scheduled in a timely manner, and the City shall mail written notice of the hearing to the customer at least ten (10) days before the date of the said hearing.

2. Upon receiving a written notice of appeal, a hearing on the matter shall be held within thirty (30) days the notice was received by the City before a hearing officer appointed by the City Manager. Upon hearing all of the evidence presented by the City and the appellant, the hearing officer shall prepare a written decision within thirty (30) days of the hearing.

3. Pending receipt of a written appeal or pending a hearing pursuant to an appeal, the City may take appropriate steps to prevent the unauthorized use of water as appropriate to the nature and extent of the violations and the current declared water level condition.

**SECTION 2.** Chapter 13.70 of the Pico Rivera Municipal Code entitled "Prohibitions on Wasteful Use of Water" is hereby repealed in its entirety and replaced with Chapter 13.70 "Establishing a water conservation and water supply shortage program and regulations."

**SECTION 3.** Chapter 13.80 of the Pico Rivera Municipal Code entitled "Moratorium on Service Commitments and New Connections" is hereby repealed in its entirety.

**SECTION 4.** The City Council hereby declares that it would have passed this ordinance sentence by sentence, paragraph by paragraph, and section by section, and does hereby declare that the provisions of this ordinance are severable and, if for any reason any sentence, paragraph, or section of this ordinance shall be held invalid, such decision will not affect the validity of the remaining parts of this ordinance.

**SECTION 5.** The City Clerk shall certify to the adoption of this Ordinance. The City Council hereby finds and determines that there are no newspapers of general circulation both published and circulated within the City and, in compliance with Section 36933 of the Government Code directs the City Clerk to cause said Ordinance, within fifteen (15) days after its passage, to be posted in at least five (5) public places within the City. This Ordinance shall take effect thirty (30) days after its adoption.

**ADOPTED AND APPROVED** this 9th day of June, 2009.

Gracie Gallegos, Mayor

**ATTEST:**

Daryl A. Betancur, City Clerk

**APPROVED AS TO FORM:**

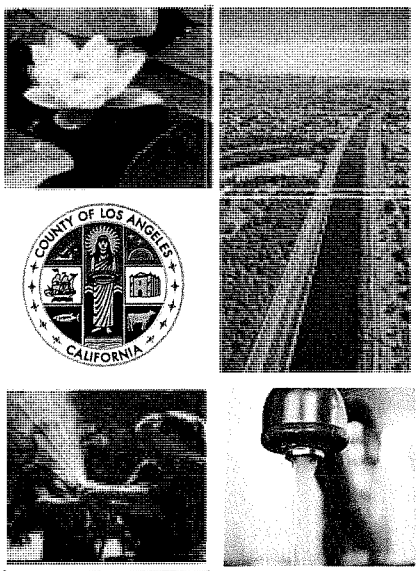
Arnold M. Alvarez-Glasman, City Attorney

**AYES:** Archuleta, Beilke, Salcido, Gallegos
**NOES:** None
**ABSENT:** Armenta
**ABSTAIN:** None

ENCLOSURE 2

# SOUTHERN CALIFORNIA WATER COMMITTEE

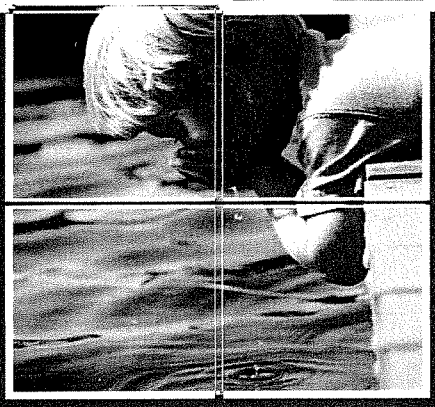
# LOS ANGELES COUNTY WATER SUMMIT



## Wednesday, June 3, 2009
## Hosted by Supervisor Don Knabe
## 8:00 a.m. - 1:30 p.m.
## Queen Mary, Long Beach

Continental breakfast, lunch, parking and program included for $40.00.

**SPONSORED BY:** Los Angeles Area Chamber of Commerce, Long Beach Chamber of Commerce, County of Los Angeles Department of Public Works, Metropolitan Water District of Southern California, Castaic Lake Water Agency, Central Basin Municipal Water District, County Sanitation Districts of Los Angeles County, MWH, Water Replenishment District of Southern California, West Basin Municipal Water District, and Building Industry Association of Southern California.



### REGISTRATION FORM

SOUTHERN CALIFORNIA WATER COMMITTEE
10184 SIXTH STREET - SUITE C, RANCHO CUCAMONGA, CA 91730
Tel. (909) 980-4700 Fax. (909) 980-2628

NAME: _____ TITLE: _____

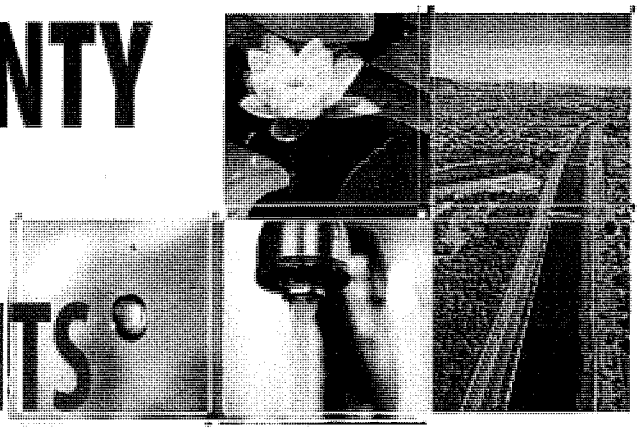
ORGANIZATION: _____

ADDRESS: _____ CITY/STATE/ZIP: _____

TEL: _____ FAX: _____ EMAIL: _____

Seating is limited to the first 200 people. NO REFUNDS. Make checks payable to Southern California Water Committee.

# LOS ANGELES COUNTY WATER SUMMIT PROGRAM HIGHLIGHTS



## Los Angeles County Water Today

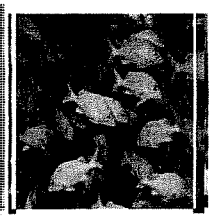
The headlines have been ominous: California is facing the worst water crisis in its history. The state is running out of water! Where does Los Angeles get its water supply? Did you know that most of our water supplies come from outside our area? Do you understand the diversity and challenges facing these water supplies?

## California Water in Crisis

The Governor proclaimed a statewide drought and ordered immediate actions to address the dire situation. A growing population, environmental demands, and the influence of climate changes have impacted these water supplies. As a result, communities throughout the region are being forced to mandate water conservation or rationing. Federal Court actions are reducing water deliveries to Southern California. Do you understand what all this means to you?

## The California Bay Delta

Learn why the Bay Delta is critical to our businesses and communities. Hear why the Delta is in crisis and one natural disaster away from collapse. Learn about the Governor's Delta Vision Process and its strategic recommedations. Hear a panel of policy issues of proposed actions and recommendations for long-term sustainability of this valuable ecosystem.



## Business Opportunities and Local Supply Challenges

Hear from the Los Angeles Area Chamber of Commerce, about the challenges in developing local water supplies and the importance of implementing solutions. What action plans can our communities, businesses and local elected officials undertake to energize policymakers to insure we have adequate water supplies for the future and the stability of our economy.

# Appendix E
# Emergency Response Plan

# Pico Rivera Water Authority
# Emergency Action Plan

## Introduction

This plan has been developed to assist the Pico Rivera Water Authority employees in coping with emergency conditions that may arise. The goal of this plan is to provide a working document that provides general instruction on responding to emergencies. The objectives of this plan are:

- Ensure the safety of City employees, their families, and property.
- Provide general direction to each employee responding to an emergency.
- Determines basic assignments and reporting locations for each employee.
- Establish a basic strategy designed to keep Pico Rivera Water Authority facilities operational and provide the highest possible service to its customers.
- Create an internal communication protocol to provide necessary information during the emergency.
- Ensure compliance with Cal-OSHA, California Code of Regulations, Title 8 §3220, Emergency Action Plans.

## Guide Structure

This Emergency Response Guide is divided into three major sections, which are interrelated with each other, to offer a concise organized response by City personnel to emergency situations as they occur. Although it is impossible to foresee every emergency that might arise, this guide utilized by well-trained City staff should allow the City to return to normal operations as rapidly as possible when abnormal conditions arise. The Emergency Action Plan discusses the nature and categories of emergencies offering general response guidelines. The Fire Prevention and Fire Emergency Plan offers guidance for the prevention of fires, and, in conjunction with the Emergency Action Plan, provides instruction should a fire start. The Emergency Chlorination Plan outlines the City's response to water quality issues.

## The Emergency Action Plan

The Emergency Action Plan is the backbone of the City's emergency response effort. It has been designed to provide a general operational framework from which the City can respond, both personally and corporately, to emergencies. Each employee should become familiar with the Cities Emergency Response Guide. This guide includes basic emergency instruction via the

Emergency Action Plan, Fire Prevention Plan, and Emergency Chlorination Plan. Periodic training is conducted to test the Cities emergency plans and their procedures.

The Emergency Response Guide is not intended to offer specific instructions on making repairs to damaged facilities. Cities employees are already well trained to handle the repair and maintenance of the Cities facilities. Instead, it is intended to offer both general and specific instructions on invoking emergency procedures, allowing the organized repair of City facilities, even under adverse conditions. Additionally, the plan outlines the responsibilities and roles each employee will assume during an emergency.

## Brief Overview of Normal Pico Rivera Water Authority Operation

The City of Pico Rivera lies between the Rio Hondo and the San Gabriel Rivers at the foot of the Whittier Narrows Dam. It occupies an area of nearly 8.4 square miles (366,000 acres). The City was incorporated in 1958. There is little open space remaining in the City; thus, any growth will be incremental.

The Pico Rivera Water Authority delivers potable water supplies to its 9,100 customers through its pressurized distribution system. The PRWA's potable water treatment and distribution system is comprised of: 10 chlorination facilities; three small reservoirs with combined storage of 1 million gallons; 90 miles of mains; 875 fire hydrants; and, 11 booster pumps with a capacity of 12,500 gallons per minute (GPM). Average daily demand is approximately 5.0 million gallons. The first three are wells numbers 2,4, and 12 which are controlled by variable frequency drives and are each capable of producing approximately 2300 gallons per minute. Wells number 1,3 and 11 fill reservoirs and have the capacity of approximately 2800 gallons per minute each and are constant speed. Well number 5 is capable of pumping 1500 gallons per minute. Wells number 6,7 and 8 and 3 booster pump stations have a capacity to also maintain system pressure. Average system pressure is 78psi, 72 and the remaining booster pumps are for complete redundancy. The PRWA is interconnected with the City of Whittier and the San Gabriel Valley Water Company, from which it may draw emergency needs.

Precautionary chlorination is provided through the injection of chlorine gas into the common well discharge header. Contact time is provided in the reservoir and secondary chlorination is applied prior to the water entering the distribution piping prior to the first domestic connection. The Cities has two fixed natural gas engines to power wells 2, and 12, to continue pumping water in the event of a commercial power failure.. The Cities also has a portable generator equipped to specifically power the main office facilities in the case of a power outage.

## Emergency Operations

During emergency conditions, the Park and Recreation office doubles as the Emergency Operations Center (EOC), located at 6767 Passons Blvd. All operations will be directed from this location. The EOC shall be under the direction of the City Manager, Chuck Fuentes, who shall direct the activities of the Cities staff. Additional contractual staff (i.e. engineering, construction) shall be obtained on an as needed basis.

## What is an Emergency?

The dictionary defines an emergency as: "a sudden, urgent, unexpected occurrence requiring immediate action." Using this definition it can be seen that emergencies can and do happen almost on a daily basis. These are handled in the normal daily course of events and are not the subject of this emergency response plan. This does not lessen their importance, but this type of emergency would not normally invoke a full emergency response. Less frequent but considerably more devastating emergencies are always possibilities. Emergencies created by natural events such as earthquakes, tidal waves, flooding, drought, fire, wind, etc., can be extremely devastating and have far reaching effects. In an effort to categorize emergencies, and the required level of response, the following classifications have been developed:

**Level I Emergency:** A level I emergency can normally be handled by a single person or a small field crew. A typical level I emergency is a line break, severed fire hydrant, customer emergency turn off, pump; valve, well, reservoir or other alarm condition. Most level 1 emergency only effect a small area, but some such as a commercial power failure may affect several facilities. Level I emergencies are normally handled at the Cities level with management being informed through the normal channels. Generally the EOC is not activated for a level I emergency.

**Level II Emergency:** Level II emergencies may involve multiple crews or even outside resources. Level II emergencies are major emergencies that might involve other agencies, yet are generally within the Cities service area. Examples of a level II emergency are major line breaks, requiring an outside contractor, an area wide power outage that lasts for an extended period of time, etc. Local police, Cal-Trans, the county or other water agencies might be involved in a level II emergency. Depending upon the severity of the emergency, the full EOC, or at least an abbreviated version, may need to be set up to handle coordination and information exchange.

**Level III Emergency:** Level III emergencies are severe catastrophic events such as high magnitude earthquakes, floods, major fires, etc. that do extensive damage to facilities. A level III emergency will require the response of all personnel who can report to duty. Level III emergencies would be beyond the capability of the City to control, requiring extensive outside assistance. In a level III incident the major damage could be outside the Cities service area, but require the Pico Water District assistance. In the event of a level III emergency the EOC should be immediately set up.

Any emergency can escalate or de-escalate requiring the City to respond accordingly. Simple level I incidents can escalate to level II requiring additional response while the more severe level III can de-escalate to level II or level I as conditions are returned to normal. For example should a major local earthquake occur, Cities resources would probably become rapidly depleted, requiring the City's response to escalate accordingly? As the situation is brought under control, with the restoration of the production and distribution systems, the Cities response would de-escalate to a normal operation. Level II and III incidents may involve local, county, or state public safety officials (police and/or fire) requiring City forces to coordinate their efforts with the local officials.

## Response to an emergency

The most important response to any emergency is to **STAY CALM** and rely on your training and good common sense. It would be impossible to create a complete set of guidelines detailing complete instructions on how to handle every type of emergency that might occur. In lieu of that, the following are guidelines to assist you in responding to an emergency.

**If you are at work when an emergency occurs:**

- Level I Emergency - These types of emergencies are common and might be the result of an alarm condition or a customer complaint. Rely on your training and good common sense to resolve these emergencies. Should the situation escalate, or you feel additional assistance is required, immediately contact your supervisor for assistance. Do not try to remedy a situation that you are either unprepared for or you do not have adequate resources to control. Report all emergencies and their resolution to your supervisor.
- Level II Emergency - Should a level I emergency escalate to level II, or if when responding to an emergency it turns out to be of level II proportions, immediately notify your supervisor for assistance and direction.
- Level III Emergency - Report to your supervisor or to the Cities EOC for additional instructions.

**If you are NOT at work when an emergency occurs:**

- Level I and II Emergencies - Normally the "on-call" person would be the first responder to after hour's emergencies. The person responding should notify their supervisor if assistance is needed and assemble a crew to correct the emergency. AllCities employees are subject to call out as needed.
- Level III Emergency - Since Level III emergencies are catastrophic in nature the following guidelines are given:
    - Insure the safety of your family.
    - Call your supervisor for instructions. If you cannot reach your supervisor,
    - Call the Cities office for instructions. If you cannot contact the office,
    - Report directly to work. You should report to the Cities main office.
    - Do not wait for someone to contact you. In a catastrophe, time is of the essence.
    - Providing the City's office is safe to enter, try to assess the damage to the system. Use the TV (local Channel 3), Cities radio, telephone, or whatever is functioning to assist you.

If there is immediate danger, or if there has been an injury requiring medical attention, call 911 to report the incident if phones are available and working. If the two-way radio is the only communications available, report the emergency to the City's Public Work Department for first aid if necessary.

## Chain of Command

During emergency situations, the chain of command remains as it does during normal operations. The City Manager is responsible for the operation of the City with City employees being subordinate to the City Manager. Should the City Manager be absent, the Assistant City Manager shall acquire the duties. All field operations are managed through the City Of Pico Rivera Public Works Department's Water Division and lead by the Director of Public Works. A Senior Supervisor oversees the water division operating staff at the city corporate yard facility.

All pertinent decisions, communications and coordinating efforts must have the approval of the City Manager or his designate. The City Manager will assess the situation and determine what actions are necessary to return the Cities to normal operation.

## Emergency Operations Center

During times of emergency, requiring the setup of an Emergency Operations Center (EOC), the Pico Rivera Water Authority will utilize its office facilities for this function. The will be the operations center. From this location the EOC Director (City Manager or his designate) will direct the activities of the Cities staff and outside support personnel. Commercial radio and television is available as a source of media information. Additional information may be available via the Cities Internet connection. System maps and other pertinent information are available in the file room and would be moved to the boardroom on an as needed basis. Security would be handled from the receptionist area utilizing the existing front security gate. Communications with the field crew(s) would be via the existing Nextel wireless telephone/radio system.

## General Response Guidelines

The following are general response guidelines to emergency conditions that may occur. Emergencies can occur at any time, from minor level I emergencies to level III catastrophes. Remember that the key to success in dealing with any emergency is to STAY CALM and use a common sense approach.

These basic guidelines are intended to give basic assistance to an employee in dealing with an emergency. It is impossible to predict the nature, and to what extent, any emergency might involve. The following guidelines are intended to offer general assistance for some of the more probable emergencies an employee might encounter.

**Fire** (for additional information refer the Cities Emergency Operation Plan)

Buildings - If a small fire, such as a trash can fire, breaks out within a building and a fire extinguisher is available, and you are trained in its use, you may attempt to extinguish the fire. If the building structure is involved, you should evacuate the building, sounding an alarm if others are present, and summon the fire authority.

If you are in the office and a fire breaks out, activate the fire alarm. If the fire is small, such as a trashcan or computer fire and a fire extinguisher is near and you are trained in the use of fire extinguishers, you may attempt to extinguish the fire. If the fire involves the building structure, sound an alarm and evacuate the building, proceed to the designated staging area and notify the fire authority. Do not attempt to extinguish the fire. It is important that all

personnel in the building evacuate to the staging area to help account for all known persons that were in the building.

If you are caught in a building that is on fire observe the following:

- Stay close to the floor. The temperature will be cooler there and this is where you will find fresh air. Smoke tends to kill more people than flames.
- Never open any doors without checking to see if they are hot. A hot door indicates flames on the other side.
- If your clothing catches on fire, drop to the ground and roll.
- If a companion's clothing catches on fire, push them to the floor and make them roll. If a blanket, coat or other piece of heavy clothing is available, use it to smother the flames.

Motors or Switchgear - If you approach a well facility, pump, or control cabinet that appears to be on fire, DO NOT enter the site. Notify the fire authority and be available to assist as necessary. If the fire has spread to involve the structure, DO NOT try to extinguish the fire yourself. If a fire erupts in a motor or the switchgear, if possible, immediately turn off the main electrical breaker. If the fire is small, not involving the building structure and a fire extinguisher is near and you are trained in the use of fire extinguishers, you may attempt to extinguish the fire. DO NOT try to restart any electrical component that has been subjected to a fire.

Vehicles - If you encounter a vehicle fire while driving, pull the vehicle to the side of the road and exit as soon as it is safely possible. Summon assistance in whatever way is available without endangering your life. If the fire is in the engine compartment and the hood can be safely opened, you may use the vehicles fire extinguisher to extinguish the fire. Be careful of the battery. When overheated, batteries will explode.

Above all else, in the event of a fire, stay calm and DO NOT take unnecessary chances.

**Earthquake**

If you are in a building when an earthquake strikes you should DUCK, COVER, HOLD.

- DUCK - or drop to the floor.
- COVER - Take cover under a sturdy table or desk away from windows or other objects that might fall. If that is not possible, seek cover against an interior wall.
- HOLD - If you have taken cover under an object, HOLD on to it and be prepared to move with it. Stay in that position until the shaking stops and it is safe to move.

Some additional tips to remember in dealing with an earthquake:

- DO NOT try to exit a building during an earthquake. Wait until the shaking stops and then exit as rapidly as safely possible.
- Always try to move along an interior wall if possible.

- When outdoors, move to a clear area away from trees, buildings, signs, power lines, or other objects that might fall.
- If you are on the sidewalk near a building when an earthquake strikes, move into a doorway to protect yourself from falling plaster, bricks, glass or other debris.
- If you are in a store or other public building move away from windows, display cases or shelves with objects that might fall.
- When driving, pull over to the side of the road. Avoid overpasses and power lines. Stay in your vehicle until the shaking stops.

After an earthquake City facilities need to be inspected for their serviceability.

- Pumps and Wells - Carefully inspect the exterior of the well site for its stability before entering the site. If the building does not appear stable, do not enter it. Once inside inspect the alignment of the piping, motors and pumps. Do not try to run a pump or well if the associated piping or the pump and motor appear to be mis-aligned. Control cabinets should be standing in their normal position with all conduits intact. Do not try to run a pump or well using a control cabinet that is in any way damaged or has exposed electrical components. Do not touch any exposed wiring. Assume that all electrical wiring is HOT.
- Reservoir - On the tank look for piping separations, and buckling of the walls. Check to see if the tank is still centered on its base ring. Look for leaks.
- Pipelines - Look for wet spots or water bubbling up along known distribution lines. Investigate no water of low water pressure customer complaints for indications of broken pipelines.

**Flooding**

Unusually heavy rains, or the over spilling of the Los Angeles and San Gabriel River, have the potential of creating a flood situation. To the extent possible, sandbagging can be utilized to protect Cities facilities. Motors or electrical switchgear that is in danger of coming in contact with floodwaters should be turned off and the main breakers deactivated. Never try to run any electrical appliance that is in contact with water unless the appliance (such as a submersible pump) is designed to operate in a wet environment, nor should any motor or switchgear that has been submerged be operated before it has been thoroughly inspected by a qualified electrician.

Water quality can be affected by flooding. Well and distribution system samples must be taken. Should contamination be indicated, immediate action must be taken. This can include, but not be limited to, additional chlorination, flushing, activation of interconnections, public notification or boil water orders.

**Sabotage of Water Supplies**

As the population of the area increases and political and other changes take place in our society, there unfortunately becomes an increased potential for the Cities water storage and supply system to become the target of sabotage. This can be a simple prank, someone using a

reservoir for recreational purposes, to a deliberate attempt to contaminate the potable water system. Should there be evidence of tampering; an open or damaged reservoir hatch; apparent tampering with wells or pumps, suspicious containers left on site; water having strange odor or color; the following steps must be taken:

- Isolate the affected system.
- Immediately notify your supervisor and management.
- Isolate the area and notify local law enforcement officials.
- Collect water samples for analysis.
- Notify the Health Department.
- Public Notification as appropriate.
- Flush and chlorinate as appropriate.
- Return the system to service only after testing has deemed it safe.

For additional instruction refer to the Cities Emergency Chlorination Plan included in this booklet.

**System Contamination**

Should contamination occur within the distribution system, reservoir or wells, follow the procedures contained in the Cities Emergency Chlorination Plan. Likewise the Emergency Chlorination Plan should be consulted should there be a malfunction with the chlorination system.

**Disruption of Supply**

In the event of a disruption of the normal supply due to well failure, commercial power failure, pipeline failure, etc., activate the emergency generators. Should the problem involve the operation of a well notify one of the Well/ Pump repair companies for assistance.

**Civil Disorder**

Civil Disorders could cause an emergency status. Complete cooperation and coordination with local peace keeping authorities is essential. To prevent sabotage or vandalism of City facilities, they should remain locked and, as is safe and practical, staffed by City staff. Should additional security be required, private security guards would be hired.

**Disruption of Distribution Pumping**

Should there be a disruption in distribution pumping, such as a fire in one of the well sites, shut it down and activate one of the alternate wells, and check your chlorine residual after starting the well. **Do not attempt to handle the situation without first calling for assistance. Contact your superintendent and inform him of the situation.**

**Main Breaks**

Should a main break be evidenced by water coming up out of the ground, loss of pressure in the service area, etc., repairs should be initiated immediately; Cities forces will make the necessary repairs unless City Manager and or the field superintendent deems that assistance

will be necessary. These repairs are normally done under pressure utilizing the appropriate repair clamp. Repairs are made under pressure to minimize the possibility of back siphoning and contamination of the distribution system. Although in some cases when the water leaking out of the main is too excessive, an isolation of the area may be required by closing the closest line valves to the leak. If assistance is required City Manager Will notifying the Cities licensed pipeline contractor for the emergency pipeline repair. A Cities representative should monitor the repair activity to insure all repair work is in accordance with AWWA and Cities standards.

**Fire Hydrants**

Should a fire hydrant become damaged or sheered, isolate the hydrant by closing the hydrant lateral valve. If possible initiate repairs there after. If repairs for some reason can't be made then the area should be delineated and secured, if the hydrant still stands then a bag should be placed over the hydrant to prevent usage.

The local fire authority must be notified immediately of the hydrant's location and that it is out of service.

**Commercial Power Outages**

Commercial power outages will occur from time to time. These may be scheduled, due to maintenance or rolling blackouts, or unscheduled because of equipment damage or failure. At the time of a commercial power outage, contact the Southern California Edison Cities (SCE) for a determination as to the anticipated duration of the outage. The Cities has three portable diesel powered generator that can provide sufficient power for distribution pumping. The units must be manually started as per manufactures instructions and load must be manually transferred from commercial to standby power. Do not tamper with the normal generator connections as it can force motors to run in reverse or back feed the SCE system causing severe injury or death. Do not try to apply a load greater than that for which the generator is rated. Do not try to refuel the generator while it is running. Shut the unit down, refuel, and then return the generator to service. When commercial power is restored, allow time for the SCE system to stabilize before transferring load and stopping the generator. Once the load has been transferred, allow the generator to go through its cool down cycle before final shut down.

**Building Evacuation**

Should a Cities building evacuation be required, follow the posted evacuation route to the assigned staging area. Select an evacuation route that is farthest away from the emergency i.e. fire. Remain calm and move quickly, without running, to the nearest safe evacuation exit. The evacuation commander (individual assigned evacuation duties at the site or the most senior individual on site in their absence) is responsible to sound the evacuation alarm and oversee the evacuation. Providing it can be done safely, assigned individuals are to shut off the gas and electrical service to the building. Once assembled in the staging area, the Evacuation Commander, is to determine if all the known occupants have been safely evacuated. During an earthquake, do not evacuate the building until the earthquake has stopped. Do not reenter a building until it has been deemed safe.

**Bomb Threats**

Regardless of how they are received, bomb threats must be taken seriously. If the threat is to an occupied building, the building must be evacuated until the threat is alleviated. Cities management, local police and fire authorities must be immediately notified of the threat. If you are the person receiving the threat, try to remain clam and note as much information about the person making the threat as possible. This information can be valuable to authorities trying to apprehend the individual making bomb or other threats. At no time is a Cities employee to try to disable a suspected bomb or other suspicious device. The area should be secured allowing access only to authorized personnel.

**Emergency Water Disbursement**

In the event it becomes impossible to distribute water through the normal distribution system, emergency water distribution is possible from the reservoir. The compound is ideal because of its security fences and gated entrances. Additional security may be required for crowd control while Cities forces fill allocation requests from reservoir taps. This approach would provide a safer environment and better control for Cities staff than utilizing trailers or other means of trying to satisfy water demands in the community at large.

**Emergency Notification**

Should an emergency event occur requiring public notification, the Cities will follow the directions ascribed by the state health department. As necessary, electronic media, radio and television, as well as print media (both English and Spanish) will be utilized as required under Title 22 of the California Code of Regulations, sections 64463.1 – 64467. Additionally, two vehicles equipped with loudspeakers could be utilized to notify the residents of the emergency and any special circumstances such as water conservation requests. Because of the size of the service area this should be accomplished in 3 to 4 hours.

# FREQUENTLY ASKED QUESTIONS

**How will I know if I'm supposed to report to work?** - If you are called, then you are to report. If you are not called, use your best judgment. During extreme emergencies it might be impossible for someone from the Cities to call you because of disruptions in the telephone system. Should there be a major event, such as a large scale earthquake, and your family and property are safe, you should make an effort to report to work or in some way make contact with the District.

**How do I get through the roadblocks?** - Roadblocks are a real potential. There are some things you can do to assist getting through. Always have your ID card handy. Politely inform the officer you are responding to an emergency. If possible, use a marked Cities vehicle. The EOC Director (City Manager or his designate) will try to notify the Los Angeles County Sheriff to allow employees into the service area.

**If I'm at work and a major event occurs, will I be able to look after my family?** - Yes. The well being of the Cities employees and their families takes a top priority in the Cities efforts in dealing with an emergency. How this is to be accomplished will depend upon conditions surrounding the event.

**How will I communicate during an emergency?** - Reliable communications is essential to combating the effects of an emergency. If there were a major event, such as a large earthquake, communications would be based upon what worked. The Cities has telephone, Nextel cellular phones, fax and Internet, commercial radio and television available for communications. Depending upon the severity of the event, you would use whatever communications, or mixture of communications, that still function, to communicate.

**How long will the emergency last?** - There is no way to tell how long an emergency will last. Generally emergency conditions will be in effect until the Cities operation has returned to a normal state.

**How long will I be required to work?** - That depends upon the severity of the emergency, the number people who respond, and the need for your particular expertise and abilities.

**What type of work will I be required to do?** - During an emergency the Cities will be required to make the best of what it has. This means there is a good possibility you may be asked to perform a function you are not accustomed to.

**Will we get any help?** - That depends upon the severity of the emergency and how wide spread it is. For catastrophic emergencies, the general rule of thumb is to not expect any outside help for the first twenty-four (24) to forty-eight (48) hours after the initial event. During that time the Cities will have to survive the best it can on what it has available.

**What do I say if asked a question by the Media?** - Refer all questions to the EOC Director. The same is true for questions you might be asked from the general public. Do not make comments on your own. During an emergency, accurate information is essential. It is important that all questions about the emergency be handled by a central source.

# Emergency Contacts

Pico Rivera Water Authority Contacts

| | |
|---|---|
| Adrian L. Diaz | |
| Office | 562-801-4462 |
| Cellular #1 | 562-755-0176 |
| Fax | 562-699-3585 |
| Home | 562-692-7370 |
| E-Mail | adiaz@pico-rivera.org |

| | |
|---|---|
| Angel Quintero – Water Quality Specialist | |
| Office | 562-692-4282 |
| Cellular # 1 562-755-0954 | |
| Fax | 562-699-3585 |
| Home | 562-906-5312 |

E-mail aquintero@pico-rivera.org

| | |
|---|---|
| Chris Alaniz – Utility Maintenance III | |
| Office | 562-801-4462 |
| Cellular | 562-755-0768 |
| Fax | 562-699-3585 |
| Home | 562-864-6428 |

24-Hour Water Standby phone 562-244-0685

**SEE 2006 WATER STANDBYS CALENDAR**
**SEE EMERGENCY TELEPHONE NUMBERS BOOKLET**

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Pipeline Contractor

**A.R. Sarmiento, Inc.**

| | |
|---|---|
| Tony Sarmiento | |
| Office | 562-941-1165 |
| Cellular | 562-318-7001 |
| Fax | 562-941-1902 |

**Valverde Construction, Inc.**

| | |
|---|---|
| Ahron Valverde | |
| Office | 562-906-1826 |
| Cellular | 562-244-4705 |
| Fax | 562-906-1918 |

Emergency Chlorination

**Matt-Chlor Inc.**

| | |
|---|---|
| James Woodward | |
| Mark Woodward | |
| Office | 626-443-5034 |
| Fax | 626-443-2226 |

Well Service

**General Pump District**

| | |
|---|---|
| Mike Bodart ext. 222 | |
| Office | 949-599-9606 |
| Fax | 949-599-6238 |

**Layne**

| | |
|---|---|
| Dean Garcia 562-691-0903 | |
| Office | 714-870-5360 |
| Cellular | 562-755-5813 |
| Fax | 562-690-9192 |

**Water Well Supply**

| | |
|---|---|
| Dale Epperly | |
| Office | 562-864-3229 |
| Fax | |

Laboratory

**Weck Lab- Industry**

| | |
|---|---|
| Office | 626-336-2139 |
| Fax | 626-336-2634 |

Electrical Repairs

**M&S Electric**

| | |
|---|---|
| Manuel Saenz | |
| Office | 562-699-7697 |
| Cellular | 562-533-6964 |

Generator Repairs

**Ashley Electric Service**

| | |
|---|---|
| Larry Lindsey | |
| Office | 323-773-4303 |
| Home | 909-677-0118 |
| Pager | 323-707-6209 |

Southern California Edison 800-655-4555

California Department of Health Services – Hollywood District

| | |
|---|---|
| David Chang | 213-580-3171 |
| Office | 213-580-5723 |
| Fax | 213-580-5711 |

Police Department

| | |
|---|---|
| Emergency | 911 |
| Office | 562-949-2421 |

Fire

| | |
|---|---|
| Emergency | 911 |
| Office | 562-942-1015 |

## Location of Emergency Equipment

| Type of Equipment | Location |
|---|---|
| General | |
| Fire extinguishers | Office, Warehouse and Wells |
| First Aid Kit(s) | Warehouse and service vehicles |
| Respirators | Warehouse and office and wells |
| Spare Cell Phones | Office |
| Emergency Survival Kits | |
| | |
| Water Quality Items | |
| Chlorine Test Kits | Three colorimeter kits |
| Water Sample Kits | City Yard (Refrigerator) |
| Repair Equipment | |
| Utility truck | **City Yard** |
| Barricades | City Yard |
| Repair Clamps | City Yard |
| Air Compressor | City Yard |
| Back hoe | City Yard |

## Training

| *Type of Training* | *Frequency* | *Topics Covered* |
|---|---|---|
| Fire Extinguisher Training | Annually | Review types of extinguishers and general fire extinguisher use. |
| Generator Training | Annually | Review generator-operating procedures and power failure scenarios. |
| Chlorination Training | Annually | Review CL2 safety, and emergency chlorination procedures. |
| | | |

Reference: California Code of Regulation, Title 8 Sections 3220.

# Pico Rivera Water Authority
# Fire Prevention and Fire Emergency Plan

## General

A Fire Prevention and Fire Emergency Plan is part of the Cities Emergency Response Plan. Its intent is to alert employees to potential fire hazards, abate those hazards, and provide an emergency plan in the event of a fire.

## Typical Fire Hazards

Typical fire hazards consist of, but are not limited to the following:

- Combustible materials: These are any type of materials which when ignited will burn. Included would be paper products, plastics, packing material, wood, certain chemicals, petroleum products, (gasoline, diesel fuel, paint thinners, cleaning solvents etc.).
- Electrical appliances: Any electrical appliance such as coffee makers, computers, radios, office equipment, and pumps motors, switch gear, etc., is capable of being a fire hazard. This occurs when the equipment is mis-used, poorly maintained, used in an environment where it was not intended (using an appliance intended only for indoor use out of doors), or used to provide a function for which it was not intended, etc. Over-loading receptacles, bypassing fuses or circuit breakers, using frayed or damaged electrical cords or wiring, all contribute to creating an electrical fire hazard.
- Gas appliances and items that produce sparks during their operation: Gas appliances, such as heaters, gasoline fueled equipment, cutting or welding torches, that are improperly used or maintained can create a fire hazard. This is also true of tools such as grinders or saws that produce sparks.

## Fire Prevention

Being aware of what constitutes a fire hazard and acting accordingly is an important aspect to a good fire prevention program. The following suggestions should be adhered to as part of the Cities fire prevention program.

- Good housekeeping: Good housekeeping is essential to fire prevention. Clutter or accumulations of combustible material should not be allowed to accumulate, especially near an ignition source. Combustible materials must not be stored in closets or other places where there is a viable source of ignition. Example: storing combustible materials in the same closet with the furnace or water heater having a pilot light. Likewise, flammable liquids or chemicals must not be stored near an ignition source.

- Refueling of equipment: Refueling vehicles or equipment must be done with the engine off and in the appropriate location away from any source of ignition. Smoking is never permitted when refueling vehicles or equipment.
- Using electrical appliances: Never use any electrical device that is defective or has defective wiring, cords, connections, or switches. Only use the appliance for its intended purpose. Never overload an outlet, circumvent fuses or circuit breakers, and insure the appliances' grounding needs are properly adhered to.

**Inspections and Maintenance**

Inspections and proper maintenance are a part of the Cities fire prevention program. Inspections are likewise a part of the Cities overall safety program. Inspections are accomplished on a regular basis but need to be augmented by brief safety checks each time a tool, appliance, or piece of equipment is to be used. Any time a tool, appliance or piece of equipment appears to be damaged, does not work properly, or appears to be unsafe, DO NOT USE IT until it can be properly repaired or replaced. Do not use electrical equipment with frayed wiring, cords or plugs with the grounding or other prongs removed or altered.

**Fire Control**

None of the Cities facilities are equipped with internal automatic sprinkler systems. AllCities facilities and vehicles are equipped with fire extinguishers. These portable fire extinguishers are dry chemical, or CO2, depending upon their location. All the fire extinguishers are checked monthly and serviced annually. Fire extinguisher locations must not be obstructed. Fire extinguishers must be in plain sight with easy access and clearly marked as appropriate. Fire extinguishers are for use on small non-structural fires such as wastebasket fires or small appliance fires. They are to be used only by persons who have been trained in their usage. To effectively use a fire extinguisher, do the following:

- Remove the fire extinguisher from its mounting point.
- Grasping the fire extinguisher with one hand on its handle and the other on the bottom, rotate the extinguisher, top to bottom, a couple times. This is of particular importance with dry chemical extinguishers as it loosens up the chemical allowing it to be expelled with the propellant.
- Holding the extinguisher with one hand in the upright position, remove the ring pin with the other hand.
- Keeping a safe distance from the fire, point the nozzle of the extinguisher at the base of the fire.
- Squeeze the trigger, using short bursts while moving the extinguishers blast across the fire.
- Continue using an arching motion and short bursts aimed at the base of the fire until the fire is out or the fire extinguisher is empty.

If the fire involved an electrical appliance, tool or equipment, do not try to re-start or run the device until it can be thoroughly inspected and repaired by a qualified electrician.

**Fire Alarm Systems**

The City's facilities do not have any type of fire sensing or alarming equipment. Should a fire be discovered, the person discovering the fire should yell "FIRE" to alert any other building occupants and take the appropriate action. If the fire is small, such as a trash can fire, and a fire extinguisher is available, and you are trained in its proper operation, you may extinguish the fire. For larger fires, or fires that involve the building structure or fires that could not be successfully extinguished, call the local fire authority.

Anytime the fire alarm is sounded, the occupants of the affected facility must immediately engage in an orderly evacuation. Occupied Cities facilities have evacuation routes posted. The evacuation route posters include staging areas and the locations of fire extinguishers. The fire authority should be called for any fires that are larger than those that can be easily extinguished with a portable fire extinguisher. Fire alarms are serious and activation as a prank will result in the appropriate disciplinary action.

**Employee Fire Prevention Safe Work Practices**

Every employee must comply with safe work practices to minimize fire hazards and insure a safe response in the event of a fire. The following guidelines are designed to encourage safe work practices:

- Handle flammable or combustible liquids very carefully. Gasoline, paint thinners, diesel fuel, etc. should only be stored in small amounts (five gallons or less) in approved marked containers and away from any source of ignition.
- When refueling vehicles or other engine power equipment, never leave the engine running.
- Never smoke when refueling vehicles or engine driven equipment.
- Should a spill of a flammable liquid occur, immediately clean it up and properly dispose of the clean-up materials.
- Oily rags, or rags with other combustible liquids on them, must only be stored in the proper fire safe containers.
- Never store materials where they may block access to a fire extinguisher, fire sprinklers, or fire alarm.
- Never store combustible materials, including flammable liquids, near an ignition source.
- Do not block fire exits with stored materials. Always keep exits free and clear.
- Avoid overloading electrical receptacles and keep use of extension cords to a minimum.

- Do not use defective electrical equipment. This includes equipment with frayed wiring, defective plugs, bad switches, or that is improperly grounded.
- Never circumvent any electrical safety device such as a fuse or circuit breaker.
- Know how to use a fire extinguisher and its limitations. Do not try to fight a fire that is to big for the rating of the fire extinguisher being used. Do not use a fire extinguisher if you are not trained in its usage.
- Know where the fire alarms are, how to activate them, and what they sound like when activated.
- When working in a building, know where the exits and evacuation routes are.

**Areas Subject to Periodic Inspection**

The following areas will be periodically inspected for fire hazard. The following areas are scheduled monthly for inspected are:

Cities Office
Storage Facilities
Motor Control Centers (MCC)
Wells and associated areas
Pumps and associated areas
Chlorination equipment
All Fire Extinguishers

Reference: California Code of Regulation, Title 8 Sections 3221.

# Pico Rivera Water Authority
# Emergency Chlorination Plan

Name: Pico Rivera Water Authority

Address: 9633 Beverly Road

Pico Rivera CA 90660

System Supervisor: Adrian Diaz (Distribution Grade 3, Treatment Grade 2)

Water Quality Specialist: Angel Quintero (Distribution Grade 2, Treatment Grade 2)

System Operators: Chris Alaniz, Utility Maintenance III (Distribution Grade 3, Treatment Grade 2)

Dave Valdepena, Utility Maintenance III (Distribution Grade 2 Treatment 2)

| | |
|---|---|
| Phone Number: | 562-755-0176 or 562-244-0685 |
| System Type: | Community Water System |
| Population Served: | Approximately 35,000 |
| Source Water: | The Pico Rivera Water Authority primary source is 10 groundwater wells drawing from common aquifers. |
| Treatment Provided: | Precautionary chlorination (gas chlorine) is provided at each of the wells when the system is utilizing its groundwater source. |

## System Overview

The City of Pico Rivera lies between the Rio Hondo and the San Gabriel Rivers at the foot of the Whittier Narrows Dam. It occupies an area of nearly 8.4 square miles (366,000 acres). The City was incorporated in 1958. There is little open space remaining in the City; thus, any growth will be incremental.

The Pico Rivera Water Authority delivers potable water supplies to its 9,100 customers through its pressurized distribution system. The PRWA's potable water treatment and distribution system is comprised of: 10 chlorination facilities; three small reservoirs with combined storage of 1 million gallons; 90 miles of mains; 875 fire hydrants; and, 11 booster pumps with a capacity of 12,500 gallons per minute (GPM). Average daily demand is approximately 5.0 million gallons. The first three are wells numbers 2,4, and 12 which are controlled by variable frequency drives and are each capable of producing approximately 2300 gallons per minute. Wells number 1,3 and 11 fill reservoirs and have the capacity of approximately 2800 gallons per minute each and are constant speed. Well number 5 is capable of pumping 1500 gallons per minute. Wells number 6,7 and 8 and 3 booster pump stations have a capacity to also maintain system pressure. Average system pressure is 78psi-72psi and the remaining booster pumps are for complete redundancy. The PRWA is interconnected with the City of Whittier and the San Gabriel Valley Water Company, from which it may draw emergency needs.

Precautionary chlorination is provided through the injection of chlorine gas into the common well discharge header. Contact time is provided in the reservoir and secondary chlorination is applied prior to the water entering the distribution piping prior to the first domestic connection. The Cities has two fixed natural gas engines to power wells 2, and 12, to continue pumping water in the event of a commercial power failure. The Cities also has a portable generator equipped to specifically power the main office facilities in the case of a power outage.

## Normal Operation

Potable water for the Pico Rivera Water Authority is provided by groundwater wells. Operation of the wells is controlled by system pressure directly related to system demand. As the system water pressure drops, indicated by pressure transducers for each well, which is connected to PLC and then the well is controlled by the SCADA system either starting or stopping the well to attain the desired pressure. Once the desired system pressure is attained the well production is stopped. Each well has sufficient capacity to provide the system's daily needs. The wells alternate their duty cycles on a weekly basis.

Distribution system pressure is maintained at approximately 78 to 72 psi by any three City wells or two wells and two boosters, pump from any one of the three reservoirs. Pump activation is via pressure sensors monitoring the distribution system.

Reservoir levels and distribution system pressure are monitored 24hrs/day via SCADA and recorded on a daily basis by the individual checking the wells for that day.

## System Disinfection

Chlorine levels are monitored daily. Chlorinators are used to inject gas chlorine to an injection point on the distribution line prior to the water entering the distribution system. The rortometer is manually adjusted to provide a .50 mg/L dosage. This dosage has proven to provide an average residual of .25 mg/L to the farthest point in the distribution system. Daily chorine residuals are taken at each of the Districts well sites at a designated sample tap prior to the distribution system. Additionally, chlorine is monitored when water samples are taken throughout the distribution system. Records are maintained at the Cities office. There are no known water quality issues that can affect the chlorination process.

Emergency chlorination connections are provided at the reservoir, the discharge of the wells. Matt-Chlor Inc. provides emergency chlorination equipment on an as needed basis.

## Monitoring

Chlorine sampling is accomplished daily with bacteria sampling being done weekly throughout the distribution system. Table 1 indicates the maximum chlorine levels allowed during normal system operation. Disinfectant residual levels for chlorine or chloramines shall not exceed those listed in Table 1 unless, under the direction of the Department of Health Services (DHS), higher levels of disinfectant are necessary to protect the public health or address a specific contamination issue. Table 2 indicates the sampling sites and their respective location to the source of supply. Figure 3 graphically shows the locations of the various distribution system-sampling points and sources of supply.

**TABLE 1**

*Maximum Residual Disinfectant Levels*

| | |
|---|---|
| Chlorine | 1.0 mg/L |
| Chloramines | 0.0 mg/L |

| TABLE 2<br>*Monitoring Sites for Groundwater* | | |
|---|---|---|
| **SITE NUMBER** | **SITE ADDRESS** | **LOCATION** |
| 1 | 8739 Gallatin Road<br>Plant # 1 | North part of the system |
| 2 | | |
| 3 | 8316 Washington Blvd<br>Plant # 2 | Middle of the system |
| 4 | | |
| 5 | 8305 Slauson Ave | Southwest part of system |
| 6 | 8231 Elmont Ave | South part of the system |
| 7 | 8523 Ceylon Ave | South of the system |
| 8 | 9623 Telegraph Rd | South part of the system |
| 11 | 9732 Lundahl Ave<br>Plant # 3 | Southeast part of the system |
| 12 | | |

Samples are tested by Clinical Laboratories of City of Riverside for E.coli, fecal coli and coliform. The lab will immediately notify (within 24 hours) the Cities and the DHS of any positive samples. If a routine sample is total coliform-positive, a repeat sample must be taken within 24 hours of notification. The repeat samples shall be taken within the same 24-hour period and shall consist of at least three samples for every total coliform-positive routine sample. When collecting repeat samples, at least one sample must be from the same sampling tap that produced the original total coliform-positive sample. At least one sample shall be taken within five service connections upstream and downstream of the point of the original positive sample unless there is no upstream or downstream service connection. If a repeat sample returns total coliform-positive, the DHS is to be immediately notified.

**Chlorination Equipment**

Gas chlorine provides primary chlorination. These units are capable of producing 50 pounds per day, should additional chlorine be required, the chlorinators can be upgraded to a 100 pound per day chlorinator concentration of gas chlorine. Injection is at each of the groundwater wells discharge. Piping changes to the inlet/outlet piping have been made to enhance the contact time. Lighting and ventilation are provided at each injection site. Matt-Chlor Inc. provides chlorine system maintenance.

**System Maintenance**

Matt-Chlor Inc. provides maintenance of the chlorine system including calibration of the chlorine test equipment.

An annual flushing program is utilized to flush the distribution system. All fire hydrants and isolation valves are exercised and tested at this time.

Main breaks on the older shallower lines are repaired under pressure utilizing repair clamps to minimize the possibility of back siphoning and contamination of the distribution system.

**Record Keeping**

Sampling reports and test results shall be retained for at least five years at the City Yard office. Additionally, the laboratory shall submit copies of all required bacteriological monitoring results directly to the DHS.

**Emergency Contamination Procedures**

If repeat samples are total coliform-positive, City's Water Authority and the DHS must be immediately notified and the effected system must be flushed, disinfected and resample until the contamination is alleviated. The City Manager in conjunction with one or both of the City's' certified operators, under the direction of the DHS, will determine the need for and the oversight of all emergency events. The Director of Public Works and Senior Supervisor will have the responsibility to insure that proper procedures are followed protecting the Pico Rivera Water Authority system and its customers.

Well Contamination: Should sampling reveal possible contamination of one or more of our wells do the following:

- Samples of the reservoir and the distribution system should be taken to insure the contamination has not entered the system.
- Notify the Senior Supervisor. He shall be responsible, under the direction of the DHS, for determining the need for and the oversight of all emergency events. It shall be his responsibility to insure that proper procedures are followed protecting the Pico Rivera Water Authority system and its customers.
- Notify Water Well Supply for assistance in flushing and decontaminating the well(s).
- Return the system to normal operation only after it has been deemed safe to do so.

Reservoir Contamination: Should sampling reveal possible contamination of our reservoir, do the following:

- Samples of the distribution system should be taken to insure the contamination has not entered the system.
- Samples of the well(s) should be taken to determine if the contamination source is within the well(s).
- Notify the Senior Supervisor. He shall be responsible, under the direction of the DOHS, for determining the need for and the oversight of all emergency events. It

shall be his responsibility to insure that proper procedures are followed protecting the Pico Rivera Water Authority system and its customers.

- If deemed necessary, notify Matt-Chlor Inc. for assistance in flushing and chlorinating the reservoir(s).
- Return the system to normal operation only after it has been deemed safe to do so.

Distribution System Contamination: Should sampling reveal possible contamination of our reservoir, do the following:

- Samples of the wells and the reservoir should be taken to determine the source of the contamination.
- Utilizing fire hydrants flush the effected area and resample.
- Notify the Senior Supervisor. He shall be responsible, under the direction of the DHS, for determining the need for and the oversight of all emergency events. It shall be his responsibility to insure that proper procedures are followed protecting the Pico Rivera Water Authority system and its customers.
- Notify Matt-Chlor Inc. if portable or spot chlorination of the distribution system is required.
- Return the system to normal operation only after it has been deemed safe to do so.

Should emergency or portable chlorination equipment be needed, or spot chlorination be required in the distribution system, contact Matt-Chlor Inc. Chlorine injection points are provided at each well discharge piping, each reservoir and on the discharge piping of the distribution pumps. Likewise, should a failure occur in the chlorination system, contact Matt-Chlor Inc. for service.

**Public Notification**

Should a contamination event occur requiring public notification as directed by DHS, theCities will follow the dictates of Title 22, Sections 64463.1 – 664467 to the satisfaction of the DHS inspector. The following will be enacted based upon the direction of the DHS inspector:

- Electronic media notification via local radio and television as soon as possible but in no case more than 24 hours after being directed to do so by the DOHS.
- Print media via local daily newspapers of a Water Quality Failure given at least once within 14 days of the incident.
- If required, flyers containing information about the Water Quality Failure would be handed out door-to-door and posted in public places.
- Additionally, two vehicles equipped with loudspeakers could be utilized to notify the residents of the Water Quality Failure.
- In severe contamination cases, boil water notices would be handed out door-to-door, posted in public places and local media notified.

## Chlorine Gas Safety and First Aid

Safety

Do Not Attempt to repair a leak with out proper equipment and supervision

1. For leaks, contain the material, close the doors to the chlorine room and call the fire department
2. Fumes from leaks can be very irritating and or deadly.
3. Gas chlorine is very corrosive and can cause severe chemical burns.
4. Wear proper clothing such as classA fully encapsulated suit equipped with an SCBA.
5. Segregate from acids, reducing agents, and combustibles.

First Aid

1. Eyes - Flush with water for at least 15 minutes.
2. Skin - Remove soaked clothes. Wash with plenty water for at least 15 minutes.
3. Inhalation - Remove to fresh air. Seek medical help immediately.
4. Ingestion - If conscious, drink large amounts of water. Do not induce vomiting. Seek prompt medical attention.
5. Refer to the Material Safety Data Sheets (MSDS) for further information.

# Appendix F
# PRWA Resolution 3945; Ordinance 1061

**RESOLUTION NO. 3945**

**A RESOLUTION ADOPTING THE WATER SHORTAGE CONTINGENCY PLAN**

WHEREAS, the California Legislature enacted Assembly Bill 11X during the 1991 Extraordinary Session of the California Legislature (an act to amend California Water Code Sections 10620, 10621, 10631, and 10652, and to add Section 10656 to the California Water Code, relating to water); and

WHEREAS, AB11X mandates that every urban water supplier providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to develop a Water Shortage Contingency Plan; and

WHEREAS, AB11X mandates that said Plan be filed with the California Department of Water Resources by January 31, 1992; and

WHEREAS, the City of Pico Rivera is an urban supplier of water providing water to more than 3,000 customers, and has therefore, prepared and circulated for public review a Draft Water Shortage Contingency Plan, in compliance with the requirements of AB11X, and a properly noticed public hearing regarding said Draft Plan was held by the City Council on December 21, 1992 and a Final Water Shortage Contingency Plan prepared;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PICO RIVERA DOES RESOLVE AS FOLLOWS:

1. The Water Shortage Contingency Plan attached hereto as Exhibit "A" and incorporated by reference as fully set forth herein is hereby adopted and ordered filed with the City Clerk;

2. The City Manager is hereby authorized and directed to file this Plan with the California Department of Water Resources;

3. The City Manager is hereby authorized at his discretion to declare that a Water Shortage Emergency and at such time implement this Water Shortage Contingency Plan;

4. The City Manager shall recommend to the City Council regarding additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources during a water shortage.

**APPROVED AND ADOPTED this 21st day of December 1992.**

John G. Chavez

**John G. Chavez, Mayor**

**ATEST:**

Christine Schaefer

**Christine Schaefer, City Clerk**

**APPROVED AS TO FORM:**

Samuel Siegel

**Samuel Siegel, City Attorney**

**AYES:** Gardner, Mercado, Natividad, Proo, Chavez
**NOES:** None
**ABSENT:** None
**ABSTAIN:** None

CITY COUNCIL | AGENDA REPORT

**To:** Mayor and City Council

**From:** City Manager

**Meeting Date:** February 9, 2010

**Subject:** WATER EFFICIENT LANDSCAPE ORDINANCE (2nd Reading)

## Recommendation:

Adopt on Second Reading, a proposed Ordinance adding Chapter 13.90, of the Pico Rivera Municipal Code relative to the Water Efficient Landscape Ordinance.

## Background:

AB 1881 amended the Landscape Act (the "Act") and mandated that all public water agencies update their local Landscape Ordinances by January 1, 2010 to be minimally compliant with the California Department of Water Resource's ("DWR") Model Ordinance. The proposed Municipal Code amendment in Chapter 13.90 applies to all new construction and rehabilitated landscapes that are public agency or developer installed projects with a total landscape area of greater than 2,500 square feet; new homeowner-installed residential projects with a landscape area of greater than 5,000 square feet; and includes certain existing and special landscaped areas.

For properties and projects that are subject to this Chapter, a licensed landscape architect must submit a "Landscape Documentation Package." The applicant shall submit to the City a Certificate of Completion prior to the City issuing a Certificate of Occupancy stating the landscaping has been completed pursuant to the approved Landscaped Documentation Package.

<u>Landscape Documentation Package</u>

This mandated process includes the following:

- Landscape Concept Plan (design statement, irrigation notes).
- Conceptual Plant Palette identifying proposed hydrozones.
- Irrigation Plan
- Planting and Soils Plan
- Water Management Plan

Landscape Design and Plan Requirements

The Ordinance recommends the use of certain native plants and trees that are selected be appropriate for the climatic, environmental, and soil conditions of the property, while also encouraging the minimal use of turf in landscaping. Where turf is called out, its use will be taken into account when determining the total amount of water to be used, AKA "Maximum Allowed Water Allowance". The Maximum Applied Water Allowance is based upon the total amount of water that will be used for landscaping and takes into account both the natural evapotranspiration rate and land area.

In addition, the proposed Ordinance requires that decorative water systems (i.e., fountains) must be recirculating and that if available, recycled-reclaimed water be used for water fixtures (excluding pools and spas).

Proposed Ordinance is at Least as Effective as the Model Ordinance

This proposed Ordinance meets the AB 1881 mandate that it be as effective as the Model Ordinance in requiring water efficient landscaping for all new projects. The proposed Ordinance was developed using ordinances from several local jurisdictions that have already adopted their own ordinances in compliance with AB 1881, which include agencies in the Chino Valley Basin and Orange County. It is projected that other agencies in the Central Basin Municipal Water District will also follow this process in adopting their ordinances.

The proposed Ordinance contains all of the provisions that are required in AB 1881 and it requires the same reports (i.e. a Soils Management Report, Irrigation Plan, and Water Management Plan, referred to as the Landscape Documentation Package) as recommended in the Model Ordinance.

Charles P. Fuentes

CPF:ARC:AD:lg

Enc.

1) Water Efficient Landscape Ordinance
2) Landscape Documentation Package worksheet

**ORDINANCE NO. 1061**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PICO RIVERA, CALIFORNIA, ADOPTING CHAPTER 90 OF TITLE 13 OF THE PICO RIVERA MUNICIPAL CODE ENTITLED "WATER EFFICIENT LANDSCAPE ORDINANCE"**

**WHEREAS,** Article X, Section 2 of the California Constitution declares that waters of the State are to be put to beneficial use, that waste, unreasonable use, or unreasonable method of use of water be prevented and that waste be conserved for the public welfare;

**WHEREAS,** the waters of the State and those from which the City of Pico Rivera (the "City") receives its water supply are of limited supply and are subject to ever increasing demands;

**WHEREAS,** the continuation of the City's economic prosperity is dependent on the availability of adequate supplies of water for future uses;

**WHEREAS,** it is the policy of the City to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;

**WHEREAS,** landscapes are essential to the quality of life in California and the City by providing areas for active and passive recreation and as an enhancement to the environment by claiming air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development;

**WHEREAS,** landscape design, installation, maintenance and management can and should be water efficient;

**WHEREAS,** pursuant to Government Code § 65594(c), the City is required to adopt a water efficient landscape ordinance that is at least as effective in conserving water as the State's Model Ordinance;

**WHEREAS,** the Ordinance includes provisions for water conservation and the appropriate use and groupings of plants that are well adapted to particular sites and to particular climatic, soil, and topographic conditions;

**WHEREAS,** the Ordinance will promote alternative landscape and irrigation methods and strategies for water conservation by encouraging use of native landscaping and responsible water management practices;

**WHEREAS,** the Ordinance provides for onsite soil assessment and soil management plans that include drainage and grading to promote healthy plant growth and to prevent excessive erosion and runoff, and the use of mulches in shrub areas, garden beds, and landscaped areas where appropriate;

**WHEREAS,** the Ordinance provides for landscape maintenance practices that foster long-term landscape water conservation;

**WHEREAS,** the Ordinance includes provisions to establish a maximum amount of water to be applied through the irrigation system;

**WHEREAS,** the Ordinance encourages the capture and retention of stormwater to improve water use efficiency or water quality;

**WHEREAS,** the Ordinance includes provisions for the use of automatic irrigation systems and irrigation schedules based upon climatic conditions, specific terrains and soil types, and other environmental conditions;

**WHEREAS,** the Ordinance promotes the use of recycled water;

**WHEREAS,** this Ordinance is at least as effective in conserving water as the model ordinance adopted pursuant to Government Code § 65595;

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PICO RIVERA DOES HEREBY ORDAIN AS FOLLOWS:**

**SECTION 1.** Chapter 13.90 is hereby established to the Pico Rivera Municipal Code to read as follows:

**13.90.010. Purpose and Intent.**

The purpose of this Water Efficient Landscape Ordinance is:

a. That this Ordinance be at least as effective in conserving water as the model ordinance adopted pursuant to Government Code § 65595;
b. To assure beneficial, efficient, and responsible use of water resources for all users within the City of Pico Rivera;
c. To retain the land's natural hydrological role and promote the infiltration of surface water into the groundwater;
d. To acknowledge that landscape water use accounts for more than 60% of all domestic water use in the City;
e. To recognize that landscapes enhance the aesthetic appearance of developments and communities;
f. To encourage the appropriate design, installation, maintenance, and management of landscapes so that water demand can be decreased, runoff can be retained, and flooding can be reduced without a decline in the quality or quantity of landscapes;
g. To preserve existing natural vegetation and the incorporation of native plants, plant communities, and ecosystems into landscape design, where possible;
h. To promote and encourage the use of low water use plants;
i. To minimize the use of cool season turf;
j. To promote the conservation of potable water by maximizing the use of recycled water and other water conserving technology for appropriate applications;

k. To promote public education about water conservation and efficient water management;
l. To reduce or eliminate water waste.

**13.90.020. Definitions.**

a. "Administrator" means the Department or person at the City who has the authority to approve a permit, plan check, and design review for a project.
b. "Amendments" means any material added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, and drainage.
c. "Anti-drain check valve" means a valve located under a sprinkler head to hold water in the system to prevent drainage from the lower elevation sprinkler heads when the system is off.
d. "Applicant" means the individual or entity submitting a Landscape Documentation Package required under this Chapter or State law, to request a permit, plan check, or design review from the City. A project applicant may be the property owner or his/her designee.
e. "Application rate" means the depth of water applied to a given area, measured in inches per minute, or inches per hour, or gallons per hour.
f. "Applied water" means the portion of water supplied by the irrigation system to the landscape.
g. "Automatic rain shut-off feature" means a system of which a component automatically suspends the irrigation system event when it rains.
h. "Backflow prevention device" means a safety device used to prevent pollution or contamination of the potable water supply due to the reverse flow of water from the irrigation system.
i. "Botanical gardens and arboretums" means a garden in which a variety of plants is grown for scientific and educational purposes.
j. "Certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited educational institution or professional trade organization.
k. "Control valve" means a device used to control the flow of water in the irrigation system. It may also mean all of the sprinklers or emitters in a line controlled by the valve.
l. "Controller" means an automatic timing device used to remotely control valves or heads to set an irrigation schedule. A weather-based controller is a controller that uses evapotranspiration or weather data. A self-adjusting irrigation controller is a controller that uses sensor data (i.e., soil moisture sensor).
m. "Developer" means a landowner or owner's agent responsible for the development of land. It does not include homeowners or landlords of single-family homes.
n. "Discretionary permit" means any permit requiring a decision making body to exercise judgment prior to its approval, conditional approval, or disapproval.
o. "Ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, and/or historic ecosystem.
p. "Estimated Applied Water Use ("EAWU")" means the portion of the Estimated Total Water Use that is derived from applied water. The Landscape Documentation Package shall contain the formula and calculation. The Estimated Water Use shall not exceed the Maximum Applied Water Allowance.

q. "Estimated total water use" ("ETWU") means the total water used for the landscape.

r. "ET Adjustment Factor" or "ETAF" is equal to the plant factor divided by the irrigation efficiency factor for a landscape project. The ETAF is calculated in the context of local reference evapotranspiration, using site-specific plant factors and irrigation efficiency factors that influence the amount of water that needs to be applied to the specific landscaped area. A combined plant mix with a site-wide average plant factor of 0.5 (indicating a moderate water need) and average irrigation efficiency of 0.71 produces an ET adjustment factor of (0.7) = (0.5/0.71), which is the standard of water use efficiency generally required by this Chapter except that the ETAF for a special landscape area shall not exceed 1.0.

s. "Hardscape" means any durable material or feature installed in or around a landscaped area, such as pavements or walls. Pools and other water features are considered part of the landscaped area and not considered hardscapes for purposes of this Chapter.

t. "High water use plants" means turfs, annuals, container plantings, and other plants recognized in the Water Classification of Landscape Species document as available from the State of California as it currently exists or may be amended in the future.

u. "Hydrozone" means a section or zone of the landscaped area having plants with similar water needs that are served by a valve or set of valves with the same schedule. A hydrozone may be irrigated or non-irrigated.

v. "Infiltration rate" means the rate of water entry into the soil expressed as a depth of water per unit of time (i.e., inches per hour).

w. "Invasive species" means non-indigenous species that adversely affect the habitats they invade economically, environmentally, or ecologically.

x. "Irrigation audit" means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

y. "Irrigation efficiency" means the measurement of the amount of water beneficially used divided by the amount of amount applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of this Chapter is 0.71.

z. "Irrigation system" means the network of piping, valves, and irrigation heads.

aa. "Landscape architect" means a person licensed to practice landscape architecture in this State pursuant to Chapter 3.5 (commencing with Section 5615) of Division 3 of the Business and Professions Code.

bb. "Landscape concept plan" means the portion of a landscape documentation package that includes a design statement, irrigation notes, planting notes, the plant palette, and conforms with the requirements of this Chapter.

cc. "Landscape construction drawings" means the portion of a landscape documentation package that includes the irrigation plan, plant and soils plan, water management plan, and conforms with the requirements of this Chapter.

dd. "Landscape documentation package" or "documentation package" means the complete packet of documents required under this Chapter to be submitted to the City. Documentation packages include the landscape concept plan and landscape construction drawings.

ee. "Local water purveyor" means any entity, including a public agency, city, county or private water company that provides retail water service.

ff. "Low head drainage" means drainage from a sprinkler that is caused by water flowing down an irrigation system from a higher level of elevation.

gg. "Low water use plants" means Mediterranean region and native trees, shrubs and groundcovers and other plants recognized as low-water-use by the Water Classification of Landscape Species document as available from the State of California as it currently exists or may be amended in the future.

hh. "Maximum Applied Water Allowance" or "MAWA" means the upper limit of annual applied water for the established landscaped area. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscaped area. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance.

ii. "Moderate water use plants" means ornamental trees, shrubs ground covers, perennials, and other plants recognized as moderate-water-use by the Water Classification of Landscape Species document as available from the State of California as it currently exists or may be amended in the future.

jj. "Mulch" means any organic material such leaves, bark, or inorganic material such as pebbles, stones, gravel, decorative sand or decomposed granite left loose and applied to the soil surface to reduce evaporation.

kk. "Operating pressure" means the pressure at which an irrigation system of sprinklers is designed by the manufacturer to operate, usually indicated at the base of a sprinkler.

ll. "Overspray" means the water that is delivered beyond the landscaped areas by the irrigation system onto pavements, walks, structures, or other non-landscaped areas.

mm. "Planting plan" means a plan submitted with the construction drawings indicating a list and quantity of plants.

nn. "Potable water" means water meant for human consumption that is treated to legal standards for human consumption.

oo. "Pressure regulator" means a device used in sprinkler systems for radius and high-pressure control.

pp. "Project net landscape area," "landscaped area," or "landscape project area" means all of the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other previous or non-pervious hardscapes, and other non-irrigated areas designated for non-development.

qq. "Rain sensor" means a system component that detects rainfall and automatically overrides the irrigation system during rain events.

rr. "Recycled water" means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource. Recycled water shall not be intended for human consumption.

ss. "Rehabilitated landscapes" means any re-landscaping project that requires a permit, plan check, or design review and meets the requirements of this Chapter.

tt. "Runoff" means water that is not absorbed by the soil or landscape to which it is applied and flows from the area.

uu. "SMART irrigation controller" means weather-based or soil moisture-based irrigation controller that monitors and uses information about the environmental conditions at a specific location and landscape to automatically adjust watering schedules.

vv. "Soil Management Plan" means a plan submitted with the construction drawings indicating results from soil tests and recommended soil amendments.

ww. "Soil test" means a test done by a soil test lab that indicates at minimum soil texture, water holding capacity, pH, and clay.

xx. "Soil type" means the classification of soil based on the percentage of its composition of sand, silt, and clay.

yy. "Special landscape area" means an area of the landscape dedicated to edible plants, areas irrigated with recycled water, and areas dedicated to active play such as parks, sports fields, golf courses, where turf provides a playing surface.

zz. "Sprinkler head" means a device that delivers water through a nozzle.

aaa. "Static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.

bbb. "Submeter" means a separate meter that is located on the private side of the water system and is plumbed to measure all water that flows only through the irrigation system intended for landscaping. The meter is to be used to monitor irrigation water use for landscaping.

ccc. "Turf" means a surface layer of earth containing mowed grass or grass-like sedge with its roots, a groundcover surface of moved grass or grass-like sedge. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tail fescue are common cool-season turf. Bermuda grass, Kikuyu grass, Seashore Paspalum, St. Augustine grass, Zoysia grass, Carex pansa, and Buffalo grass are common warm-season turf.

ddd. "Water Efficient Landscape Worksheet" means a worksheet that calculates a site's water budget.

eee. "Water feature" means any water applied to the landscape for non-irrigation, decorative purposes. Fountains, streams, ponds, lakes, and swimming pools are considered water features.

fff. "Water Management Plan" means a plan submitted with the construction drawings as part of the Landscape Documentation Package.

ggg. "Water schedules" means a schedule of irrigation times throughout a given year.

hhh. "Water-conserving Landscape Design" means a landscape design developed to conserve water.

**13.90.030. Applicability**

a. All planting, irrigation, and landscape-related improvements required by this Chapter shall apply to the following landscape projects:

1. New construction and rehabilitated landscapes for public agency projects and private development projects with a total project net landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review. A landscape area includes pools and other water features but excludes hardscape areas.

2. New construction and rehabilitated landscapes which are developer-installed residential projects with a total project net landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review. A landscape area includes pools and other water features but excludes hardscape areas.

3. New construction which are homeowner-installed residential projects with a total project net landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check, or design review. A landscape area includes pools and other water features but excludes hardscape areas.

4. Existing landscapes that are one acre or more are limited to preparing a water efficient landscape worksheet pursuant to the specifications for existing landscapes in the Landscape Documentation Package.

5. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries shall prepare a water efficient landscape worksheet, landscape and irrigation maintenance schedule, and irrigation audit, survey and water use analysis. Existing cemeteries are limited to preparing a water efficient landscape worksheet according to the specifications for existing landscapes in the Landscape Documentation Package.

6. Special Landscaped Areas, such areas dedicated to edible plants, irrigated with recycled water, or dedicated to active play, shall prepare a water efficient landscape worksheet and Landscape Documentation Package according to the specifications for Special Landscaped Areas.

b. This Chapter does not apply to:

1. Registered local, state or federal historical sites;

2. Ecological restoration projects that do not require a permanent irrigation system;

3. Mined-land reclamation projects that do not require a permanent irrigation system; or

4. Botanical gardens and arboretums open to the public.

**13.90.040. Landscape Design Criteria.**

A Landscape Documentation Package prepared by a licensed landscape architect shall include the following landscape design criteria:

a. Plant Selection and Grouping.

1. Any plant may be used in the landscape, providing the EAWU does not exceed the MAWA and that the plants must meet the specifications set forth in this subsection.
2. Plants which have similar water needs shall be grouped together in distinct hydrozones.
    i. Low and moderate water use plants can be mixed but the entire hydrozone will be classified as moderate water use for MAWA calculations.
    ii. High water use plants shall not be mixed with low or moderate water use plants.
3. Plants shall be selected appropriately based upon their adaptability to the climate, geologic, and topographical conditions of the site. Protection and preservation of existing native species and natural areas is encouraged. The planting of appropriate trees is encouraged.
4. The minimal use of turf.
    i. Turf areas shall be used wisely in response to functional needs and shall not exceed the MAWA.
    ii. Where turf is installed, the use of warm season turf is strongly encouraged.
    iii. Turf is not allowed on slopes greater than twenty-five percent where the toe of the slope is adjacent to an impermeable hardscape and where twenty-five percent means one foot of vertical elevation change for every four feet of horizontal length.
5. Fire prevention needs shall be addressed in areas that are fire prone. Design should be consistent with regulations from the Fire Department.
6. Invasive species of plants as listed by the California Invasive Plant Council should be avoided especially near parks, buffers, greenbelts, water bodies, and open spaces because of their potential to cause harm to sensitive areas.
7. Encourage the appropriate use of mulch within developed landscapes to retain moisture.
    i. Stabilizing mulching products shall be used on slopes greater than 3:1.
    ii. A minimum layer of two inches (2") of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping groundcovers or areas where mulch is not advisable. The plans shall identify the type of mulch and application depth.

b. Water Features.

1. Recirculating water systems shall be used for decorative water features.
2. Where available, recycled water shall be used as the source for water fixtures (excluding swimming pools and spas).
3. The surface area of a water feature will be included in the MAWA calculation with the evaporation rate.

**13.90.050. Irrigation Requirements.**

a. All irrigation systems shall be designed to prevent runoff, over-spray, low head drainage and other similar conditions. Soil types and infiltration rates shall be considered when

designing irrigation systems. Irrigation systems shall be designed, constructed, managed, and maintained to achieve as high an overall efficiency as possible.

b. Dedicated and separate landscape water meters shall be installed for all projects greater than 5,000 square feet, except for single-family residences. Dedicated landscape water meters are highly recommended on landscape areas less than 5,000 square feet to facilitate water management.

c. All irrigation systems shall include:
    1. A SMART irrigation controller, or other equivalent technology which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions, shall be required. The planting areas shall be grouped and irrigated in relation to hydrozones based on similarity of water requirements.
    2. Anti-drain check valves shall be installed to prevent low-head drainage in sprinkler heads.
    3. A pressure regulator when the static pressure exceeds the maximum recommended operating pressure of the irrigation system.
    4. A rain sensor with an automatic rain shut-off feature shall be required.
    5. A backflow prevention device.
    6. Connection to reclaimed water system if subject property is located within 150 feet of a public reclaimed water distribution system, and subject to appropriate health standards.
    7. Installation that conforms to the current Uniform Plumbing Code.
    8. Irrigation shall comply with the City's water conservation regulations in Chapter 13.70 of this Code.

**13.90.060. Soil and Grading Requirements.**

a. Soil testing shall be performed after mass grading if applicable, prior to landscape installation to ensure the selection of appropriate plant material that is suitable for the site, and reported in a soil management plan. The soil management plan shall include:
    1. Determination of soil texture, indicating the available water holding capacity.
    2. An approximate soil infiltration rate measure or derived from soil texture/infiltration rate tables. A range of infiltration rates shall be noted where appropriate.
    3. Measure of pH and total soluble salts.
    4. Recommended amendments.

b. Grading on-site shall be designed to minimize unnecessary soil compaction, erosion and water waste. Grading plans must satisfy all other applicable laws related to grading and be submitted as part of the landscape documentation package.

c. Where slopes exceed ten percent, a grading plan drawn at the same scale as the planting plan that accurately and clearly identifies finished grades, drainage patterns, pad elevations, spot elevations, and stormwater retention improvements.

**Section 13.90.070. Submittal Requirements.**

Applicants subject to the requirements of this Chapter shall submit a complete Landscape Documentation Package to the Administrator. The Package may be submitted in two parts: A Landscape Concept Plan, which is submitted with an application for a zoning approval or similar approval and Landscape Construction Drawings, submitted with the plan check or building permit application. All applications and plans shall conform to the design criteria, irrigation, soils and grading requirements, recycled water requirements and water budget requirements set forth in this Chapter.

a. The Landscape Concept Plan shall include:
    1. Design statement, irrigation notes, planting notes, and a conceptual plant palette identification of proposed hydrozones.
    2. MAWA circulation for the landscape project area (including water features).
    3. ETWU calculation for the landscape project area.
    4. Hydrozone information.

b. The Landscape Construction Drawings shall include:
    1. Compliance with the design standards and specifications contained in this Chapter.
    2. Compliance with the Landscape Concept Plan. If the construction drawings differ from the Landscape Concept Plan, the Applicant may be required to submit a revised Landscape Concept Plan.
    3. An Irrigation Plan. The Irrigation Plan shall be a separate document from the planting plan. The Irrigation Plan shall be prepared pursuant to the requirements in this Chapter and include pressure calculations and the location, installation details, and specifications of control valves, irrigation heads, piping, irrigation controllers, and power supply.
    4. A Planting Plan & Soils Plan which shall include, but not be limited to:
        i. A description of any existing plant material to be retained or removed.
        ii. A plan showing the planting areas and hydrozones, plant spacing, plant location, and size, natural features, water features and all paved areas.
        iii. A legend listing the common and botanical plant names and total quantities by container size and species.
        iv. A description of the seed mixes with application rates and relevant germination specifications.
        v. Soil management plan, including the soil test results and recommendations.
        vi. The grading plan shall be submitted for reference.
    5. A Water Management Plan which shall include, but not be limited to:
        i. An introduction and statement of site conditions as described in this Section or in the Landscape Concept Plan.
        ii. An introduction and statement of site conditions as described in this Section or a Landscape Concept Plan.
        iii. Identification of the party or parties responsible for implementation of the Water Management Plan.

iv. The anticipated water requirements in inches per year, and water budget for the various hydrozones identified in the Landscape Concept Plan to include calculations demonstrating an overall water budget that requires no more irrigation than the 0.7 of the ET adjustment factor.

v. A description of the water delivery systems, including the type of irrigation system to be used; water conservation methods to be applied; and precipitation rates for each hydrozone.

vi. Season irrigation water schedules or procedures for programming of proposed SMART controllers.

vii. A maintenance plan for the ongoing operation and maintenance of the irrigation system.

viii. All applications for model homes shall include the nature of public information documents and signage that will be placed at model homes describing water conservation principles used in the landscaping for the model home.

c. An applicant submitting a Landscape Documentation Project shall include with the documentation package any fees established by the City to cover the City's cost to review an submitted documents.

**Section 13.90.080. Compliance and Enforcement.**

The Community and Economic Development Department shall have the duty and authority to administer the provisions of this Chapter until such time the Certificate of Completion is completed. The Public Works Department shall work with the Community and Economic Development Department to ensure compliance with other provisions in this Code and with State law regarding the conservation of water. The Public Works Department shall also have the duty and authority to administer the provisions of this Chapter for any property that has had its Certificate of Completion certified.

a. A project must proceed with the following review and approval process:

1. Prior to the issuance of a building permit, a complete Landscape Documentation Package prepared by an independent licensed landscape architect shall be submitted to the Administrator for review and approval. The licensed landscape architect shall ensure that all components of the package adhere to the requirements of this Chapter. Any documentation packages submitted without the signature of a licensed landscape architect shall not be accepted for review.

2. Prior to issuance of a Certificate of Occupancy or final inspection for a project subject to this Chapter, a Certificate of Completion shall be submitted to the Administrator certifying that the landscaping has been completed in accordance with the approved Planting and Irrigation Plans for the project. The Certificate of Completion shall be signed by a licensed landscape architect and shall indicate the following:

i. The landscaping has been installed in conformance with the approved Planting and Irrigation Plans;

ii. The SMART irrigation controller has been set according to the irrigation schedule;
iii. The irrigation system has been adjusted to maximize irrigation efficiency and eliminate over-spray and run-off; and
iv. A copy of the irrigation schedule has been given to the property owner.

3. Upon receipt of a Certificate of Completion, the City shall either approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the City shall not be obligated to issue an occupancy permit and will provide information to the project applicant regarding necessary corrections, appeal, or other assistance.

4. Upon notice of the Applicant, the Administrator shall have the right to enter the project site to conduct inspections for the purpose of enforcing this Chapter, before, during, and immediately after installation of the landscaping.

5. A copy of the completed Landscape Documentation Package shall be given to the Planning Division and Public Works Department. If the property is found to be in excess of their established MAWA, the property shall be subject to an irrigation audit.

b. Irrigation of all landscaped areas shall be conducted in a manner conforming to the rules and requirements, and shall be subject to penalties and incentives for water conservation and water waste prevention as determined and implemented by the local water purveyor or as mutually agreed by local water purveyor and the City. The City Public Works Department may require mandatory irrigation audits at the property owners' expense to demonstrate that the landscaping conforms to the MAWA.

c. An irrigation audit shall proceed as follows:

1. The applicant shall submit an irrigation audit to the City upon the Public Works Department's request pursuant to this Chapter.
2. In the event that the applicant does not submit an irrigation audit to the City within sixty days after the Public Works Department has requested an irrigation audit be submitted, the Public Works Department may conduct an irrigation audit and charge the property owner any and all fees associated with the irrigation audit.

d. In addition to any other remedies provided for in the Code, any violation of this Chapter and failure to comply with the terms of the Landscape Documentation Package and Certificate of Completion submitted to the City pursuant to this Code may be enforced by a civil action brought by the City.

1. In any such action, the City may seek, and the Court may grant, as appropriate, any or all of the following remedies:

i. A temporary and/or permanent injunction;

ii. An assessment of the violator for the costs of any investigation which led to the establishment of the violation and for the reasonable costs of preparing and bringing legal action under this Chapter;
iii. Any other costs incurred in enforcing the provisions of this Chapter;
iv. Any other action the City deems appropriate to protect the general welfare and the City's water supplies, and to reduce water consumption in accordance with this Chapter and with the declares policies and law of the State.

2. Assessments under this Section shall be paid to the City to be used exclusively for costs associated with implementing or enforcing this Chapter.

e. In addition to any other remedies provided for in this Chapter, any violation of this Chapter shall constitute a misdemeanor and be punishable by a fine of not more than five hundred dollars or a term in County jail not to exceed six months. A violation may also be an infraction punishable by a fine not to exceed two hundred fifty dollars. Any person shall be deemed guilty of a separate offense for each and every day during any portion of which any violation of this Chapter is committed, continued, or permitted by such person.

**Section 13.90.090. Landscape and Irrigation Maintenance.**

Landscape and irrigation improvements required by this ordinance shall be continually maintained in optimal conditions at all times. Maintenance shall include but not be limited to:

1. Fertilizing;
2. Irrigation head adjustments, repairs and replacements, per original approval;
3. Maintaining adequate water pressure;
4. Pruning and weeding all landscaping within the property;
5. Removing all dead plant material;
6. Replacing all dead plant material, per original approval;
7. Replenishing mulch;
8. Resetting, repairing or replacing the SMART automatic controller, per original approval;
9. Valve adjustments , repairs and replacements, per original approval.

**Section 13.90.100. Recycled Water.**

a. The installation of recycled water irrigation systems (i.e. dual distribution systems) shall be required to allow for the current and future use of recycled water, unless a written exemption by the City's Public Works Department has been granted stating that recycled water will not be available in the foreseeable future.

b. Irrigation systems shall make use of recycled water unless a written exemption has been granted by the Public Works Department stating that recycled water meeting all public health codes and standards is not available and will not be available in the foreseeable future or where the physical constraints or functional difficulties would make the use of recycled water irrigation systems impracticable.

c. The Public Works Department may grant an exemption from the use of recycled water if the use of recycled water would not meet all relevant public health codes and standards, if the use of recycled water would not be available in the foreseeable future through the local water purveyor, or where the physical constraints or functional difficulties would make the use of recycled water systems impracticable.

d. The recycled water irrigation systems shall be designed in accordance with all local agency and State Codes.

**Section 13.90.110. Stormwater Management.**

a. Stormwater management combines practices to minimize runoff and water waste to recharge groundwater, and to improve water quality. Implementing stormwater best management practices into the landscape, irrigation, and grading design plans to minimize runoff, and increase retention and infiltration are highly recommended onsite.

b. Project applicants shall refer to the City or Regional Water Quality Control Board for information addressing stormwater ordinances and stormwater management plans.

**Section 13.90.120. Existing Landscapes.**

a. Irrigation of all landscaped areas shall be conducted in a manner conforming to the rules and requirements and shall be subject to penalties and incentives for water conservation and water waste prevention, as determined and implemented by the local water purveyor and as may be mutually agreed by the City.

   The City and/or the regional or local water purveyor may administer programs such as irrigation water use analyses, irrigation surveys and/or irrigation audits, tiered water rate structures, water budgeting by parcel, or other approaches to achieve landscape water use efficiency community-wide to a level equivalent to or less than would be achieved by applying a MAWA calculated with an ETAF of 0.8 to all landscaped areas in the City over one acre in size.

b. The architectural guidelines of a common interest development, including apartments, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

**Section 13.90.130. Recovery of Costs.**

a. The City Manager or his or her designee shall serve an invoice for costs upon the person or responsible person who is subject to a notice of a violation, a cease and desist order, or an administrative compliance order. An invoice for costs shall be immediately due and payable to the City. If any person or responsible person fails to either pay the invoice for costs or appeal successfully the invoice for costs in accordance to the provisions in this Chapter, then the City may institute collection proceedings. The invoice for costs may include reasonable attorneys' fees.

The City shall impose any other penalties or regulatory fees, as fixed from time to time by resolution of the City Council, for a violation or enforcement of this Chapter.

b. In addition to the costs which may be recovered pursuant to the Code, an in order to recover the costs of the water efficient landscape regulatory program set forth in this Chapter, the City Council may from time to time, fix and impose by resolution fees and charges. The fees and charges may include, but are not limited to, fees and charges for:

1. Any visits of any enforcement officer, or any other City staff or authorized representative of the City for time incurred for inspections of the property;
2. Any monitoring, inspection, and surveillance procedures pertaining to enforcement of this Chapter;
3. Any audits conducted by the City pursuant to this Chapter;
4. Enforcing compliance with any term or provision of this Chapter;
5. Any other necessary and appropriate fees and charges to recover the cost of providing the City's water efficient landscape regulatory program.

**Section 13.90.140. Appeals.**

a. The applicant or any affected person may appeal the final decision of staff regarding any approvals required under this Chapter by filing a written notice of appeal to the City Council within ten business days after the date of the final decision in writing.

b. An appeal, established by the City, shall be required for each appeal under this Section. No appeal shall be placed on the agenda of any meeting of the City Council until such fee has been paid.

**SECTION 2.** The City Council hereby declares that it would have passed this ordinance sentence by sentence, paragraph by paragraph, and section by section, and does hereby declare that the provisions of this ordinance are severable and, if for any reason any sentence, paragraph, or section of this ordinance shall be held invalid, such decision will not affect the validity of the remaining parts of this ordinance.

**SECTION 3.** The City Council hereby determines that this Ordinance is exempt from review under the California Environmental Quality Act ("CEQA ") (California Public Resources Code Section 21000 et seq.), because pursuant to State CEQA Regulation 15307 (14 Cal. Code Regs., § 15307), this Ordinance is covered by the CEQA Categorical Exemption for actions taken to assure the maintenance, restoration, enhancement, or protection of a natural resource where the regulatory process involves procedures for protection of the environment. The adoption of this Ordinance will result in the enhancement and protection of water resources in the City, and will not result in cumulative adverse environment impacts. It is therefore exempt from the provisions of CEQA. The City Council hereby directs the City Manager or designee to prepare and file a Notice of Exemption as soon as possible following adoption of this Ordinance.

**SECTION 4.** The City Clerk shall certify to the adoption of this Ordinance. The City Council hereby finds and determines that there are no newspapers of general circulation both published and circulated within the City and, in compliance with Section 36933 of the

Government Code directs the City Clerk to cause said Ordinance, within fifteen (15) days after its passage, to be posted in at least five (5) public places within the City. This Ordinance shall take effect thirty (30) days after its adoption.

**ADOPTED AND APPROVED this 9th, day of February, 2010.**

**Gregory Salcido, Mayor**

**ATTEST:**

**Daryl A. Betancur, City Clerk**

**APPROVED AS TO FORM:**

**Arnold M. Alvarez-Glasman, City Attorney**

| | |
|---|---|
| **AYES:** | Archuleta, Armenta, Camacho, Salcido |
| **NOES:** | None |
| **ABSENT:** | None |
| **ABSTAIN:** | None |

# WATER EFFICIENT LANDSCAPE WORKSHEET

Please complete the entire worksheet as it is part of the Landscape Documentation Package that is required to be submitted pursuant to Chapter 13.90 of the Pico Rivera Municipal Code.

## SECTION A. PROJECT INFORMATION

Date: _____

Project Name: _____

Project Applicant: _____

Project Address and Location:

| | |
|---|---|
| Street Address | Parcel Number |
| City | Tract or Lot Number(s) |
| State | Zip Code |

Please use the checklist below to indicate the completion of the Landscape Documentation Package.

## SECTION B. PROJECT INFORMATION AND CHECKLIST

**Landscape Documentation Package**

- ☐ Water Efficient Landscape Worksheet
- ☐ Soil Management Plan
- ☐ Landscape Design Plan
- ☐ Irrigation Design Plan
- ☐ Planting and Soils Plan
- ☐ Grading Design Plan

Please fill in the information to describe the landscape project, where applicable:

Total Project Area: _____

Total Irrigated Landscape Area: _____

Turf Area: _____

Non-Turf Area: _____

Recreational Areas: _____

Areas permanently and solely dedicated to edible plants: _____

Total Non-Irrigated Landscape Area: _____

Total Special Landscape Area: _____

**Water Supply Type:**

- ☐ Potable Water
- ☐ Recycled Water
- ☐ Graywater
- ☐ Groundwater or Well Water
- ☐ Mixed Use
- ☐ Other _____

**Project Type:** Please check only one

- ☐ Public or community facility
- ☐ Commercial
- ☐ Industrial
- ☐ Institutional (i.e., school)
- ☐ Other_____
- ☐ Single Family Residence
- ☐ Multi-Family Residential
- ☐ Mixed Use

**Project Contacts** – The project applicant and other individuals may receive inquiries or notifications of all proceedings regarding the Water Efficient Landscape Worksheet from the City. Please provide the name, address, email address, and telephone, etc. of each person to receive such inquiries and notifications.

1. **Project Applicant**

| Name | Telephone and Fax Number | |
|---|---|---|
| Title | Email address | |
| Company | Street Address | |
| City | State | Zip Code |

## 2. Property Owner

| | | |
|---|---|---|
| Name | Telephone and Fax Number | |
| Title | Email address | |
| Company | Street Address | |
| City | State | Zip Code |

## 3. Licensed Landscape Architect

| | | |
|---|---|---|
| Name | Telephone and Fax Number | |
| Title | Email address | |
| Company | Street Address | |
| City | State | Zip Code |

## 4. Certified Irrigation Designer

| | | |
|---|---|---|
| Name | Telephone and Fax Number | |
| Title | Email address | |
| License # | Business License # | |
| Company | Street Address | |
| City | State | Zip Code |

## 5. Landscape Installation Contractor

| | | |
|---|---|---|
| Name | Telephone and Fax Number | |
| Title | Email address | |
| State License # | Business License # | |
| Company | Street Address | |
| City | State | Zip Code |

## 6. Landscape Maintenance Contractor

| | | |
|---|---|---|
| Name | Telephone and Fax Number | |
| Title | Email address | |
| State License # | Business License # | |
| Company | Street Address | |
| City | State | Zip Code |

7. **Local retail water purveyor**

| | | |
|---|---|---|
| Name of contact at water purveyor | Telephone No. | |
| Title | Fax No. | |
| Name of Company or Water Purveyor | Street Address | |
| City | State | Zip Code |

## SECTION C. WATER USE EFFICIENCY STATEMENT

Provide a narrative summary of the water use efficiency practices applied to the landscape project and answer all of the following questions (attach additional sheets if necessary):

Narrative Statement: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(1) Did you review Chapter 13.90 of the Pico Rivera Municipal Code to learn about the criteria and specifications for landscape design plans? _____

(2) Did you coordinate with the City or local water purveyor on the landscape plan? _____

_____

(3) Which criteria and specifications did you apply to the landscape design plan? _____

_____

_____

_____

_____

_____

(4) Did you review Chapter 13.90 to learn about the criteria and specifications for the irrigation design plan? _____

(5) Did you coordinate with the City or local water purveyor on the irrigation design plan? __

_____

_____

_____

(6) Which criteria and specifications did you apply to your irrigation design plan? _____

_____

_____

_____

_____

_____

_____

(7) Did you ask for assistance from the City or local water purveyor to calculate a project water budget? _____

_____

_____

(8) Did you receive any water efficient landscape publications from the City or local water purveyor, and if so, which ones? _____

_____

_____

_____

(9) How did you assure the overall quality of the irrigation system? _____

_____

_____

_____

_____

_____

_____

(10) How will you manage the irrigation system for optimum operation and performance? ____

_____

_____

_____

_____

_____

(11) How will you manage the irrigation system to respond to the changing requirements for water in the landscape? _____

_____

_____

_____

_____

_____

(12) Did you apply any stormwater best management practices to the design, and if so, which ones? _____

_____

_____

_____

(13) If recycled water was available, did you design and install a dual distribution system? ___

_____

_____

## SECTION D. MAXIMUM APPLIED WATER ALLOWANCE

(1) MAWA = (ETo)(0.62)[0.7 x LA) + (0.3 x SLA)

Where:

| | |
|---|---|
| MAWA = | Maximum Applied Water Allowance (gallons per year) |
| ETo = | Reference Evapotranspiration |
| 0.7 = | ET Adjustment Factor (ETAF) |
| LA = | Landscaped Area includes Special Landscape Area (square feet) |
| 0.62 = | Conversion factor (to gallons per square feet) |
| SLA = | Portion of the landscape area identified as Special Landscape Area |
| 0.3 = | Additional ET Adjustment Factor for Special Landscape Area |

(2) Example MAWA calculation: A hypothetical landscape project in Pico Rivera, CA with an irrigated area of 50,000 square feet without any Special Landscape Area (SLA = 0, no edible plants or recreational areas or use of recycled water). To calculate MAWA, the annual (ETo) value for Pico Rivera is 39.7.

To convert from gallons per year to hundred-cubic-feet per year: 100 cubic feet = 748 gallons.

(3) Show calculations:

MAWA for Total Landscape Area: _____ gallons

## SECTION E. ESTIMATED WATER USE FOR HYDROZONES AND ESTIMATED TOTAL WATER USE

### Estimated Total Water Use

Estimated Total Water Use shall be calculated using the equation below. Estimate Total Water Use shall not exceed MAWA.

ETWU = (Eto)(0.62)((PF x HA)/(IE) + SA)

| | |
|---|---|
| ETWU = | Estimated total water use per year (gallons) |
| ETo = | Reference Evapotranspiration (inches) |
| PF = | Plant Factor[1] |
| HA = | Hydrozone Area (high, medium, and low water use areas) (square feet) |
| SLA = | Special Landscape Area (square feet) |
| 0.62 = | Conversion Factor |
| IE = | Irrigation Efficiency (minimum 0.71) |

Attach calculations for each hydrozone.

Estimated Total Water Use: _____

## SECTION F. HYDROZONE INFORMATION

### Section F(i). Hydrozone Map

(1) Attach a hydrozone map to the Water Efficient Landscape Worksheet. Hydrozones shall be designed by number, letter or other designation. Designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Hydrozone Table. This map can also assist with inspections of the irrigation system and programming the controller.

---

[1] The plant factor shall be from the Water Use Classification of Landscape Species (WUCOLS) published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation 2000, which are as follows:

i. Low water use plants = 0 to 0.3
ii. Moderate water use plants = 0.4 to 0.6
iii. High water use plants = 0.7 to 1.0

**Section F(ii). Hydrozone Table**

(2) Hydrozone Table

| Controller # | Valve Circuit | Plant Types[2] | Irrigation Method**[3] | Area (square feet) | % Landscape Area |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |

[2] Plant type may include: cool season turf, warm season turf, high water use plants, moderate water use plants, or low water use plants.

[3] Irrigation method may include spray, rotor, bubbler, or drip.

**Section F(iii). Hydrozone Calculation Summary.**

| Hydrozone | Total Square Feet | % of Total Landscape Area |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**SIGNATURES**

I further acknowledge and agree under penalty of perjury under the laws of the State of California that the information contained in this Water Efficient Landscape Worksheet is true and correct.

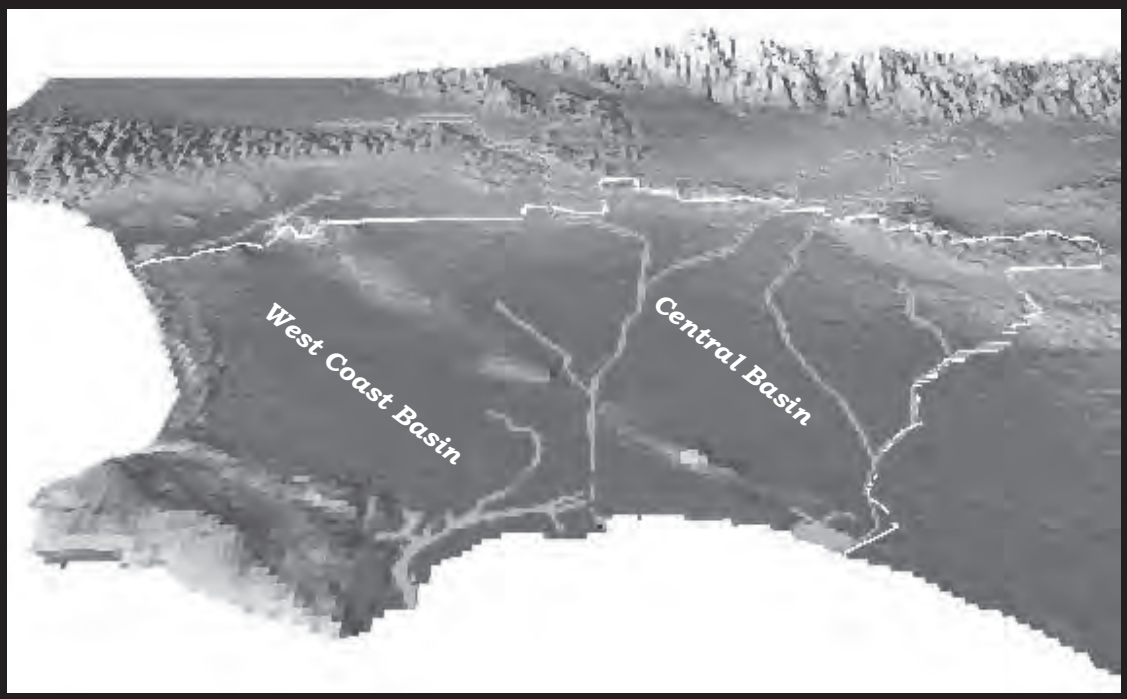
_____ _____

Project Applicant (Owner or Authorized Agent) Date

_____ _____

Licensed Landscape Architect Date

# Appendix G
# WRD Engineering Survey Report 2011




# Engineering Survey and Report

# 2011

WRD

*March 4, 2011*

# Water Replenishment District
# Of Southern California

# ENGINEERING SURVEY AND REPORT, 2011

| BOARD OF DIRECTORS | MANAGEMENT |
|---|---|
| **Division 1** | **General Manager** |
| Willard H. Murray, Jr., Vice President | Robb Whitaker |
| **Division 2** | **Chief Engineer** |
| Robert Katherman, Secretary | Vacant |
| **Division 3** | **Chief Hydrogeologist** |
| Lillian Kawasaki, Director | Theodore Johnson |
| **Division 4** | **Chief Financial Officer** |
| Sergio Calderon, President | Scott Ota |
| **Division 5** | **Manager of External Affairs** |
| Albert Robles, Treasurer | Elsa Lopez |
| **District Counsel** | **Manager of Finance and Administration** |
| Francisco Leal | Jenna Shaunessy |

## Professional Certification

This Engineering Survey and Report has been prepared under the direct supervision of the California Professional Geologist whose signature appears below. This individual certifies that the information contained in the report has been prepared in accordance with the generally accepted principles and practices of his profession.

(signature to be provided on revised ESR following Board adoption of Replenishment Assessment in May)

_____

Theodore A. Johnson, PG 6142, CHG 240

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# GLOSSARY OF ACRONYMS

| | |
|---|---|
| ABP | Alamitos Barrier Project |
| AF | Acre-Feet (equivalent to 325,851 gallons) |
| AFY | Acre-Feet per Year |
| APA | Allowed Pumping Allocation |
| | |
| CB | Central Basin |
| CBMWD | Central Basin Municipal Water District |
| CDPH | California Department of Public Health (formerly California Department of Health Services) |
| CEC | Chemicals of Emerging Concern |
| CEQA | California Environmental Quality Act |
| CHG | Certified Hydrogeologist |
| CIP | Capital Improvement Program |
| CPI | Consumer Price Index |
| CWCB | Central and West Coast Basins |
| | |
| DGBP | Dominguez Gap Barrier Project |
| DPH | California Department of Public Health |
| DTSC | California Department of Toxic Substances Control |
| DWR | State Department of Water Resources |
| | |
| EIR | Environmental Impact Report |
| EPA | U.S. Environmental Protection Agency |
| ESR | Engineering Survey and Report |
| | |
| FY | Fiscal Year (July 1 – June 30) |
| | |
| GAC | Granular Activated Carbon |
| GIS | Geographic Information System |
| | |
| IRWMP | Integrated Regional Water Management Plan |
| | |
| LACDHS | Los Angeles County Department of Health Services |
| LACDPW | Los Angeles County Department of Public Works (Flood Control) |
| LADWP | Los Angeles Department of Water and Power |
| LBWD | Long Beach Water Department |
| | |
| MAR | Managed Aquifer Recharge |
| Met | Metropolitan Water District of Southern California |
| MCL | Maximum Contaminant Level |
| MF | Microfiltration |
| MFI | Modified Fouling Index |
| mgd | Million Gallons per Day |
| MOU | Memorandum of Understanding |

# GLOSSARY OF ACRONYMS (continued)

| | |
|---|---|
| msl | Mean Sea Level |
| MWD | Metropolitan Water District of Southern California |
| NDMA | N-Nitrosodimethylamine |
| O&M | Operations and Maintenance |
| PG | Professional Geologist |
| ppb | Parts Per Billion (µg/L) |
| ppm | Parts Per Million (mg/L) |
| PRC | Program Review Committee |
| PWRP | Pomona Water Reclamation Plant |
| RA | Replenishment Assessment |
| RO | Reverse Osmosis |
| RTS | Readiness-to-Serve |
| RWQCB | Regional Water Quality Control Board (Los Angeles Region) |
| SAT | Soil Aquifer Treatment |
| SDLAC | Sanitation Districts of Los Angeles County |
| SDWP | Safe Drinking Water Program |
| SGVMWD | San Gabriel Valley Municipal Water District |
| SJCWRP | San Jose Creek Water Reclamation Plant |
| TAC | Technical Advisory Committee |
| TITP | Terminal Island Treatment Plant |
| USGS | United States Geological Survey |
| USGVMWD | Upper San Gabriel Valley Municipal Water District |
| UV | Ultraviolet Light Treatment |
| VOC | Volatile Organic Compound |
| WAS | Water Augmentation Study |
| WBMWD | West Basin Municipal Water District |
| WCB | West Coast Basin |
| WCBBP | West Coast Basin Barrier Project |
| WIN | Water Independence Network |
| WNWRP | Whittier Narrows Water Reclamation Plant |
| WRD | Water Replenishment District of Southern California |
| WRP | Water Reclamation Plant |
| WY | Water Year (October 1 – September 30) |

# BOARD SUMMARY

District Staff is pleased to present the 2011 Engineering Survey and Report ("ESR"). It was prepared pursuant to the California Water Code, Section 60300 et seq. and determines the past, current, and ensuing year groundwater conditions in the Central and West Coast Basins ("CWCB"). The report contains information on groundwater production, annual and accumulated overdraft, water levels, quantity, source, and cost of replenishment water, and a discussion of necessary projects and programs to protect and preserve the groundwater resources of the basins.

The ESR provides the Board of Directors with the necessary information to justify the setting of a replenishment assessment ("RA") for the ensuing fiscal year (July 1 – June 30) to purchase replenishment water and to fund projects and programs related to groundwater replenishment and groundwater quality over the water year (October 1 – September 30).

The following is a summary of information presented in the ESR:

**1. <u>Groundwater Production</u>**

- Adjudicated Amount: 281,835 AF
- Previous Water Year: 241,329 AF
- Current Water Year: 241,000 AF (est)
- Ensuing Water Year: 243,000 AF (est)

**2. <u>Annual Overdraft</u>**

- Previous Water Year: 84,200 AF
- Current Water Year: 80,800 AF (est)
- Ensuing Water Year: 97,800 AF (est)

**3. <u>Accumulated Overdraft</u>**

- Previous Water Year: 726,300 AF
- Current Water Year: 703,600 AF (est)

**4. <u>Groundwater Levels</u>**

Groundwater levels are an indication of the amount of water in the basins. They indicate areas of recharge and discharge and reveal which way the groundwater is moving. Groundwater levels are used to determine when additional replenishment water is required and are used to calculate storage changes. The groundwater levels can also indicate possible source areas for saltwater intrusion and can show the effectiveness of the seawater barrier injection wells along the coast.

WRD staff tracks groundwater levels throughout the year by measuring the depth to water in production wells and monitoring wells. **Plate 3** shows changes in groundwater levels in the CWCB over the previous water year 2009/2010. Because of the storm water captured and purchase of untreated Tier 1 replenishment water by WRD, the Montebello Forebay area experienced a rise of up to 10 feet in some areas and the average increase was about 5 feet. This increase partially but not completely offset the losses incurred in storage over the past 10 years where mostly dry conditions prevailed. Parts of the Lakewood and Long Beach areas saw declines of up to 5 feet. The remainder of the CB was generally unchanged with the exception of a small area near Cerritos which saw an increase of nearly 15 feet. The West Coast Basin was less impacted because the inflows generally matched the outflows in the western and southern parts of the basin, with increases of 5 feet or less observed. But in the northeastern area around Gardena, a decline of nearly 10 feet was observed.

Based on the groundwater levels observed over various areas of the Central and West Coast Basins and the anticipated replenishment activities by WRD, the District anticipates having sufficient supplies of safe and reliable groundwater to meet the demands of the pumpers in the ensuing year.

**5. <u>Quantity Required for Replenishment</u>**

Chapter IV details the quantity of water that WRD must purchase in the ensuing water year to help offset the annual overdraft. A summary is listed below:

- Spreading Water: 71,000 AF (50,000 recycled; 21,000 imported)
- Seawater Barrier Water: 31,600 AF (14,800 AF recycled; 16,800 imported)
- In-Lieu Program Water: 10,303 AF
- Total Water: 112,903 AF

**6. <u>Source of Replenishment Water</u>**

The sources of replenishment water to the District for the ensuing water year are detailed in Chapter IV. Seasonal spreading water from MWD has not been available since May 2007 and is not anticipated to be available in the ensuing year. Therefore, like last year WRD is planning for untreated Tier 1 imported water for spreading. The In-Lieu water is not currently available from MWD but is being budgeted for in case it becomes available. If it does not, the collected monies will be placed in a water purchase reserve for replenishment water purchases at a later time. A summary of the sources of replenishment water is as follows:

- <u>Recycled Water:</u> Spreading water from the Sanitation Districts of Los Angeles County (SDLAC). West Coast Basin Barrier Project (WCBBP) water from the West Basin Municipal Water District's Edward C. Little Water Treatment Facility. Dominguez Gap Barrier Project (DGBP) water from the City of Los Angeles Terminal Island Treatment Plant. Alamitos Barrier Project (ABP) water from WRD's Leo J. Vander Lans Facility.

- Imported Water: Spreading water from Central Basin Municipal Water District or other MWD member agencies. WCBBP water and DGBP water from West Basin Municipal Water District. ABP water from the City of Long Beach.

## 7. Cost of Replenishment Water

WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

MWD in 2010 established a two-year budget with an anticipated price increase of around 7% for their water. MWD-member agencies such as CBMWD, WBMWD, and Long Beach have not yet set their rates so WRD does not know what their surcharges on the MWD water will be at this time. Over the next couple months, this information will become available and WRD will adjust its water cost estimates prior to adopting its replenishment assessment in May 2011.

Using currently available information and estimates for the cost of replenishment water to WRD in the ensuing year, the 112,903 AF required for purchase will cost approximately $42,156,493. This includes $16,100,428 for the spreading grounds, $22,356,257 for the seawater barrier injection wells, and $3,699,808 for In-Lieu water. **Tables 1 and 2** provide a detailed breakdown of these costs.

These estimated costs are for anticipated water purchases only in the ensuing year for normal WRD operations. They do not include possible makeup water purchases to help overcome the Optimum Quantity deficit as discussed on page 2 of Chapter IV. Nor do they include the additional costs for projects and programs required to replenish the basins and to protect groundwater quality. These projects and programs are discussed in the Chapter V. The anticipated costs for any makeup water and for the projects and programs to protect and preserve groundwater supplies in the District will be presented during the District's annual budgeting and rate setting process that will culminate in the Board's adoption of the 2011/2012 Replenishment Assessment in May 2011 effective July 1, 2011.

## 8. Projects and Programs

A list of the WRD projects and programs related to groundwater replenishment and the protection and preservation of water quality is shown on **Table 3**. Funds are required to finance these projects and programs. Sections 60221 and 60230 of the Water Replenishment District Act authorize the WRD to undertake a wide range of capital projects and other programs aimed at enhancing groundwater replenishment. Section 60224 of the Water Replenishment District Act states that WRD may establish projects or programs that will directly or indirectly preserve and protect the groundwater supplies within its boundaries.

These projects and programs address any existing or potential problems related to the basin's groundwater, and may extend beyond the District's boundaries if the threat of contamination is outside those boundaries. The programs span all phases of planning, design, and construction and are financed by the collection of a replenishment assessment. A more detailed description of each project and program is presented in Chapter V of the report.

## 9. Conclusions

Based upon the information presented in the ESR, a replenishment assessment is necessary in the ensuing year to purchase replenishment water for managed aquifer recharge to help make up the annual overdraft and to finance projects and programs to perform replenishment and water quality activities. These actions will ensure sufficient supplies of high quality groundwater within the District for the benefit of the residents and businesses in the Central and West Coast Basins.

# CHAPTER I
# INTRODUCTION

## Purpose of the Engineering Survey & Report

To facilitate the Board of Directors' decisions and actions, the Water Replenishment District Act requires that an engineering survey and report ("ESR") be prepared each year. This *Engineering Survey and Report 2011* is in conformity with the requirements of Section 60300 et seq. Water Replenishment District Act and presents the necessary information on which the Board of Directors can declare whether funds shall be raised to purchase water for replenishment during the ensuing year, as well as to finance projects and programs aimed at accomplishing groundwater replenishment. With the information in this ESR, the Board can also declare whether funds shall be collected to remove contaminants from the groundwater supplies or to exercise any other power under Section 60224 of the California Water Code. The information presented in this report along with the District's strategic planning and budget preparation presents the necessary information on which the Board of Directors can base the establishment of a replenishment assessment for the ensuing year 2011/2012.

## Scope of Engineering Survey & Report

This report contains specific information outlined in Chapter I, Part 6 of Division 18 of the Water Code (the Water Replenishment District Act, § 60300 and § 60301). The following is a brief description of the contents of this report:

1) *a discussion of groundwater production within the District (Chapter II);*
2) *an evaluation of groundwater conditions within the District, including estimates of the annual overdraft, the accumulated overdraft, changes in water levels, and the effects of water level fluctuations on the groundwater resources (Chapter III);*
3) *an appraisal of the quantity, availability, and cost of replenishment water required for the ensuing water year (Chapter IV); and*
4) *a description of current and proposed programs and projects to accomplish replenishment goals and to protect and preserve high quality groundwater supplies within the District (Chapter V).*

## Schedule for Setting the Replenishment Assessment

The following actions are required by the Water Code to set the Replenishment Assessment:

1) *The Board shall order the preparation of the ESR by the second Tuesday in February (see Section 60300).*
2) *The Board shall declare by resolution whether funds shall be collected to purchase replenishment water and to fund projects and programs related to replenishment and/or water quality activities by the second Tuesday in March and after the ESR has been completed (see Section 60305).*
3) *A Public Hearing will be held for the purpose of determining whether District costs will be paid for by a replenishment assessment. The Public Hearing will be opened on or before the second Tuesday in April and may be continued from time to time to subsequent Board meetings but will be completed by the first Tuesday in May (see Section 60306).*

4) *The Board by resolution shall levy a replenishment assessment for the ensuing fiscal year by the second Tuesday in May (see Sections 60315; 60317).*

Although dates specified in the code refer generally to 'on or before certain Tuesdays', the Water Code (Section 60043) also states that "*Whenever any act is required to be done or proceeding taken on or set for a particular day or day of the week in any month, the act may be done or proceeding set for and acted upon a day of the month otherwise specified for a regular meeting of the board"*. Therefore, there is flexibility as to the actual dates when Board actions are taken regarding the ESR, adopting resolutions, conducting public hearings, and the setting the replenishment assessment.

The ESR is completed in March of each year to provide the Board with the necessary information to determine whether a replenishment assessment will be needed in the ensuing year to purchase replenishment water and to fund projects and programs related to water quality and replenishment activities. However, in the subsequent months leading up to the adoption of the replenishment assessment in April or May, new information is normally received that affects the findings presented in the March ESR. This new information is typically related to the price WRD has to pay for replenishment water since the rates set by the Metropolitan Water District of Southern California (MWD or Met) and the Met-member agencies are not typically finalized until after the March ESR is adopted. The final information used by the Board to adopt the replenishment assessment in April or May is reflected in an updated ESR published following the adoption of the replenishment assessment.

# CHAPTER II
# GROUNDWATER PRODUCTION

## Adjudication and Demand

Prior to the adjudication of groundwater rights in the early 1960s, annual production (pumping) reached levels as high as 292,000 AF in the Central Basin ("CB") and 94,000 AF in the West Coast Basin ("WCB"). This was more than double the natural safe yield of the basins as determined by the California Department of Water Resources in 1962 (173,400 AF). Due to this serious overdraft, water levels declined, groundwater was lost from storage, and seawater intruded into the coastal aquifers. To remedy this problem, the courts adjudicated the two basins to put a limit on pumping. The West Coast Basin adjudication was set at 64,468.25 acre-feet per year ("AFY"). The Central Basin adjudication was set at 271,650 AFY, although the Judgment set a lower "Allowed Pumping Allocation" ("APA") of 217,367 AFY to impose stricter control. Therefore, the current amount allowed to be pumped from both basins is 281,835 AFY.

The adjudicated pumping amounts are greater than the natural replenishment of the groundwater aquifers, creating an annual deficit or annual overdraft. WRD is enabled under the California Water Code to purchase and recharge additional water to make up the overdraft, which is known as artificial replenishment or managed aquifer recharge (MAR). WRD has the authority to levy a replenishment assessment on all pumping within the District to raise the monies necessary to purchase the artificial replenishment water and to fund projects and programs necessary for replenishment and groundwater quality activities.

## Production

Under the terms of Section 60326.1 of the Water Replenishment District Act, each groundwater producer must submit a report to the District summarizing their monthly production activities (quarterly for smaller producers). The information from these reports is the basis by which each producer pays the replenishment assessment. WRD then provides these production data to the State Department of Water Resources ("DWR"), which acts as the court-appointed Watermaster in connection with the adjudication of the Central and West Coast Basins ("CWCB").

Previous Water Year:

Per the Water Code, WRD tracks and reports on groundwater production (pumping) on a Water Year ("WY") basis covering the time frame of October 1 - September 30 for each year. For the previous WY (2009/2010), groundwater production in both basins totaled 241,329 AF (197,387 AF in CB and 43,942 AF in the WCB). This is 2,073 AF less than the previous water year (769 AF less in the CB and 1,304 AF less in the WCB).

**Plate 1** illustrates the groundwater production in the CWCB during the previous water year and **Table A-5** presents historical pumping amounts in the CWCB.

Current Water Year:

For the first two months of the current WY (October and November 2010), production was 36,991 AF in the two groundwater basins (30,019 AF in the CB and 6,972 AF in the WCB). This is 258 AF more than in October and November of the previous year. However, due to the WRD Board's

declaration of a Water Emergency on November 19, 2010 (see below), it is anticipated that pumping may end up lower than in the previous year. Taking this into account, it is currently estimated that the pumping in the current WY will total 241,000 AF (197,000 AF in CB and 44,000 AF in the WCB).

Ensuing Water Year:

To estimate production for the ensuing year, recent averages are used in addition to knowledge of changing conditions that might affect pumping. Actual pumping patterns can vary considerably throughout the year based on a pumper's individual operational needs, water demands, conservation efforts and hydrology, making accurate forecasting difficult.

To estimate the ensuing year's groundwater production, WRD is using the average of the past 3 years actual pumping (rounded to nearest 500 AF). This equals 243,000 AF total for both basins including 200,500 AF in the CB and 42,500 AF in the WCB. **Table 1** shows the groundwater production amounts for the previous, current, and ensuing water years.

Measurement of Production

With few exceptions, meters installed and maintained by the individual producers measure the groundwater production from their wells. Through periodic testing, DWR as Watermaster verifies the accuracy of individual meters and orders corrective measures when necessary. The production of the few wells that are not metered is estimated on the basis of electrical energy consumed by individual pump motors, duty of water, or other reasonable means.

Carryover and Drought Provisions

The "carryover" of unused rights influences the actual amount of production for any given year. The "carryover" for any single year is 20% of the allotted pumping right in both the Central and West Coast Basins. This provision of the Judgments extends the flexibility with which the pumpers can operate. Conversely, the use of rights beyond the annual allotted quantity affects the annual production amount in the opposite manner.

During emergency or drought conditions, WRD can allow under certain conditions an additional 27,000 AF of extractions for a four-month period (17,000 for CB and 10,000 for WCB) assuming certain conditions are met. This provision has yet to be exercised but offers the potential use of an additional 7.8% pumping in the CB and 15% in the WCB.

Drought Carryover due to a WRD-Declared Water Emergency

The Central Basin Judgment also contains an additional Drought Carryover provision available to all Central Basin water rights holders after a declaration of a Water Emergency by the WRD Board of Directors. The Drought Carryover allows water rights holders to carryover an additional 35% of their APA (or 35 AF, whichever is larger) beyond the annual 20% described above during the period that the Declared Water Emergency is in effect.

The intent of the action is prevent further degradation of the groundwater basins by helping to restore groundwater levels and improving the water supply in the aquifers by providing an incentive to groundwater producers in the Central Basin to reduce pumping for a particular period of time.

A Declared Water Emergency is defined in the Judgment as:

> *"A period commencing with the adoption of a resolution of the Board of Directors of the Central and West Basin Water Replenishment District declaring that conditions within the Central Basin relating to natural and imported supplies of water are such that, without implementation of the water emergency provisions of this Judgment, the water resources of the Central Basin risk degradation. In making such declaration, the Board of Directors shall consider any information and requests provided by water producers, purveyors and other affected entities and may, for that purpose, hold a public hearing in advance of such declaration. A Declared Water Emergency shall extend for one (1) year following such resolution, unless sooner ended by similar resolution."*

In 2010 the District received formal requests to declare a Water Emergency from 21 Central Basin pumpers, representing 55.2% of the water rights holders in the Central Basin. Additionally, the Central Basin Water Association and the District's Technical Advisory Committee both recommended such a declaration. Staff reviewed the requests and analyzed the current groundwater conditions in the Central Basin as follows:

- Water years 2007-2009 were the 12th driest three-year period in the State's measured hydrologic record and also marked a period of severe restrictions in State Water Project diversions from the Sacramento-San Joaquin River Delta to protect endangered fish species. As a result, the Central Basin has seen a significant drop in water levels and storage due to reduced availability of both imported and local (stormwater) groundwater replenishment supplies.

- The Montebello Forebay key well 1601T was near 32-year lows.

- The average elevation of the four Central Basin key wells identified in the Central Basin Judgment to assess the health of the basin was near 32 year lows.

- Groundwater levels in the southern portion of the Central Basin were near historic lows.

- The accumulated overdraft of the Central and West Coast Basins is approximately 140,000 acre-feet below the WRD Board adopted optimum quantity.

- Future availability of discounted imported replenishment water from MWD, the water the District has relied upon for nearly 50 years to replenish the basins, was cut off by MWD in May 2007 and remains unavailable to this day with future availabilities uncertain.

- The next grade of water for replenishment is the more expensive untreated Tier 1 water. WRD does not have an agreement for this water and must rely on surplus Tier 1 that may be available from MWD member agencies within the District's service area.

Based on this information and the requests received from the Central Basin water rights holders, on November 19, 2010 the WRD Board held a Public Hearing to accept testimony and receive evidence on the Declared Water Emergency, and adopted Resolution 10-892 to declare the water emergency effective November 19, 2010 for a period of one year unless ended sooner by another WRD Resolution.

# CHAPTER III
# GROUNDWATER CONDITIONS

## Introduction

The California Water Code Section 60300 requires WRD to determine annually in the Engineering Survey and Report ("ESR") the following items related to groundwater conditions in the Central and West Coast Basins ("CWCB"):

1) Total groundwater production for the previous water year and estimates for the current and ensuing water years;

2) The Annual Overdraft for the previous water year and estimates for the current and ensuing water years;

3) The Accumulated Overdraft for previous water year and an estimate for the current water year;

4) Changes in groundwater levels (pressure levels or piezometric heights) within the District and the effects these changes have on groundwater supplies within the District; and

5) An estimate of the quantity, source, and cost of water available for replenishment during the ensuing water year;

To meet these requirements, WRD's hydrogeologists and engineers closely monitor and collect data to manage the groundwater resources of the District throughout the year. They track groundwater levels from WRD's network of specialized monitoring wells and from groundwater producers' production wells. They update and run computer models developed by the United States Geological Survey ("USGS") and others to simulate groundwater conditions and to predict future conditions. They use their geographic information system ("GIS") and database management system to store, analyze, map, and report on the information required for the ESR. They work closely with the Los Angeles County Department of Public Works on spreading grounds and seawater barrier wells to determine current and future operational impacts to groundwater supplies. They work closely with the Metropolitan Water District of Southern California ("MWD" or "Met"), the local MWD member agencies, and the Sanitation Districts of Los Angeles County ("SDLAC") on the current and future availability of supplemental replenishment water. They also work with regulators on replenishment criteria for water quality and recycled water use, and with the groundwater pumpers, the pumpers' Technical Advisory Committee ("TAC"), and other stakeholders to discuss the current and future groundwater conditions within the District and in neighboring basins.

The information on Annual Overdraft, Accumulated Overdraft, water levels, and change in storage are discussed in the remainder of this chapter. Groundwater production was previously discussed in Chapter II. The estimated quantity, source, and cost of replenishment water will be discussed in Chapter IV.

## Annual Overdraft

Section 60022 of the Water Replenishment District Act defines Annual Overdraft as "*...the amount...by which the quantity of groundwater removed by any natural or artificial means from the*

*groundwater supplies within such replenishment district during the water year exceeds the quantity of non-saline water replaced therein by the replenishment of such groundwater supplies in such water year by any natural or artificial means other than replenishment under the provisions of Part 6 of this act or by any other governmental agency or entity.*" (Part 6 of the Act pertains to water that WRD purchases for replenishment). Therefore, the Annual Overdraft equals the natural inflows to basins (not including WRD purchased water) minus all of the outflows (mostly pumping). There is an Annual Overdraft almost every year for the simple fact that the groundwater extractions typically exceed the natural groundwater replenishment. It has been one of the District's main responsibilities since 1959 to help make up this Annual Overdraft by purchasing artificial replenishment water to recharge the aquifers and supplement the natural recharge.

To determine the Annual Overdraft for the previous water year, WRD determines the inflows and outflows of the CWCB. In Water Year 2009/2010, natural inflows (storm water capture, areal recharge, and underflow) totaled 157,125 AF and WRD purchased 111,201 AF of recharge water (at barrier wells and spreading grounds). The total net outflows from the basins were 241,326 AF from pumping. The difference between the inflows and outflows was +27,000 AF, which is a gain in storage. The Annual Overdraft is the natural inflows minus total outflows, or 84,201 AF.

For the current and ensuing WY estimates for Annual Overdraft, the concept of "Average Annual Groundwater Deficiency" is utilized. The Average Annual Groundwater Deficiency is the long-term average of natural inflows minus total outflows and represents the long term average deficit (Annual Overdraft) in the basins. The development of the USGS/WRD computer model derived these long term average inflow and outflow terms. **Table 4** presents this information, which concluded that the Average Annual Groundwater Deficiency is 105,385 AFY. Values of the average deficiency are based on the long term (30 year average) inflows and outflows as calculated by the computer model. Long-term average inflows are influenced by the amount of precipitation falling on the District as well as for storm water capture at the spreading grounds. **Table 5** and **Figure A** show the historical precipitation at LACDPW Station #107D, located in Downey near the Montebello Forebay.

The calculation of the Average Annual Groundwater Deficiency represents in general that WRD needs to replenish about 105,385 AFY assuming long-term average conditions for the water balance to reach equilibrium, the overall change in storage to equal zero, and groundwater levels to remain relatively constant. As shown in **Table 6**, adjustments are made to the long term average inflows and outflows for the current and ensuing WY to reflect estimates of the Annual Overdraft for those particular years. Based on these adjustments, the current year Annual Overdraft is estimated at 80,800 AF and for the ensuing year 97,800 AF.

### Accumulated Overdraft

Section 60023 of the Water Replenishment District Act defines *"Accumulated Overdraft"* as "*...the aggregate amount…by which the quantity of ground water removed by any natural or artificial means from the groundwater supplies…during all preceding water years shall have exceeded the quantity of nonsaline water replaced therein by the replenishment of such ground water supplies in such water years by any natural or artificial means…"*

In connection with the preparation of Bulletin No. 104-Appendix A (1961), the DWR estimated that the historically utilized storage (Accumulated Overdraft) between the high water year of 1904 and

1957[1] was 1,080,000 AF (780,000 in CB, 300,000 in WCB). Much of this storage removal was from the forebay areas (Montebello Forebay and Los Angeles Forebay), where aquifers are merged, unconfined and serve as the "headwaters" to the confined pressure aquifers. Storage loss from the confined and completely full, deeper aquifers was minimal in comparison or was replaced by seawater intrusion, which can not be accounted for under the language of the Water Code since it is considered saline water.

The goal of groundwater basin management by WRD is to ensure a sufficient supply of safe and reliable groundwater in the basins for annual use by the pumpers, to keep a sufficient supply in storage for times of drought when imported water supplies may be curtailed for several consecutive years as well as to keep suitable room available in the basins to receive natural water replenishment in very wet years, such as an El Niño type year.

To compute the Accumulated Overdraft since this initial amount, WRD takes each consecutive year's Annual Overdraft and replenishment activities and determines the change in storage. It adds to or subtracts the corresponding value from the Accumulated Overdraft. Since the base level, the aggregate excess of extractions over recharge from the basins has been reduced due to the replenishment by WRD, the reduction of pumping from the adjudications, and the replenishment from seawater barrier injection. The Accumulated Overdraft at the end of the previous WY was determined to be 726,300 AF. For the current year, the Accumulated Overdraft is forecast to be 703,600 AF. This could change if hydrology or pumping patterns or planned artificial replenishment activities vary considerably.

**Table 7** presents information for the previous and current Accumulated Overdraft estimate. The annual changes in storage since 1961/1962 are presented on **Table 8**.

### Groundwater Levels

A groundwater elevation contour map representing water levels within the District in fall 2010 (end of the water year) was prepared for this report and is presented as **Plate 2**. The data for the map were collected from wells that are screened in the deeper basin aquifers where the majority of groundwater pumping occurs. These deeper aquifers include the Upper San Pedro Formation aquifers, including the Lynwood, Silverado, and Sunnyside. Water level data was obtained from WRD's network of monitoring wells and from groundwater production wells that are screened in the deeper aquifers.

As can be seen on **Plate 2**, groundwater elevations range from a high of about 170 feet above mean sea level (msl) in the northeast portion of the basin above the spreading grounds in the Whittier Narrows to a low of about 120 feet below msl in the Long Beach area and about 130 feet below msl in the Gardena area. With the exception of the Montebello Forebay and along the West Coast Basin Barrier Project, the majority of groundwater levels in the District are below sea level, which is why continued injection at the seawater barriers is needed to prevent saltwater intrusion.

**Plate 2** also shows the location of the key wells used for long-term water level data. These long-term hydrographs have been presented in the ESR for years, and provide a consistent basis from

[1] DWR Bulletin 104-A did not refer to the ending year for the storage determination. WRD has assumed it to be the year 1957, as this is the end year for their detailed storage analysis presented in Bulletin 104-B – Safe Yield Determination.

which to compare changing water levels. A discussion of water levels observed in the key wells is presented below.

Los Angeles Forebay

The Los Angeles Forebay occupies the westerly portion of the Central Basin Non-Pressure Area. Historically a recharge area for the Los Angeles River, this forebay's recharge capability has been substantially reduced since the river channel was lined. Recharge is now limited to deep percolation of precipitation, in-lieu when available, subsurface inflow from the Montebello Forebay, the northern portion of the Central Basin outside of WRD's boundary, and relatively small amounts from the San Fernando Valley through the Los Angeles Narrows.

Key well **2S/13W-10A01** represents the overall water level conditions of the Los Angeles Forebay (see **Figure B**). The water level high was observed in 1938 and by 1962 water levels had fallen nearly 180 feet due to basin over-pumping and lack of sufficient natural recharge. Since then, basin adjudication and managed aquifer recharge by WRD and others have improved water levels in this area by over 80 feet. Over the past 10 years, groundwater levels in this well have remained relatively constant with only minor fluctuations. This past year saw a rise of less than a foot.

For the current water year, rainfall is about normal for a full year with a couple months to go in the rainy season. Therefore, it is expected that the water year will end up slightly above normal for precipitation amounts. This plus a pumping decrease that is expected (See Section II) and the spreading of untreated Tier 1 (firm delivery) imported water in the Montebello Forebay are expected to cause water levels in the Los Angeles Forebay to slightly rise in the current year.

Montebello Forebay

The Montebello Forebay lies in the northeastern portion of the Central Basin and connects with the San Gabriel Basin to the north to the Central Basin via the Whittier Narrows. The Rio Hondo and San Gabriel River Spreading Grounds in the forebay provide the vast majority of artificial recharge to the Central Basin aquifers. Three key wells help describe the water level conditions in the Montebello Forebay, a northern well, middle well, and southeastern well (**Plate 2**):

- **Well 2S/11W-18C07** (WRD Monitoring Well Pico#1, Zone 4) is in the northern part of the Montebello Forebay. It replaces the earlier production well 2S/11W-18K02 that had been used for over 50 years but has been destroyed. The upper chart on **Figure C** shows the water levels for this well. At the end of water year 2009/2010, groundwater levels in this well were 9 feet higher than the previous year due to natural and managed replenishment efforts.

- **Well 2S/12W-24M08** (LACDPW Well No. 1601T) is centrally located between the two spreading grounds. This well is monitored weekly by WRD to assess water levels in the forebay and as an indicator of the water levels in the middle of the Forebay and as an indicator for purchasing replenishment water. The middle chart on **Figure C** shows the water levels for this well. The historic water level high was observed in 1942, but by 1957 had fallen 117 feet to an all-time low due to basin over-pumping and insufficient natural recharge. As described above for the Los Angeles Forebay, adjudication of pumping rights and managed aquifer recharge helped restore water levels in the Montebello Forebay. Due to drought and lack of discounted replenishment water, this well had recently been experiencing dropping water levels and reached

a 32-year low in 2009. However in WY 2009/2010 it recovered somewhat due to precipitation recharge and purchase of untreated Tier 1 water by WRD for replenishment. At the end of WY 2009/2010, groundwater levels in this well were 8 feet higher than the previous year.

- **Well 3S/12W-01A06** (LACDPW Well No. 1615P) is located downgradient and southeast of the spreading grounds near the southern end of the Montebello Forebay and the water level responses in this well are less pronounced than the other two wells because it is further from the spreading grounds and the recharge that occurs there. The lower chart on **Figure C** shows the water levels for this well. At the end of water year 2009/2010, groundwater levels in this well were 0.5 feet lower than the previous year.

- For the current water year, rainfall is about normal for a full year with a couple months to go in the rainy season. Therefore, it is expected that the water year will end up slightly above normal for precipitation amounts. This plus a pumping decrease that is expected (See Section II) and the spreading of untreated Tier 1 (firm delivery) imported water in the Montebello Forebay are expected to cause water levels to rise in the current year.

Central Basin Pressure Area

The District monitors key wells **4S/13W-12K01** (LACDPW No. 906D) and **4S/12W-28H09** (LACDPW No. 460K) which represent the conditions of the pressurized groundwater levels in the Central Basin Pressure Area. The hydrographs for these two wells are shown on **Figure D**.

Groundwater highs were observed in these wells in 1935 when they began to continually drop over 110 feet until their lows in 1961 due to the over-pumping and insufficient natural recharge. Groundwater levels recovered substantially during the early 1960s as a result of replenishment operations and reduced pumping. Between 1995 and 2007 there have been 100-foot swings in water levels each year from winter to summer. These swings were due to pumping pattern changes by some of the Central Basin producers who operate with more groundwater in the summer months and less groundwater in the winter months, and took advantage of the MWD and WRD In-Lieu program. However, since May 2007 the In-Lieu water has not been available, so pumping has remained more constant throughout the year and water levels remain depressed as shown in the two hydrographs.

At the end of WY 2009/2010, water levels in well 4S/13W-12K01 were nearly a foot lower than the previous year, and well 4S/12W-28H09 was 7.5 feet lower than the previous year. This drop is expected due to an increase in pumping the past year in this area. Water levels in the CB Pressure area are expected to rise in the current year due to anticipated reduced pumping.

West Coast Basin

The West Coast Basin is separated from the Central Basin by the Newport-Inglewood Uplift which is a series of discontinuous, subparallel hills and faults that act as a partial barrier to groundwater flow. Groundwater moves across the uplift from one basin to the other based on water levels on either side of the uplift and the "tightness" of the fault along various reaches.

**Figure E** shows the hydrographs of key wells **3S/14W-22L01** (LACDPW No. 760C) and **4S/13W-21H05** (LACDWP No. 869). These two wells represent the general conditions of the water levels in the West Coast Basin. In 1955, the control of groundwater extractions in the West Coast Basin

resulted in stabilizing and reversal of the declining water levels in the center of the basin (well 3S/14W-22L01), whereas at the eastern end near the Dominguez Gap Barrier water levels continued to decline until about 1971, when a recovery began due mostly to the startup of the Dominguez Gap Barrier Project. For the previous year 2009/2010, water levels in both wells were about 2 feet higher than the previous year. Water levels in the West Coast Basin are expected to rise another couple feet in the current year due to reduced pumping and increased injection.

**Plate 3** shows the water level changes over the entire CWCB over the previous water year. Because of the storm water captured and purchase of untreated Tier 1 replenishment water by WRD, the Montebello Forebay area experienced a rise of over 10 feet in some areas compared to the previous year and the average increase in the Forebay was about 5 feet. This increase partially but not completely offset the losses incurred in storage over the past 10 years where mostly dry conditions prevailed. Parts of the Lakewood and Long Beach areas saw declines of up to 5 feet. The remainder of the CB was generally unchanged with the exception of a small area near Cerritos which saw an increase of nearly 15 feet. The West Coast Basin was less impacted because the inflows generally matched the outflows in the western and southern parts of the basin, with increases of 5 feet or less, but in the northeastern area around Gardena a decline of nearly 10 feet was observed.

Based on the groundwater levels observed over various areas of the Central and West Coast Basins and the anticipated replenishment activities by WRD, the District anticipates having sufficient supplies of safe and reliable groundwater to meet the demands of the pumpers in the ensuing year.

### Change in Storage

The District determines the change in storage by comparing water levels from one year to the next. Rising water levels means an increase in storage groundwater whereas a drop in water levels means a decrease in storage. Using groundwater elevation data collected from WRD's monitoring well network and selected production wells, the District constructs a groundwater level change map showing water level differences from one year to the next (**Plate 3**). The data from this map are multiplied by the storage coefficient values for the aquifers as obtained from the USGS calibrated model of the District to produce the change in storage estimate for the previous water year.

As reported in the Annual Overdraft discussion, the gain in storage in WY 2009/2010 was 27,000 AF. In the past 10 years, groundwater in storage has declined by 114,400 acre-feet, including the gain observed in 09-10. **Table 8** provides the historical tracking of storage changes in the CWCB.

### Optimum Groundwater Quantity

In response to a 2002 State audit of the District's activities, the Board of Directors adopted an Optimum Quantity for groundwater amounts in the Central and West Coast Basins. The Optimum Quantity is based on the Accumulated Overdraft (AOD) concept described in the Water Code and in this ESR. The historic maximum groundwater drawdown due to over pumping reported in the CWCB between 1904 and 1957 was 1,080,000 AF. This is defined as the historic maximum AOD. As pumping eased and artificial replenishment occurred, more water was put back into the basins and the AOD was reduced resulting in rising water levels.

After considerable analysis and discussion, on June 18, 2003 the Board of Directors adopted the Optimum Quantity for the CWCB at an AOD of 400,000 AF, or 680,000 AF on top of the historic maximum AOD. The adopted value was based on the amount of groundwater necessary to meet the

pumpers' demands in a worst case scenario of a major 3-year major drought where pumping would be maximized due to a lack of MWD water and replenishment at the spreading grounds and other means is at a minimum.

In 2003 through 2006, however, new discussions were being held by the local water community on groundwater storage opportunities within the District. The original derivation of the Optimum Quantity of AOD = 400,000 AF did not take into full account storage projects. If this Optimum Quantity were fully realized, there would not be enough storage space in the aquifers for large storage projects. Therefore, to utilize the groundwater basins for both endeavors, the Board of Directors on April 19, 2006 established a new Optimum Quantity at an AOD of 612,000 AF. This value was based on an extensive review of over 70 years of water level fluctuations in the District and recognizing that in the year 2000, groundwater amounts were at a healthy quantity to sustain the adjudicated pumping rights in the basins. The AOD in the year 2000 was 612,000, and therefore was set by the Board of Directors as the new Optimum Quantity.

The Board of Directors at that April 19, 2006 meeting also adopted a policy to make up the Optimum Quantity should it fall too low. The policy is as follows:

> *An Accumulated Overdraft greater than the Optimum Quantity is a deficit. WRD will make up the deficit within a 20 year period as decided by the Board on an annual basis. If the deficit is within 5 percent of the Optimum Quantity, then no action needs to be taken to allow for natural replenishment to makeup the deficit.*

Since the year 2000 a total of approximately 114,300 AF have been lost from storage, brining the AOD down to 726,300 AF from its Optimum Quantity of 612,000 AF. Based on the adopted policy, the Board will be considering options to make up the AOD and return the basin to the Optimum Quantity over a period of time.

# CHAPTER IV
# GROUNDWATER REPLENISHMENT: QUANTITIES, AVAILABILITY, AND COSTS

As discussed in the previous chapter, the Central and West Coast Basins have an annual overdraft because more groundwater is pumped out than is replaced naturally. The District purchases supplemental water (artificial replenishment water) each year to help offset this overdraft through managed aquifer recharge. The purchased water enters the groundwater basins at the Montebello Forebay spreading grounds, at the seawater barrier injection wells, and through the District's In-Lieu Program. The purpose of this Chapter is to determine the quantities of water needed for purchase in the ensuing year and to determine the availability and cost of that water.

The District currently has available to it recycled and imported water sources for use as artificial replenishment water. These two sources are described below:

- ***Recycled Water****: Recycled water is wastewater from the sewer systems that is reclaimed through extensive treatment at water reclamation plants ("WRP"s). The water is treated to high quality standards so that it can be reused safely. Some agencies and businesses use recycled water for non-potable purposes, such as for irrigation of parks, golf courses, and street medians, or for industrial purposes. WRD has used recycled water for groundwater recharge since 1962. In semi-arid areas such as Southern California where groundwater and imported water are in short supply, recycled water has proven to be a safe and reliable additional resource to supplement the water supply. Recycled water is used at the spreading grounds and the seawater barrier wells. Although recycled water is high quality, relatively low cost, and a reliable supply all year long, the District is limited by regulatory agencies in the amount it can use for replenishment. Therefore, imported water is also used for recharge.*

- ***Imported Water****: River water from northern California (State Water Project) and the Colorado River is imported into Southern California by the Metropolitan Water District of Southern California ("MWD" or "Met"). MWD then sells this water to their member agencies for multiple uses, including potable water and recharge water. WRD uses raw (untreated) imported water at the spreading grounds and potable (treated) imported water at the seawater intrusion barriers and for the in-lieu program for groundwater recharge. Because of treatment and transportation costs, it is the most expensive source for recharge water. The supply is under full upstream control, and its availability at the spreading grounds is limited and variable, especially during drought years. In fact, since May 2007 MWD has stopped delivery of its historically available discounted surplus replenishment and In-Lieu waters due to reduced supply, environmental issues and judicial decisions. As a result, the District purchased the more expensive but more available untreated Tier 1 water from CBMWD and Long Beach in 2010/2011 for spreading. Because it is questionable that the discounted replenishment water will be available anytime soon, the District plans on purchasing the Tier 1 water in the ensuing year as well.*

**Recommended Quantities of Replenishment Water**

With information presented in the preceding chapters regarding the basins' pumping demands and the overall condition of the groundwater basins, WRD can estimate its projected need for replenishment water in the ensuing year.

Spreading

Groundwater recharge through surface spreading occurs in the Montebello Forebay Spreading Grounds adjacent to the Rio Hondo and the San Gabriel River, within the unlined portion of the San Gabriel River, and behind the Whittier Narrows Dam in the Whittier Narrows Reservoir. Owned and operated by the Los Angeles County Department of Public Works ("LACDPW"), they were originally constructed in 1938 for flood control and conservation of local storm water, but have been used since the 1950s to replenish the basins with imported water and since 1962 with recycled water.

Since recycled water is a high quality, less expensive, and available year-round source of replenishment water, the District maximizes its use within established regulatory limits. These limits are discussed below under "Expected Availability of Replenishment Water". In general, the District plans on purchasing 50,000 AF in the ensuing year to maximize the amount under regulatory limits, unless lack of dilution water (storm water and imported water) causes a reduction in the recycled water amounts.

Additional replenishment water is needed beyond the 50,000 AFY of recycled water and will have to come from imported water. In 2003, the WRD Board adopted the long term average of 27,600 AFY of imported water to purchase for spreading. This value was based on long-term (30 year) averages of the overall water budget of the basins using the USGS computer model. The 2003 ESR discusses the derivation of this value in more detail.

Since that time, the District has invested in cooperative projects with the LACDPW to capture more storm water and to lessen the need for imported water as part of WRD's Water Independence Now program, or WIN. Improvements to the Whittier Narrows Conservation Pool are expected to conserve an additional 3,000 AFY of storm water on average. Two new rubber dams were built in the San Gabriel River near Valley Boulevard and are expected to conserve an additional 3,600 AFY on average. Therefore, the new Long Term Average for imported spreading demands is 21,000 AFY. This amount plus the recycled demand cited earlier brings the total WRD basic spreading needs for the ensuing year to 71,000 AF (50,000 AF recycled and 21,000 AF imported). This is the amount planned for the ensuing year for spreading.

In addition, supplemental water may be needed to make up the deficit in the Optimum Quantity discussed at the end of Chapter 3. Per the Board's policy in 2006, the District would attempt to make up the Optimum Quantity deficit over a 20-year period. Much of this deficit, however, could be made up by rainfall if a few extremely wet years would occur. Therefore, focus is placed on making up the imported spreading water shortage which exists due to the District's inability to purchase planned amounts in recent years. Factors such as MWD ceasing to offer traditional replenishment water in May 2007 and construction and maintenance projects at the spreading grounds have been impedances to purchasing imported water for spreading. Between WY 2003/2004 and 2008/2009, the District was short 29,968 AF of planned imported water purchases for the spreading grounds. In 2009/2010 the District for the first time purchased untreated Tier 1 water for replenishment since the historical replenishment water was not available, including an extra 5,286 AF to help make-up some of the deficit. In the current year 2010/2011, the District has plans to purchase the normal 21,000 AF of spreading water plus an additional 3,500 AF to help makeup the deficit. This water will also be untreated Tier 1 water since discounted water remains

unavailable. The deficit at the start of ensuing year 2011/2012 will be 21,282 AF and the District will be considering reducing this amount by some margin in that year.

**Table 9** presents the currently anticipated imported water replenishment needs.

Injection

Another way of replenishing the groundwater supply is to inject water at the three seawater intrusion barriers owned and operated by the LACDPW, including the West Coast Basin Barrier, Dominguez Gap Barrier, and Alamitos Barrier. Although the primary purpose of the barriers is for seawater intrusion control, groundwater replenishment also occurs as the freshwater is injected into the CWCB aquifers and then moves inland towards pumping wells.

To determine the amount of barrier water estimated for the ensuing year, WRD under an Agreement with LACDPW gets annual estimates from the expected demand at the barriers. WRD reviews these estimates and makes adjustments as necessary. For 2010/2011, no adjustments were made to estimates provided by the LACDPW, with the exception that their original 20,000 AF estimate for the West Coast Barrier was reduced to 18,000 AF based on current operating conditions.

For the West Coast Basin Barrier Project, 18,000 AF of demand is estimated, of which 10,000 AF is imported water and 8,000 AF is recycled water from WBMWD based on current delivery capabilities. For the Dominguez Gap Barrier Project, 7,400 AF are estimated, with 50% recycled water and 50% imported water. For the Alamitos Barrier on the WRD-side of the barrier, 6,200 AF are estimated with 50% recycled water and 50% imported water.

The total barrier demand for the ensuing year is estimated at 31,600 AF (**Table 9)**, including 14,800 AF recycled water (47%) and 16,800 AF imported water (53%).

In-Lieu Replenishment Water

The basic premise of WRD's In-Lieu Program is to offset the pumping in the basin to lower the annual overdraft and reduce the artificial replenishment needs. It helps provide an alternate means of replenishing the groundwater supply by encouraging basin pumpers to purchase surplus imported water when available instead of pumping groundwater. This can help raise water levels in areas that are otherwise more difficult to address. Since May 2007, the In-Lieu water has not been made available by MWD due to water shortages. However, WRD has planned for it in case the water became available. If monies raised go unspent, they are placed in a water purchase reserve for subsequent year water purchases. This concept was approved by the pumper's Technical Advisory Committee ("TAC") for the District in 2010 and will continue for ensuing year 2011/2012 at the same amount of 10,303 AF (6,000 AF in the Central Basin and 4,303 AF in the West Coast Basin).

### Expected Availability of Replenishment Water

The availability of water supplies for the ensuing water year has been taken into account when determining how funds should be raised. If a particular resource is expected to be unavailable during a given year, money can still be raised to fund the purchase of that quantity of water in a succeeding year.

Recycled Water

Recycled water is reliable all year round but its use is capped by regulatory limits. The current limits for recycled water spreading in the Montebello Forebay are established by the California Regional Water Quality Control Board (RWQCB) and are detailed in Order No. 91-100 adopted on September 9, 1991 with amendments on April 2, 2009 under Order No. R4-2009-0048. The District is limited to spreading 35% recycled water over a 5-year period based on the total inflow of all waters into the Montebello Forebay, meaning that at least 65% of the waters entering the forebay must be dilution waters such as storm water, underflow, rainfall, and imported water. As these dilution sources become scarce due to dry years or continued lack of imported replenishment water, the amount of recycled water will have to be reduced to maintain the 35% regulatory cap.

The Sanitation Districts of Los Angeles County (SDLAC) provides the recycled water to WRD for spreading by LACDPW. This water comes from the Whittier Narrows Water Reclamation Plant ("WNWRP"), San Jose Creek Water Reclamation Plant ("SJCWRP"), and Pomona Water Reclamation Plant ("PWRP"). WRD purchases water from the WNWRP and SJCWRP, whereas the water from the PWRP is considered incidental recharge and is not purchased. For planning purposes, the District assumes purchasing 50,000 AFY of recycled water each year to meet the regulatory cap. **Table 2** shows the breakdown amounts for these purchases.

Recycled water for injection into the seawater barrier wells comes from different agencies depending on the specific barrier. At the WCBBP, the water is provided by WBMWD's Edward C. Little Water Recycling Facility. Per regulatory limits, this resource can provide up to 75% of the water injected into the West Coast Basin Barrier with an increase up to 100% being planned. Because of recent operational issues at the treatment, only about 40% to 60% recycled water has been available to the barriers with imported water making up the difference. Since 18,000 AF is anticipated for the total barrier demand in the ensuing year, and 8,000 AF appears to be the current maximum capability for recycled water, imported demand is estimated at 10,000 AF.

Recycled water for the DGBP is available from the City of Los Angeles' Terminal Island Treatment Plant (Harbor Recycled Water Project). The plant is permitted to provide the barrier with up to 5 million gallons per day (mgd) or 5,600 AFY, or 50% of the total barrier supply, whichever is less. Since 7,400 AF is anticipated for the ensuing year, 3,700 AF will be recycled water and 3,700 AF will be imported water.

Recycled water for the ABP is available from WRD's Leo J. Vander Lans Water Treatment Facility. This treatment plant is permitted to provide up to 50% of barrier water with recycled water with the remainder being imported. Since 6,200 AF is anticipated for the ensuing year, 3,100 AF will be recycled water and 3,100 AF imported water.

Imported Water

All indications from MWD are that seasonal discounted spreading water and In-Lieu water will once again not be available in the ensuing year due to drought, environmental issues, and judicial decisions on the Bay Delta. As imported deliveries are cut back during dry years or with climate change or extended periods of drought, WRD may need to look at other sources for replenishment water, such as increased used of recycled water and storm water, or purchasing more expensive but more available imported water such as untreated Tier 1 (firm delivery) water. The purchase of

untreated Tier 1 water occurred for the first time in 2009/2010 and continued into 2010/2011 due to the continued unavailability of surplus water, and is expected to occur in the ensuing year.

For the imported water used for injection at the seawater barrier wells, the District pays the premium price for "non-interruptible" treated Tier 1 water meaning that it will be available all year long. Because of the increasing water costs at the barriers, the District is looking at ways to minimize costs such as reduction of pumping near the barriers, increased recycled water to offset imported water, or banking water at lower seasonal rates. At the ABP, the City of Long Beach and WRD have entered into an agreement to bank seasonal treated water and Tier 1 water through inland injection wells and then extract the water for injection at the barriers when needed, thus saving considerable costs on barrier water. In 2009/2010, the 2,000 AF of Tier 1 water banked in 2008/2009 was utilized. The seasonal water banked in 2004/2005 through 2006/2007 has 2,160 AF remaining and can be called at any time that serves the District most effectively.

**Projected Cost of Replenishment Water**

WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

MWD in 2010 established a two-year budget with an anticipated price increase of around 7% for their water. MWD-member agencies such as CBMWD, WBMWD, and Long Beach have not yet set their rates so WRD does not know what their surcharges on the MWD water will be at this time. Over the next couple months, this information will become available and WRD will adjust its water cost estimates prior to adopting its replenishment assessment in May 2011.

Using currently available information and estimates for the cost of replenishment water to WRD in the ensuing year, the 112,903 AF required for purchase will cost approximately $42,156,493. This includes $16,100,428 for the spreading grounds, $22,356,257 for the seawater barrier injection wells, and $3,699,808 for In-Lieu water.

**Tables 1 and 2** of the ESR provide a detailed breakdown of these costs.

These estimated costs are for anticipated water purchases only in the ensuing year for normal WRD operations. They do not include possible makeup water purchases to help overcome the Optimum Quantity deficit as discussed on page 2. Nor do they include the additional costs for projects and programs required to replenish the basins and to protect groundwater quality. These projects and programs are discussed in the next chapter. The anticipated costs for any makeup water and for the projects and programs to protect and preserve groundwater supplies in the District will be presented during the District's annual budgeting and rate setting process that will culminate in the Board's adoption of the 2011/2012 Replenishment Assessment in May 2011 effective July 1, 2011.

# CHAPTER V
# PROJECTS AND PROGRAMS

California Water Code Sections 60220 through 60226 describe the broad purposes and powers of the District to perform any acts necessary to replenish, protect, and preserve the groundwater supplies of the District. In order to meet its statutory responsibilities, WRD has instituted numerous projects and programs in a continuing effort to effectively manage groundwater replenishment and groundwater quality in the Central and West Coast Basins ("CWCB"). These projects and programs include activities that enhance the replenishment program, increase the reliability of the groundwater resources, improve and protect groundwater quality, and ensure that the groundwater supplies are suitable for beneficial uses.

These projects and programs have had a positive influence on the basins, and WRD anticipates continuing these activities into the ensuing year. The following is a discussion of the projects and programs that WRD intends to continue or initiate during the ensuing year.

**001 – Leo J. Vander Lans Water Treatment Facility Project**

The Leo J. Vander Lans Water Treatment Facility provides advanced treated recycled water to the Alamitos Seawater Intrusion Barrier. The facility receives tertiary-treated water from the Sanitation Districts and provides the advanced treatment through a process train that includes microfiltration, reverse-osmosis, and ultraviolet light. The facility's operations permit was approved by the Los Angeles Regional Water Quality Control Board on September 1, 2005, and the replenishment operations of this facility started in October 2005. The product water has since been discharging to the barrier to replace up to 50% of the potable imported water currently used, thereby improving the reliability and quality of the water supply to the barrier. The plant is designed to produce approximately 3,000 acre-feet per year (AFY) for delivery to the barrier. The Long Beach Water Department (LBWD) is responsible for operation and maintenance of the treatment plant under contract with WRD.

Preliminary engineering design is in progress to potentially expand the capacity of the facility so that it can provide up to 100% of the barrier water demands thereby eliminating the need for the imported water. Expected costs for the coming year will involve operation and maintenance of the plant, final design for plant expansion, as well as groundwater monitoring at the barrier. Because the primary purpose of this project is to provide a more reliable means of replenishing the basin through injection, 100% of the costs are considered to be drawn from the Replenishment Fund.

**002 – Robert W. Goldsworthy Desalter Project**

The Robert W. Goldsworthy Desalter has been operating since 2002 to remove brackish groundwater from a saline plume in the Torrance area that was stranded inland of the West Coast Basin Barrier after the barrier was put into operation in the 1950s and 1960s. The production well and desalting facility are located within the City of Torrance (City), and the product water is delivered for potable use to the City's distribution system. The treatment plan capacity is about 2,200 AFY. The City is responsible for operation and maintenance of the treatment plant under contract with WRD.

The District is evaluating the expansion of the treatment plant and plans to conduct feasibility studies for the expansion. Expected costs for the coming year will involve operation and maintenance of the plant and feasibility studies for the expansion. The purpose of the desalter is directly related to remediating degraded groundwater quality, and costs are thus attributed 100% to the Clean Water Fund.

Additional measures may be necessary in the future to fully contain and remediate the saline plume, which extends outside of the Torrance area. WRD is actively pursuing long-term solutions to this problem and continues to work with the City of Torrance Municipal Water Department, the pumpers' Technical Advisory Committee, and other stakeholders on the future of the saline plume removal in the West Coast Basin.

**004 – Recycled Water Program**

Recycled water (reclaimed municipal wastewater) has been used for groundwater recharge by WRD since 1962. Using recycled water to replenish the groundwater basins provides a reliable source of high quality water for surface spreading in the Montebello Forebay and injection at the seawater intrusion barriers. In view of the drought conditions that periodically occur in California and uncertainty in the future availability and cost of imported supplies, this resource has become increasingly vital as a replenishment source.

WRD participates in various research and testing activities to ensure that the use of recycled water continues to be a safe and reliable resource for groundwater recharge. WRD, along with other stakeholders, is working closely with the California Department of Public Health ("CDPH") to review and revise regulations on groundwater recharge using recycled water. Through this dialogue, WRD and CDPH exchange information and develop a mutual understanding of each agency's perspectives.

From an operational standpoint, the District continues to coordinate with the SDLAC with permit compliance activities, including groundwater monitoring and reporting, to ensure that the current practice and operation of replenishing with recycled water continues to be safe. Many monitoring wells and production wells are sampled frequently by WRD staff, and the results are reported as required to the regulatory agencies.

In addition to regular monitoring and sampling around the spreading grounds, WRD is partnering with others to more fully investigate the effectiveness of soil aquifer treatment ("SAT") during recharge activities. Research is being conducted by specialists and experts and includes specific tests to characterize the percolation process and quantify the filtering and purifying properties of the underlying soil on constituents of concern such as nitrogen, total organic carbon, and emerging chemicals of concern (CECs). The District continues to be vigilant in monitoring research on the detection, significance, and treatment of CECs, such as pharmaceuticals and personal care products.

Three separate groundwater tracer studies to track and verify the movement of water from the spreading grounds and monitoring wells and production wells have been performed in 2003-2005, 2005-2006, and 2010-2011. Results showed that it is the depth and not the horizontal distance from the recharge ponds that is the key factor in arrival times of water to wells (travel time to deeper wells is greater than to shallower wells, even if the deeper wells are very near the spreading grounds). In some cases, WRD made modifications to wells to seal off their shallow perforations so that the wells

only produced from the deeper aquifers. The tracer tests were then repeated to demonstrate that the travel time had been increased. These efforts, in addition to periodic studies assessing health effects and toxicological issues, are necessary to provide continued assurances that recycled water for groundwater recharge remains safe and compliant with regulatory standards in the local basins.

Recycled water is also injected into the three seawater intrusion barriers in Los Angeles County (Alamitos, West Coast Basin, and Dominguez Gap). Work associated with the use of recycled water at those facilities is maintained under the specific project (e.g., Leo J. Vander Lans Water Treatment Facility) that delivers that resource to the barriers or under the program related to recycled water use at the specified barrier.

Projects under this program help to improve the reliability and utilization of an available local resource. This resource is used to improve replenishment capabilities and is thus funded 100% from the Replenishment Fund.

### 005 – Groundwater Resources Planning Program

The Groundwater Resources Planning Program was instituted to evaluate basin management issues and to provide a means of assessing project impacts over the CWCB. Prior to moving forward with a new project, an extensive evaluation is undertaken. Within the Groundwater Resources Planning Program, new projects and programs are analyzed based on benefits to overall basin management. This analysis includes performing an extensive economic evaluation to compare estimated costs with anticipated benefits. As part of this evaluation process, all new capital projects are brought to the District's Technical Advisory Committee for review and recommendation.

One of the main programs currently underway under this Program is a Master Plan of the two groundwater basins. Efforts are underway to interview groundwater producers in these two basins to identify future pumping demands so that the District can be prepared for future replenishment needs. Also under this program, District staff will continue to monitor State and Federal funding programs to determine applicability to the District's list of potential projects. In the coming year, the District will continue participation in Integrated Regional Water Management Planning ("IRWMP") for Greater Los Angeles County. Collaborative development of the region's IRWM plan is a requirement for entities to secure grant funding under Proposition 84 and Proposition 1E which were passed in November 2006. It is expected that this plan will play a significant role in future grant funding opportunities at the Local, State and Federal levels. District staff will also monitor the ongoing AB303 and WaterSMART grant funding programs.

Projects under the Groundwater Resources Planning Program serve to improve replenishment operations and general basin management. Accordingly, this program is also wholly funded through the Replenishment Fund.

### 006 – Groundwater Quality Program

This comprehensive program constitutes an ongoing effort to address water quality issues that affect WRD projects and the pumpers' facilities. The District monitors and evaluates the impacts of proposed, pending and recently promulgated drinking water regulations and proposed legislation. The District assesses the justification and reasoning used to draft these proposals and, if warranted, joins in coordinated efforts with other interested agencies to resolve concerns during the early phases of the regulatory and/or legislative process.

*Projects and Programs*

The District continually evaluates current and proposed water quality compliance in production wells, monitoring wells, and spreading/injection waters of the basins. If noncompliance is identified, WRD staff quickly investigates to determine the causes of noncompliance, develops recommended courses of action and estimates their associated costs to address the problem, and implements the best alternative to achieve compliance.

Effective January 1, 2007, the District assumed responsibility for the Central Basin Title 22 Groundwater Monitoring Program that had been administered previously by the Central Basin Municipal Water District. This program provides services for monitoring of drinking water wells as required by state statutes to ensure that they continue to be safe for domestic use. Currently, twenty pumpers with 80 wells are participating in this program. In addition, a new contract for sample collection and laboratory analysis was issued for this work. This program is paid for by the participants, and therefore, does not impact the District's replenishment assessment.

In recent years, new CECs have been identified as potentially impacting local surface water and groundwater, not only in the CWCB but also in neighboring regions such as the Main San Gabriel Basin, Orange County Basin, Chino Basin, etc. Constituents such as perchlorate, n-nitroso dimethylamine (NDMA), hexavalent chromium, and 1,4-dioxane have emerged as CECs and may pose a potential threat to the local resources; although just their detection in the environment does not mean that they pose a public health threat at their measured concentrations. Monitoring associated with surface spreading groundwater recharge facilities may increase, specifically for CECs pending future adoption of a resolution by the State Water Resources Control Board regarding its Scientific Advisory Panel's recommendations for monitoring CECs in recycled water.

WRD's service area contains a large and diverse industrial and commercial base. Consequently, many potential groundwater contamination sources exist within District boundaries. Examples of potential contamination sources include leaking underground storage tanks, petroleum pipeline leaks at refineries and petrochemical plants, and discharges from dry cleaning facilities, auto repair shops, metal works facilities, and others. Such contamination sources may pose a threat to the drinking water aquifers. Accordingly, WRD established its Groundwater Contamination Prevention Program as a key component of the Groundwater Quality Program, in an effort to minimize or eliminate threats to groundwater supplies.

The Groundwater Contamination Prevention Program includes several ongoing efforts:

- Central and West Coast Basin Groundwater Contamination Forum: More than seven years ago, WRD established this data-sharing and discussion forum with key stakeholders including the U.S. Environmental Protection Agency ("USEPA"), the California Department of Toxic Substances Control ("DTSC"), the California Regional Water Quality Control Board – Los Angeles ("RWQCB-LA"), the California Department of Public Health ("CDPH"), the U.S. Geological Survey ("USGS"), and various cities and pumpers. Stakeholders drafted and signed a Memorandum of Understanding ("MOU") agreeing to meet regularly (meetings are held 3 to 4 times per year at WRD) and share data on contaminated groundwater sites within the District. WRD has acted as the meeting coordinator and data repository/distributor, helping stakeholders to characterize the extent of contamination to identify pathways for ~~shallow~~ contaminants in shallow aquifers to reach

deeper drinking water aquifers and develop optimal methods for remediating contaminated groundwater.

- With the cooperation and support of all stakeholders in this Forum, WRD developed a list of high-priority contaminated groundwater sites within the District. This list is a living document, subject to cleanup and "closure" of sites, as well as discovery of new sites warranting further attention. Currently, the list includes over 45~~0~~ sites across the CWCB. WRD works with the lead regulatory agencies for each of these sites to keep abreast of their status, offer data collection, review and recommendations as needed, and facilitate progress in site characterization and cleanup.

- In 2003, WRD developed a scope of work with the Los Angeles County Department of Health Services ("LACDHS") to clarify the status of 217 potentially abandoned (a.k.a., "unknown status") wells located within District boundaries, as identified through researching WRD's groundwater production database. WRD completed numerous tasks to determine the status of these wells, including: distributing, collecting and tallying a survey questionnaire to all well owners associated with the potentially abandoned wells; searching through thousands of hard-copy well construction and destruction permits at the DWR, LACDHS, and City of Long Beach; conducting field reconnaissance trips to locate and photograph wells. These efforts were successful: WRD was able to reduce the number of "unknown status" wells from 217 to 20, and most of the remaining 20 are suspected to have been paved over during development of industrial and residential neighborhoods. At this time, WRD is reviewing its groundwater production database, to identify any new "unknown status" wells~~,~~ and to repeat the tasks listed above to clarify their status.

- Beginning in April 2010, WRD commenced work with the U.S. Geological Survey on the Central Basin Groundwater Contamination Study. The purpose of this study is to characterize the threat of multiple contaminant plumes moving downward through any preferential pathways to deeper potable aquifers in the Central Basin. The study area encompasses a large portion of the Central Basin, including the locations of several high-priority contaminated groundwater sites. Study tasks include compilation of existing data, sequence stratigraphic analysis, water quality sampling, geochemical analyses, and characterization of the groundwater flow system. The study is expected to be completed at the end of 2011. WRD received AB303 grant funding to support this project.

WRD is also participating in the Water Augmentation Study ("WAS") of the Los Angeles and San Gabriel Rivers Watershed Council. This is a multi-year investigation to evaluate the feasibility of capturing more storm runoff at localized sites in lieu of discharge into the storm drains, channels, and ultimately to the ocean. It is a potential source of new replenishment water~~,~~ and would be in addition to stormwater currently captured and retained for percolation at the existing spreading grounds within the District. The underlying concept for the WAS is to retain more stormwater rather than allow it to be lost to the ocean; however, precautions must be taken to ensure that this new water does not degrade groundwater quality if allowed to percolate at local sites. More stormwater could be saved by utilizing Best Management Practices (BMPs), e.g., bioswales, infiltration basins, and porous pavements. Much of the WAS is focused on evaluating the technical feasibility of this project and the potential impacts on groundwater quality. Other aspects of the WAS include modeling to estimate the amount of water that can be percolated in the local watershed and the

economic value of this additional source of water. In 2009, the Elmer Avenue neighborhood BMP demonstration project was constructed to evaluate the effectiveness and potential of a large-scale project. Extensive monitoring of the BMP demonstration project is planned for the coming years to assess the effectiveness of the BMPs in water capture and maintaining or improving groundwater quality.

Much of the work for the coming year will involve additional investigations at well sites known to have contaminated water, continued monitoring of water quality regulations and proposals affecting production and replenishment operations, further characterization of contaminant migration into the deeper aquifers, and monitoring and expediting cleanup activities at contaminated sites. All work under this program is related to water quality and cleanup efforts; therefore, 100% of it is funded from the Clean Water Fund.

### 010 – Geographic Information System (GIS)

The District maintains an extensive database and Geographic Information System (GIS) in-house. The database includes water level and water quality data throughout the entire WRD service area with information drawn not only from the District's Regional Groundwater Monitoring Program and permit compliance monitoring, but also from water quality data obtained from the CDPH. The system requires continuous update and maintenance but serves as a powerful tool for understanding basin characteristics and overall basin health.

The GIS is used to provide better planning and basin management. The system is used to organize and store an extensive database of spatial information, including well locations, water level data, water quality information, well construction data, production data, aquifer locations, and computer model files. Staff uses the system daily for project support and database management. Specific information is available to any District pumper or stakeholder upon request and can be delivered through the preparation of maps, tables, reports, or other compatible format. Additionally, the District has made its web-based Interactive Well Search tool available to selected users. This web site provides these users with limited access to WRD's water quality and production database.

District staff will continue to streamline and refine the existing data management system and website as well as satisfy both internal and external data requests. As part of the streamlining of the data, staff will fully automate the transfer of water quality data from the laboratory directly into the District's water quality database. Additionally, District staff will continue the development of applications to more efficiently manage and report groundwater production information. Continued use, upkeep, and maintenance of the GIS are planned for the coming year. The use of the system supports both replenishment activities and groundwater quality efforts. Accordingly, the cost for this program is equally split between the Replenishment and Clean Water Funds.

### 011 – Regional Groundwater Monitoring Program

WRD has been monitoring groundwater quality and water levels in the CWCB for over 50 years. The Regional Groundwater Monitoring Program provides for the collection of basic information used for groundwater basin management including groundwater level data and water quality data. It currently consists of a network of nearly 300 WRD and USGS-installed monitoring wells at over 50 locations throughout the District, supplemented by the existing groundwater production wells. The information generated by this program is stored in the District's GIS and provides the basis to better understand the dynamic changes in the Central and West Coast Basins. WRD staff, comprised of

hydrogeologists and engineers, provides the in-house capability to collect, analyze and report groundwater data.

Water quality samples from the monitoring wells are collected twice a year. Water levels are measured in most monitoring wells with automatic data loggers daily, while water levels in all monitoring wells are measured by WRD field staff a minimum of four times per year. On an annual basis, staff prepares a report that documents groundwater level and groundwater quality conditions throughout the District.

Most of the work during the coming year will involve continuous field activities including quarterly and semi-annual data collection, continuous well and equipment maintenance, and annual reporting activities. In addition, new nested monitoring wells will be constructed. Work associated with the Regional Groundwater Monitoring Program also supports activities relating to both replenishment and water quality projects. The program, therefore, is funded 50% each from the Replenishment and Clean Water Funds.

**012 – Safe Drinking Water Program**

WRD's Safe Drinking Water Program ("SDWP") has operated since 1991 and is intended to promote the cleanup of groundwater resources at specific well locations. Through the installation of wellhead treatment facilities at existing production wells, the District hopes to remove contaminants from the underground supply and deliver the extracted water for potable purposes. Projects implemented through this program are accomplished through direct input and coordination with well owners. Two treatment facilities were constructed in 2010. Both treatment systems were constructed for the removal of iron and/or manganese. The removal mechanism is a pressurized filtration system.

The current program focuses on the removal of VOCs and offers financial assistance for the design and equipment of the selected treatment facility. Another component of the program offers no-interest loans for other constituents of concern that affect a specific production well. The capital costs of wellhead treatment facilities range from $800,000 to over $2,000,000. Due to financial constraints, this initial cost is generally prohibitive to most pumpers. Financial assistance through the District's SDWP makes project implementation much more feasible.

There are several current projects in various stages of completion and new candidates for participation are on the rise. A total of fifteen (15) facilities are already completed and online and one facility has successfully completed removal of the contamination and no longer needs treatment. While continued funding of this program is anticipated for next year, the District has revised the guidelines of the SDWP to place a greater priority on projects involving VOC contamination or other anthropogenic (man-made) constituents, now classified as Priority A Projects. Further, any treatment projects for naturally-occurring constituents would be classified as Priority B Projects and funded on a secondary priority, on a case-by-case basis, and only if program monies are still available during the fiscal year. While such projects are of interest to WRD, availability of funding for them will not be determined until after the budget process.

Projects under the SDWP involve the treatment of contaminated groundwater for subsequent beneficial use. This water quality improvement assists in meeting the District's groundwater

cleanup objectives. Thus, funding for the costs of the program is drawn wholly from the Clean Water Fund.

**018 – Dominguez Gap Barrier Recycled Water Injection**

This Project involves the delivery of recycled water from the City of Los Angeles Department of Water and Power's ("LADWP") Terminal Island Treatment Plant ("TITP") Advanced Water Treatment Facility ("AWTF") to the Dominguez Gap Barrier ("DGB"). Deliveries of recycled water to the barrier commenced in late February 2006 and have continued into 2011.

This water is being treated with microfiltration, reverse osmosis, and chlorination before being injected into the DGB. The project is permitted to maintain an overall ratio of 50% recycled water and 50% potable water to the entire barrier to satisfy regulatory requirements. Additional water quality requirements, including turbidity and modified fouling index ("MFI"), must also be met to minimize potential fouling of injection wells in the DGB, which is owned and operated by the County of Los Angeles Department of Public Works.

While LADWP is responsible for the treatment and delivery of the recycled water and all the water quality sampling associated with those activities, WRD has responsibility over groundwater monitoring compliance. As part of the permit, groundwater monitoring is required to observe water quality conditions and to anticipate potential problems before recycled water travels to downgradient drinking water wells. In addition, a tracer study was conducted at the start of recycled water injection (February 2006) through fall 2010 to determine the extent of travel and movement of the recycled water blend. The tracer study confirmed that adequate mixing and further blending in the ground is occurring and that groundwater samples being collected are representative of the recycled water blend.

Recycled water use at the seawater intrusion barriers in Los Angeles County improves the reliability of a supply that is needed on a continuous basis. Traditionally, water purchases for the barriers have been viewed as a replenishment function. Therefore, this program is funded 100% through the Replenishment Fund.

**023 – Replenishment Operations**

WRD actively monitors the operation and maintenance practices at the LACDPW-owned and operated spreading grounds and seawater barriers within the District. Optimizing replenishment opportunities is fundamentally important to WRD, in part because imported and recycled water deliveries directly affect the District's annual budget. Consequently, the District seeks to ensure that the conservation of stormwater is maximized, and that imported and recycled water replenishment is optimized.

Due to the reduction and unreliability of imported water for replenishment, WRD is working on its Water Independence Now ("WIN") program to eventually become independent from imported water for groundwater recharge. Currently, the District needs about 31,000 AF of imported water for recharge; 21,000 AF for spreading and 10,000 AF for injection at the seawater barriers. By maximizing the use of recycled water and stormwater, the amount of imported water can eventually be reduced or eliminated, thereby providing the groundwater basins with full replenishment needs through locally-derived water.

WRD coordinates regular meetings with LACDPW, MWD, SDLAC, and other water interests to discuss replenishment water availability, spreading grounds operations, scheduling of replenishment deliveries, seawater barrier improvements, upcoming maintenance activities, and facility outages or shutdowns. The District tracks groundwater levels in the Montebello Forebay weekly to assess general basin conditions and determine the level of artificial replenishment needed. WRD also monitors the amount of recycled water used at the spreading grounds and seawater barriers to maximize use while complying with pertinent regulatory limits.

Recently, the District worked with LACDPW to complete construction of the Interconnection Pipeline. This jointly-funded project is a new, dedicated pipeline and pumping station constructed between the Rio Hondo and San Gabriel Coastal Spreading Grounds to transfer replenishment water in either direction, via gravity flow from the Rio Hondo to San Gabriel or pumping in the reverse direction. The project is expected to conserve approximately 1,300 AFY of additional stormwater on average, help maximize the amount of recycled water conserved by approximately 5,700 AFY, and provide operational flexibility to mitigate obstacles to performing replenishment at these spreading grounds. The Interconnection Pipeline project is a key component of the District's WIN.

While improvements undertaken in recent years by LACDPW/WRD (e.g., expansion of Whittier Narrows Conservation Pool, installation of rubber dams on San Gabriel River, Interconnection Pipeline) have considerably increased the stormwater portion of WRD's supply portfolio, the potential for further increasing the use of stormwater for groundwater augmentation remains significant. Results of the Water Augmentation Study (described under Project 006 above) suggest that nearly 180,000 AFY of stormwater runoff is lost to the ocean from WRD's service area. Accordingly, the District plans to work with the LASGRWC on the Stormwater Recharge Feasibility Study and Pilot Project Development effort. This effort will identify regional and parcel-based locations and pilot project concepts and their respective costs and benefits within the District to achieve maximum stormwater capture for water supply benefit. Existing but independent analyses, datasets and modeling tools will be combined to identify where potential pilot projects may be located and to provide concept designs within a focused area. The study will identify with great specificity the best locations for stormwater capture and filtration and the technologies best suited to the locations.

As its name implies, this program deals primarily with replenishment issues and its costs are borne completely by the Replenishment Fund.

### 025 – Hydrogeology Program

This program accounts for the projects and programs related to hydrogeologic investigations of the District and surrounding areas to ensure safe and reliable groundwater. Work performed under this program includes the preparation of the annual Engineering Survey and Report, which incorporates the calculation and determination of annual overdraft, accumulated overdraft, change in storage, pumping amounts, and replenishment water availability into a document to help the District assess its replenishment needs and costs in the ensuing year. Extensive amounts of data are compiled and analyzed by Staff to determine these values. Maps are created showing water levels in the basins and production patterns and amounts. The updates, maintenance, and use of the Regional Groundwater Flow Model developed by the USGS and WRD are part of this program. This model is a significant analytical tool utilized by WRD to determine basin benefits and impacts of changes proposed in the management of the Central and West Coast Basins.

***Projects and Programs***

An ongoing effort at the District to better characterize the hydrogeologic conditions across the Central and West Coast Basins is called the "Hydrogeologic Conceptual Model". This long-term project involves compiling and interpreting the extensive amounts of data generated during drilling and logging of the WRD/USGS monitoring wells, and collected from historical information for production wells and oil wells within the District. The ultimate goal of this project is to incorporate these data in WRD's database/GIS and apply the system to generate aquifer surfaces and cross-sections for comparison with historical interpretations of basin hydrogeology. The final conceptual model will significantly improve the understanding of the aquifer depths, extents, and thicknesses throughout the District, and will assist Staff, pumpers and stakeholders with planning for groundwater resource projects such as new well drilling, storage opportunities, or modeling. The data will also be made available on WRD's website to be used as a reference source for hydrogeologic interpretations and fulfilling project-related data requests.

Hydrogeologic analysis is also needed for projects associated with groundwater quality concerns and specific cleanup projects. Staff work may include investigative surveys, data research, and oversight of specific project studies. Such efforts are used to relate water quality concerns with potential impact to basin resources. An example of this type of Staff work is the District's Well Profiling Program. The District assists pumpers in evaluating drinking water supply well contamination. Services may include existing data collection and review, and field tasks such as spinner logging and depth-discrete sampling. WRD's evaluation helps pumpers to determine the best course of action; e.g., sealing off a particular screened interval of a well, wellhead treatment, or well destruction.

Salt / Nutrient Management Plans are a new State requirement for all groundwater basins throughout California. The Plans are required as part of the Recycled Water Policy issued by the State Water Resources Control Board (SWRCB) and effective as of May 14, 2009. As stated in the Policy, its purpose is to "establish uniform requirements for recycled water use and to develop sustainable water supplies throughout the state". The SWRCB therefore "supports and encourages every region…to develop a Salt / Nutrient Management Plan by 2014". With one exception (elevated TDS concentrations near the coast due to historic seawater intrusion, now controlled through freshwater barrier injection), salts and nutrients have not been shown to be a concern in the CWCB. However, since Salt / Nutrient Management Plans are required, WRD began meeting with other stakeholders and the Regional Water Quality Control Board (RWQCB, the agency responsible for bringing stakeholders' Salt / Nutrient Management Plans to the SWRCB for approval) to initiate development of a Salt / Nutrient Management Plan for the CWCB. WRD will continue to take the lead in working with the RWQCB and stakeholders to develop a Plan for the CWCB.

For the ensuing year, it is expected that additional investigative research projects into the saline plume, well testing, and recycled water travel time using tracers will be performed. In 2011/2012, a major update to the regional groundwater flow model will continue to be performed by the USGS to incorporate 8 years of new information since the model was last updated.

The Hydrogeology Program addresses both groundwater replenishment objectives and groundwater quality matters. This dual service warrants that the cost of the program be split evenly between the Replenishment and Clean Water Funds.

**033 – Groundwater Reliability Improvement Program ("GRIP")**

The WRD continues to pursue projects through its WIN program that develop local, sustainable sources of water for use in groundwater replenishment. This has become increasingly important in light of the environmental and political issues limiting delivery of imported water to Los Angeles area together with the potential for a drought to hit California.

To address these issues WRD is seeking alternative sources of water to offset the imported water used for replenishment in the Montebello Forebay. This program is referred to as the Groundwater Reliability Improvement Program (GRIP). The effort of this program is to evaluate all feasible alternatives for replacing or offsetting the current quantity of imported water used for replenishment. One alternative being considered is the use of advanced treated recycled municipal wastewater (microfiltration, reverse osmosis, ultra-violet light with hydrogen peroxide.) from the Sanitation Districts of Los Angeles County's (SDLAC) San Jose Creek Water Reclamation Plant.

To determine the viability of this concept, in 2009 WRD entered into a partnership with the Upper San Gabriel Valley Municipal Water District ("USGVMWD") and the SDLAC to share in the cost for a consultant to perform a conceptual design of a facility for the purpose of developing preliminary cost estimates. The concept will be to deliver advanced treated water to the San Gabriel River spreading basins to meet a portion of WRD's replenishment requirements along with delivery to proposed spreading basins near the Santa Fe Dam to help satisfy the needs of the USGVMWD.

Upon finding the concept feasible, the same partners have more recently created a Joint Powers Authority (JPA) to fund a consultant to perform an Alternatives Analysis to evaluate various options in addition to the proposed treatment facility in order to bring replenishment water to the spreading grounds. This effort is expected to be completed in early 2011. The JPA has also hired an outreach consultant to educate and solicit input from the pumping community, elected officials, non-governmental organizations, as well as the general public. Any new source of replenishment water developed through the GRIP will help to improve the reliability and utilization of an available local resource. This resource is used to improve replenishment capabilities and is thus funded 100% from the Replenishment Fund.

# TABLES

Table 1

**GROUNDWATER CONDITIONS AND REPLENISHMENT SUMMARY**

| ITEM | WATER YEAR Oct 1 - Sep 30 | | |
|---|---|---|---|
| | *2009-2010* | *2010-2011 (a)* | *2011-2012 (a)* |
| Total Groundwater Production | 241,329 AF | 241,000 AF | 243,000 AF |
| Annual Overdraft | (84,200) AF | (80,800) AF | (97,800) AF |
| Accumulated Overdraft | (726,300) AF | (703,600) AF | |

**Quantity Required for Artificial Replenishment for the Ensuing Year**

| | | |
|---|---|---|
| **Spreading** | | |
| Imported for Spreading in Montebello Forebay | 21,000 | AF |
| Recycled for Spreading in Montebello Forebay | 50,000 | |
| Subtotal Spreading | 71,000 | |
| **Injection** | | |
| Alamitos Seawater Barrier Imported Water (WRD side only) | 3,100 | |
| Alamitos Seawater Barrier Recycled Water (WRD side only) | 3,100 | |
| Dominguez Gap Seawater Barrier Imported Water | 3,700 | |
| Dominguez Barrier Seawater Barrer Recycled Water | 3,700 | |
| West Coast Seawater Barrier Imported Water | 10,000 | |
| West Coast Seawater Barrier Recycled Water | 8,000 | |
| Subtotal Injection | 31,600 | |
| **In-lieu (b)** | | |
| Subtotal In-lieu | 10,303 | |
| **Total** | **112,903** | AF |

**Source and Unit Cost of Replenishment Water for the Ensuing Year**

| **Spreading** | **Oct-Dec** | | **Jan-Sep** | |
|---|---|---|---|---|
| *MWD Commodity Rate for Tier 1 Untreated Imported* | *$ 527* | */AF* | *$ 560* | */AF* |
| *CBMWD Administrative Surcharge* | *$ 90* | */AF* | *$ 90* | */AF* |
| *CBMWD Readiness to Serve (RTS) charge ** | *$ 26* | */AF* | *$ 26* | */AF* |
| **Cost to WRD (sum of above)** | **$ 644** | **/AF** | **$ 677** | **/AF** |
| plus CBMWD Water Service Charge | $ 72 | /cfs/mo | $ 72 | /cfs/mo |
| SDLAC recycled water from San Jose Creek | $ 34.40 | /AF | $ 34.40 | /AF |
| SDLAC recylced water from Whittier Narrows WRP | $ 7 | /AF | $ 7 | /AF |
| SDLAC makeup for undercharges in 2007-2009 | $ 19,074.86 | /mo | $ 19,074.86 | /mo |
| **Injection** | | | | |
| Alamitos Barrier | | | | |
| *MWD Commodity Rate for Tier 1 Treated Imported* | *$ 744* | */AF* | *$ 794* | */AF* |
| *Long Beach Administrative Surcharge* | *$ 5* | */AF* | *$ 5* | */AF* |
| **Cost to WRD (sum of above)** | **$ 749** | **/AF** | **$ 799** | **/AF** |
| plus Long Beach Capacity Charge * | $ 600 | /cfs/mo | $ 600 | /cfs/mo |
| Recycled water from WRD Vander Lans plant | $ 406 | /AF | $ 406 | /AF |
| Dominguez Gap and West Coast Barriers | | | | |
| *MWD Commodity Rate for Tier 1 Treated Imported* | *$ 744* | */AF* | *$ 794* | */AF* |
| *WBMWD Administrative Surcharge* | *$ 85* | */AF* | *$ 85* | */AF* |
| *WBMWD RTS ** | *$ 125* | */AF* | *$ 166* | */AF* |
| **Cost to WRD (sum of above)** | **$ 954** | **/AF** | **$ 1,045** | **/AF** |
| plus WBMWD Water Service Charge | $ 41 | /cfs/mo | $ 41 | /cfs/mo |
| plus WBMWD Capacity Charge * | $ 529 | /cfs/mo | $ 529 | /cfs/mo |
| Recycled water from LADWP (Dominguez Gap) | $ 431 | /AF | $ 431 | /AF |
| Recycled water from WBMWD (West Coast) | $ 567 | /AF | $ 567 | /AF |
| **In-lieu (b)** | | | | |
| MWD Member Agency | | | $ 336 | /AF |
| WBMWD Customer | | | $ 421 | /AF |

*(a) Estimated values*

*(b) Amounts and rates for In-lieu are estimated. Not yet been established by the Board for ensuing year*

** Amount is a direct pass through to MWD*

Table 2

**QUANTITY AND COST OF REPLENISHMENT WATER FOR WY 2010-2011**

| | Item | Quantity (AF) | Total Cost |
|---|---|---|---|
| Summary - All Water | Spreading - Tier 1 Untreated Imported | 21,000 | $ 14,425,530 |
| | Spreading - Recycled | 50,000 | $ 1,674,898 |
| | Alamitos Barrier - Imported | 3,100 | $ 2,468,390 |
| | Alamitos Barrier - Recycled* | 3,100 | $ - |
| | Dominguez Barrier - Imported | 3,700 | $ 3,722,765 |
| | Dominguez Barrier - Recycled | 3,700 | $ 1,594,700 |
| | West Coast Barrier - Imported | 10,000 | $ 10,034,402 |
| | West Coast Barrier - Recycled | 8,000 | $ 4,536,000 |
| | In-Lieu MWD Member | 7,503 | $ 2,521,008 |
| | In-Lieu WBMWD Customer | 2,800 | $ 1,178,800 |
| | **TOTAL** | **112,903** | **$ 42,156,493** |

**Detailed Breakout of Water Costs and Surcharges to WRD**

| | Item | Quantity | Oct-Dec | Jan-Sep | Melded | Total |
|---|---|---|---|---|---|---|
| Imported Water | **CBMWD** | | | | | |
| | MWD Untreated Tier 1 - Spreading ($/af) | 21,000 | $ 527 | $ 560 | $ 552 | $ 11,586,750 |
| | MWD RTS ($/af) | 21,000 | $ 26 | $ 26 | $ 26 | $ 551,250 |
| | CBMWD Administrative Surcharge ($/af) | 21,000 | $ 90 | $ 90 | $ 90 | $ 1,896,300 |
| | CBMWD Water Service Charge ($/cfs/month) | 450 | $ 72 | $ 72 | $ 72 | $ 391,230 |
| | **Total to CBMWD** | | | | | **$ 14,425,530** |
| | **LBWD** | | | | | |
| | MWD Treated Tier 1 - Alamitos Barrier ($/af) | 3,100 | $ 744 | $ 794 | $ 782 | $ 2,422,650 |
| | MWD Capacity Charge ($/cfs/month) | 4.20 | $ 600 | $ 600 | $ 600 | $ 30,240 |
| | LBWD Administrative Surcharge ($/af) | 3,100 | $ 5 | $ 5 | $ 5 | $ 15,500 |
| | **Total to LBWD** | | | | | **$ 2,468,390** |
| | **WBMWD** | | | | | |
| | MWD Tier 1 - Barriers (DG,WCB) ($/af) | 13,700 | $ 744 | $ 794 | $ 782 | $ 10,706,550 |
| | MWD RTS ($/af) | 13,700 | $ 94 | $ 125 | $ 117 | $ 1,606,325 |
| | MWD Capacity Charge ($/cfs/month) | 34 | $ 529 | $ 529 | $ 529 | $ 215,832 |
| | WBMWD Administrative Surcharge ($/af) | 13,700 | $ 85 | $ 85 | $ 85 | $ 1,164,500 |
| | WBMWD Water Service Charge ($/cfs/month) | 130 | $ 41 | $ 41 | $ 41 | $ 63,960 |
| | **Total to West Basin MWD** | | | | | **$ 13,757,167** |
| | **IN-LIEU** | | | | IL-PMT | |
| | MWD Member Agency ($/af) | 7,503 | - | - | $ 336 | $ 2,521,008 |
| | WBMWD Member Agency ($/af) | 2,800 | - | - | $ 421 | $ 1,178,800 |
| | **Total for In-Lieu Payments** | | | | | **$ 3,699,808** |
| Recycled Water | **LADWP** | | | | | |
| | LADWP Recycled Water ($/af) | 3,700 | $ 431 | $ 431 | $ 431 | $ 1,594,700 |
| | **Total to LADWP** | | | | | **$ 1,594,700** |
| | **SDLAC** | | | | | |
| | SDLAC - San Jose Creek WRP ($/af) | 40,000 | $ 34 | $ 34 | $ 34 | $ 1,376,000 |
| | SDLAC - Whittier Narrows WRP ($/af) | 10,000 | $ 7 | $ 7 | $ 7 | $ 70,000 |
| | SDLAC - Makeup Payment ($) | | | | | $ 228,898 |
| | **Total to SDLAC** | | | | | **$ 1,674,898** |
| | **WBMWD** | | | | | |
| | WBMWD Recycled Water ($/af) | 8,000 | $ 567 | $ 567 | $ 567 | $ 4,536,000 |
| | **Total to WBMWD** | | | | | **$ 4,536,000** |
| | **WRD** | | | | | |
| | WRD Recycled Water Vander Lans ($/af) | 3,100 | $ 406 | $ 406 | $ 406 | **$ 1,258,600** |
| | WRD Recycled Water Vander Lans ($/af)* | 3,100 | $ 406 | $ 406 | $ 406 | **$ (1,258,600)** |
| | **Total to WRD** | | | | | **$ -** |
| | **TOTAL** | | | | | **$ 42,156,493** |

* Cost is based on O&M less MWD rebate. Shown as a water cost but deducted out since it's part of the Vander Lans project

Table 3

**WRD PROJECTS AND PROGRAMS**

| PROJECT / PROGRAM | DISTRICT FUNCTION | |
|---|---|---|
| | Replenishment | Clean Water |
| 001 Leo J. Vander Lans Water Treatment Facility Project | 100% | |
| 002 Robert W. Goldsworthy Desalter Project | | 100% |
| 004 Recycled Water Program | 100% | |
| 005 Groundwater Resources Planning Program | 100% | |
| 006 Groundwater Quality Program | | 100% |
| 010 Geographic Information System | 50% | 50% |
| 011 Regional Groundwater Monitoring Program | 50% | 50% |
| 012 Safe Drinking Water Program | | 100% |
| 018 Dominguez Gap Barrier Recycled Water Injection | 100% | |
| 023 Replenishment Operations (Spreading & Barriers) | 100% | |
| 025 Hydrogeology Program | 50% | 50% |
| 033 Groundwater Resources Improvement Program (GRIP) | 100% | 0% |

Table 4

**30-YEAR AVERAGE GROUNDWATER BALANCE FROM USGS & WRD REGIONAL MODEL**

| INFLOWS | Average AFY | OUTFLOWS | Average AFY |
|---|---|---|---|
| **Natural Inflows:** | | **Artificial Outflows:** | |
| Local water conserved at spreading grounds [1] | 48,825 | Pumping | 250,590 |
| Interior and mountain front recharge | 47,900 | | |
| Net underflow from adjacent basins [2] | 48,480 | | |
| Subtotal Natural Inflows: | 145,205 | | |
| **Artificial Inflows:** | | | |
| Imported and recycled spreading [3] | 74,075 | | |
| Barrier injection water [4] | 34,600 | | |
| Subtotal Artificial Inflows: | 108,675 | | |
| **Total Inflows:** | **253,880** | **Total Outflows:** | **250,590** |

**Average Annual Groundwater Deficiency (afy) = Natural Inflows - Total Outflows = (105,385)**

[1] includes stormwater and base flow water captured and recharged at the spreading grounds

[2] does not include average of 7,100 afy of seawater intrusion, which can not be considered as replenishment per the water code

[3] includes all imported purchased, all recycled purchased, and Pomona Plant (free) recycled water.

[4] includes all injected water at the three barrier systems, including all of Alamitos Barrier. Model value may differ slightly from actual purchases.

Description of the model can be found in USGS, 2003, Geohydrology, Geochemistry, and Ground-Water Simulation - Optimization of the Central and West Coast Basins, Los Angeles County, California; Water Resources Investigation Report 03-4065 by Reichard, E.G., Land, M., Crawford, S.M., Johnson, T., Everett, R.R., Kulshan, T.V., Ponti, D.J., Halford, K.J., Johnson, T.A., Paybins, K.S., and Nishikawa, T.

Table 5

**HISTORICAL RAINFALL**

**Station #107D, Downey Fire Department**

| Water Year | Inches | Water Year | Inches | Water Year | Inches | Water Year | Inches |
|---|---|---|---|---|---|---|---|
| 1925-26 | 12.63 | 1950-51 | 8.27 | 1975-76 | 9.55 | 2000-01 | 14.98 |
| 1926-27 | 16.92 | 1951-52 | 24.68 | 1976-77 | 11.23 | 2001-02 | 2.52 |
| 1927-28 | 11.97 | 1952-53 | 10.53 | 1977-78 | 33.85 | 2002-03* | 19.89 |
| 1928-29 | 11.52 | 1953-54 | 12.33 | 1978-79 | 18.68 | 2003-04 | 7.73 |
| 1929-30 | 10.84 | 1954-55 | 11.84 | 1979-80 | 28.29 | 2004-05 | 23.43 |
| 1930-31 | 10.45 | 1955-56 | 13.97 | 1980-81 | 8.74 | 2005-06 | 11.36 |
| 1931-32 | 14.52 | 1956-57 | 9.89 | 1981-82 | 13.41 | 2006-07 | 1.95 |
| 1932-33 | 10.02 | 1957-58 | 24.65 | 1982-83 | 30.3 | 2007-08 | 17.11 |
| 1933-34 | 11.1 | 1958-59 | 6.68 | 1983-84 | 11.96 | 2008-09 | 9.49 |
| 1934-35 | 21.94 | 1959-60 | 9.84 | 1984-85 | 12.44 | 2009-10 | 10.42 |
| 1935-36 | 9.65 | 1960-61 | 4.3 | 1985-86 | 19.47 | | |
| 1936-37 | 22.11 | 1961-62 | 18.46 | 1986-87 | 6.49 | | |
| 1937-38 | 21.75 | 1962-63 | 10.9 | 1987-88 | 11.47 | | |
| 1938-39 | 18.69 | 1963-64 | 6.86 | 1988-89 | 7.82 | | |
| 1939-40 | 12.81 | 1964-65 | 13.27 | 1989-90 | 7.87 | | |
| 1940-41 | 34.21 | 1965-66 | 17.02 | 1990-91 | 12.22 | | |
| 1941-42 | 14.66 | 1966-67 | 17.78 | 1991-92 | 16.07 | | |
| 1942-43 | 17.91 | 1967-68 | 11.46 | 1992-93 | 26.55 | | |
| 1943-44 | 17.89 | 1968-69 | 22.33 | 1993-94 | 9.26 | | |
| 1944-45 | 11.25 | 1969-70 | 7.52 | 1994-95 | 26.82 | | |
| 1945-46 | 10.31 | 1970-71 | 11.45 | 1995-96 | 10.68 | | |
| 1946-47 | 15.24 | 1971-72 | 6.4 | 1996-97 | 13.95 | | |
| 1947-48 | 8.62 | 1972-73 | 18.57 | 1997-98 | 32.47 | | |
| 1948-49 | 9.04 | 1973-74 | 14.51 | 1998-99 | 7.29 | | |
| 1949-50 | 10.14 | 1974-75 | 15.01 | 1999-00 | 9.21 | | |
| | | | **Period of Record** | **85 years** | | | |
| | | | **Running 85 Year Average** | **14.2 inches** | | | |
| | | | **Minimum** | **2.0 inches** | | | |
| | | | **Maximum** | **34.2 inches** | | | |

* 2002/03 from station 388D (City of Paramount Fire Station), since 107D data are incomplete

Table 6

**ANNUAL OVERDRAFT CALCULATION**

**for Current and Ensuing Water Years (in acre-feet)**

| Item | WATER YEAR 2010-2011 | WATER YEAR 2011-2012 |
|---|---|---|
| **Average Annual Groundwater Deficiency (from Table 4)** | (105,385) | (105,385) |
| **Adjustments/Variances to AAGD** | | |
| (1) Local Water at Spreading Grounds[a] | 10,000 [d] | 0 [d] |
| (2) Precipitation, mountain front recharge, applied water[a] | 5,000 [d] | 0 [d] |
| (3) Subsurface inflow[b] | 0 [d] | 0 [d] |
| (4) Groundwater Extractions[c] | (9,600) [d] | (7,600) [d] |
| **ANNUAL OVERDRAFT [AAGD+(1)+(2)+(3)-(4)]** | (80,800) | (97,800) |

*Note: Numbers in parentheses represent negative values.*

*(a) Difference between actual and model average. Positive value indicates increased recharge.*

*(b) Difference between annual model value and average model value. Positive value indicates increased inflow. Does not include seawater intrusion inflow*

*(c) Difference between actual and model average. Positive value indicates increased pumpage.*

*(d) Estimated Values. A value of zero indicates average year was assumed.*

Table 7

**ACCUMULATED OVERDRAFT CALCULATION (in acre-feet)**

| ITEM | AMOUNT |
|---|---|
| **Accumulated Overdraft at end of Previous Water Year** | (726,300) |
| Estimated Annual Overdraft for Current Year | (80,800) |
| **Subtotal without artificial replenishment** | (807,100) |
| **Planned Artificial Replenishment for Current Year** | |
| Imported Water Purchased for Spreading* | 24,500 |
| Recycled Water Purchased for Spreading | 50,000 |
| Imported and Recycled Water Purchased for Barrier Wells | 29,000 |
| **Replenishment Subtotal** | 103,500 |
| **PROJECTED ACCUMULATED OVERDRAFT FOR CURRENT YEAR** | **(703,600)** |

*Note: Numbers in parentheses represent negative values.*

* - 21,000 for normal annual amount + 3,500 af of planned but unpurchased water from previous years. Unpurchased due to unavailabilitiy of discounted replenishment water or other factors.

Table 8

**CHANGES IN GROUNDWATER STORAGE**

| WATER YEAR | ANNUAL CHANGE IN STORAGE (AF) | CUMULATIVE CHANGE IN STORAGE (AF) | WATER YEAR | ANNUAL CHANGE IN STORAGE (AF) | CUMULATIVE CHANGE IN STORAGE (AF) | WATER YEAR | ANNUAL CHANGE IN STORAGE (AF) | CUMULATIVE CHANGE IN STORAGE (AF) |
|---|---|---|---|---|---|---|---|---|
| 1961-62 | 88,500 | 88,500 | 1985-86 | 10,600 | 238,200 | 2009-10 | 27,000 | 141,500 |
| 1962-63 | (11,100) | 77,400 | 1986-87 | 4,000 | 242,200 | 2010-11 | - | - |
| 1963-64 | 10,300 | 87,700 | 1987-88 | (11,700) | 230,500 | 2011-12 | - | - |
| 1964-65 | 35,200 | 122,900 | 1988-89 | 10,400 | 240,900 | 2012-13 | - | - |
| 1965-66 | 21,100 | 144,000 | 1989-90 | 13,600 | 254,500 | 2013-14 | - | - |
| 1966-67 | 21,400 | 165,400 | 1990-91 | 28,400 | 282,900 | 2014-15 | - | - |
| 1967-68 | 11,400 | 176,800 | 1991-92 | 1,600 | 284,500 | 2015-16 | - | - |
| 1968-69 | (7,500) | 169,300 | 1992-93 | 45,800 | 330,300 | 2016-17 | - | - |
| 1969-70 | (800) | 168,500 | 1993-94 | (28,500) | 301,800 | 2017-18 | - | - |
| 1970-71 | (3,400) | 165,100 | 1994-95 | 19,400 | 321,200 | 2018-19 | - | - |
| 1971-72 | (50,600) | 114,500 | 1995-96 | 12,500 | 333,700 | 2019-20 | - | - |
| 1972-73 | 34,800 | 149,300 | 1996-97 | 15,700 | 349,400 | 2020-21 | - | - |
| 1973-74 | (2,400) | 146,900 | 1997-98 | 16,700 | 366,100 | 2021-22 | - | - |
| 1974-75 | (14,100) | 132,800 | 1998-99 | (80,200) | 285,900 | 2022-23 | - | - |
| 1975-76 | (40,200) | 92,600 | 1999-00 | (30,000) | 255,900 | 2023-24 | - | - |
| 1976-77 | (32,900) | 59,700 | 2000-01 | (400) | 255,500 | 2024-25 | - | - |
| 1977-78 | 88,600 | 148,300 | 2001-02 | (36,500) | 219,000 | 2025-26 | - | - |
| 1978-79 | 30,100 | 178,400 | 2002-03 | (10,500) | 208,500 | 2026-27 | - | - |
| 1979-80 | (1,100) | 177,300 | 2003-04 | (43,000) | 165,500 | 2027-28 | - | - |
| 1980-81 | 17,100 | 194,400 | 2004-05 | 89,100 | 254,600 | 2028-29 | - | - |
| 1981-82 | 18,400 | 212,800 | 2005-06 | 12,000 | 266,600 | 2029-30 | - | - |
| 1982-83 | 46,800 | 259,600 | 2006-07 | (59,000) | 207,600 | 2030-31 | - | - |
| 1983-84 | (22,400) | 237,200 | 2007-08 | (41,600) | 166,000 | 2031-32 | - | - |
| 1984-85 | (9,600) | 227,600 | 2008-09 | (51,500) | 114,500 | 2032-33 | - | - |

*Note: Numbers in parentheses represent negative values.*

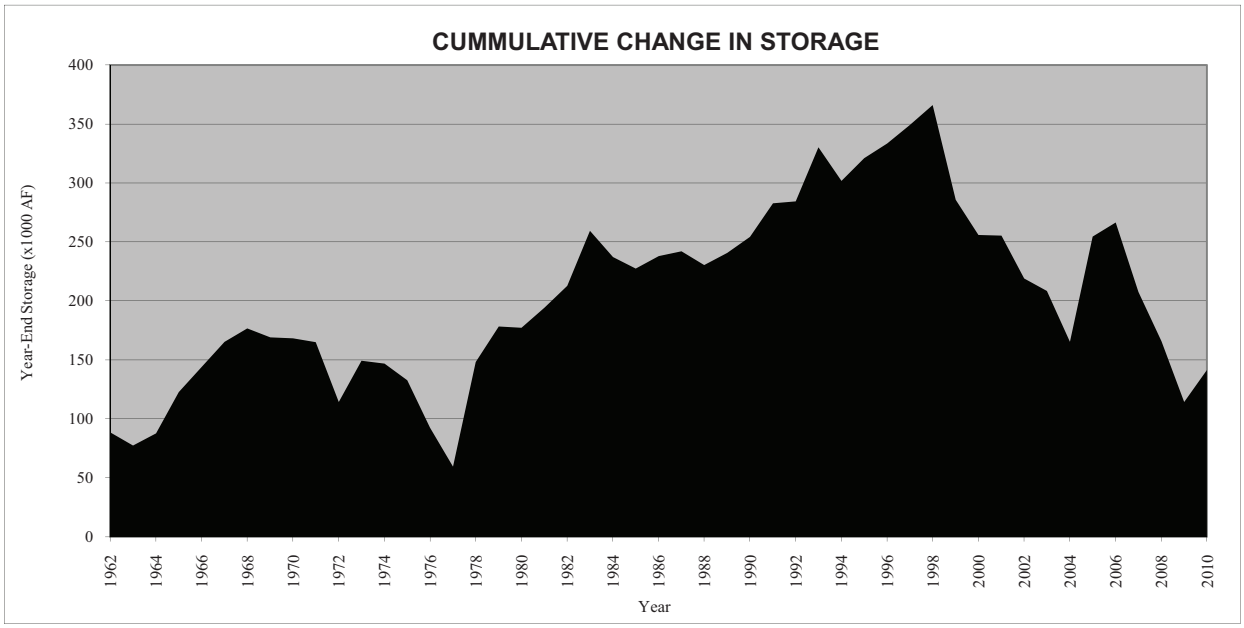


Table 9

**QUANTITY OF WATER REQUIRED FOR ARTIFICIAL REPLENISHMENT**

| WATER TYPE | AMOUNT (AF) |
|---|---|
| Long Term Average for Imported Spreading (updated, see below)* | 21,000 |
| Recycled Water for Spreading (WRD Purchases) | 50,000 |
| **Total Spreading** | **71,000** |
| West Coast Barrier - Imported | 10,000 |
| West Coast Barrier - Recycled | 8,000 |
| Dominguez Gap - Imported | 3,700 |
| Dominguez Gap - Recycled | 3,700 |
| Alamitos Barrier - Imported - WRD portion only | 3,100 |
| Alamitos Barrier - Recycled - WRD portion only | 3,100 |
| **Total Barriers** | **31,600** |
| In-Lieu Central Basin | 6,000 |
| In-Lieu West Coast Basin | 4,303 |
| **Total In-Lieu** | **10,303** |
| **Total Water Purchase Estimate for Ensuing Year** | **112,903** |

* - Derivation of new Long Term Imported Spreading Requirement is possible due to new projects that will capture more stormwater for conservation, and thus less imported needs:

1. Long Term Average of 27,600 af defined in 2003 ESR
2. Minus 3,000 afy for increasing Whittier Narrows Conservation Pool
3. Minus 3,600 afy for two new rubber dams on San Gabriel River
4. Equals new Long Term Average of **21,000** afy imported spreading

# HISTORICAL AMOUNTS OF WATER REPLENISHED IN THE MONTEBELLO FOREBAY SPREADING GROUNDS

(In Acre-feet)

| WATER YEAR | Imported Water | | Recycled Water | | | Local Water [a] | Make-up Water | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | LACFCD or Other | WRD | Whittier WRP | San Jose Creek WRP | Pomona WRP[g] | Stormwater & River Baseflow | USGVMWD & SGVMWD | CBMWD | |
| 1953-54 | 30,000 | | | | | | | | 30,000 |
| 1954-55 | 24,800 | | | | | | | | 24,800 |
| 1955-56 | 54,500 | | | | | | | | 54,500 |
| 1956-57 | 50,000 | | | | | | | | 50,000 |
| 1957-58 | 105,100 | | | | | 87,558 | | | 192,658 |
| 1958-59 | 54,400 | | | | | 31,787 | | | 86,187 |
| 1959-60 | 80,900 | | | | | 20,064 | | | 100,964 |
| 1960-61 | 80,800 | 66,400 | | | | 9,118 | | | 156,318 |
| 1961-62 | 39,500 | 168,600 | 1,178 | | | 39,548 | | | 248,826 |
| 1962-63 | 4,800 | 75,800 | 12,405 | | | 14,565 | | | 107,570 |
| 1963-64 | | 104,900 | 13,258 | | | 9,992 | | | 128,150 |
| 1964-65 | 75,500 | 84,600 | 14,528 | | | 13,097 | | | 187,725 |
| 1965-66 | 67,800 | 53,900 | 15,056 | | | 45,754 | 6,500 | | 189,010 |
| 1966-67 | 74,100 | 10,200 | 16,223 | | | 59,820 | - | | 160,343 |
| 1967-68 | 66,600 | 28,800 | 18,275 | | | 39,760 | - | | 153,435 |
| 1968-69 | 12,500 | 5,300 | 13,877 | | | 119,395 | - | | 151,072 |
| 1969-70 | 25,800 | 43,100 | 17,158 | | | 52,917 | - | | 138,975 |
| 1970-71 | 46,700 | 25,400 | 19,494 | | | 89,514 | - | | 181,108 |
| 1971-72 | | 34,450 | 17,543 | | | 17,688 | - | - | 69,681 |
| 1972-73 | | 71,900 | 13,622 | 8,327 | | 45,077 | - | 20,000 | 158,926 |
| 1973-74 | | 68,200 | 13,385 | 7,064 | | 29,171 | - | 23,900 | 141,720 |
| 1974-75 | | 71,900 | 14,650 | 6,549 | | 29,665 | - | - | 122,764 |
| 1975-76 | | 50,800 | 12,394 | 9,062 | | 22,073 | - | - | 94,329 |
| 1976-77 | | 9,300 | 10,158 | 12,705 | | 19,252 | 14,500 | 6,900 | 72,815 |
| 1977-78 | | 39,900 | 13,104 | 5,997 | | 147,317 | - | - | 206,318 |
| 1978-79 | | 65,300 | 10,716 | 11,741 | | 68,859 | - | - | 156,616 |
| 1979-80 | | 10,200 | 14,568 | 9,815 | | 106,820 | 10,900 | - | 152,303 |
| 1980-81 | 3,300 | 28,700 | 11,464 | 14,645 | | 50,590 | 31,500 | - | 140,199 |
| 1981-82 | | 4,600 | 14,133 | 15,285 | | 47,930 | 30,900 [c] | - | 112,848 |
| 1982-83 | | 2,000 | 12,818 | 4,217 | | 126,076 | 8,900 [c] | - | 154,011 |
| 1983-84 | | 1,500 | 13,194 | 14,590 | | 60,710 | 20,800 [c] | - | 110,794 |
| 1984-85 | | 40,600 | 12,905 | 14,093 | | 39,099 | - | - | 106,697 |
| 1985-86 | | 21,500 | 13,827 | 11,487 | | 66,966 | - | - | 113,780 |
| 1986-87 | | 49,200 | 15,280 | 20,041 | | 27,613 | - | 6,500 | 118,634 |
| 1987-88 | | 23,300 | 14,585 | 27,182 | | 50,068 | 5,800 [c] | - | 120,935 |
| 1988-89 | | 50,300 | 13,830 | 33,327 | | 17,096 | 6,500 [c] | - | 121,053 |
| 1989-90 | | 52,700 | 15,043 | 33,498 | 1,568 | 9,388 | 13,600 [c] | - | 125,797 |
| 1990-91 | | 56,287 | 13,841 | 38,603 | 1,420 | 35,717 | 100 [c] | - | 145,968 |
| 1991-92 | | 43,103 | 12,620 | 31,326 | 2,957 | 136,357 | - | - | 226,363 |
| 1992-93 | | 16,561 | 11,026 | 29,811 | 8,027 | 147,699 | - | - | 213,124 |
| 1993-94 | | 20,411 | 10,249 | 40,768 | 2,965 | 55,896 | - | - | 130,288 |
| 1994-95 | | 21,837 | 10,642 | 18,431 | 4,228 | 100,578 | - | - | 155,715 |
| 1995-96 | | 17,961 | 9,971 | 40,922 | 2,969 | 62,920 | - | - | 134,743 |
| 1996-97 | | 19,990 | 9,850 | 36,977 | 3,132 | 58,262 | - | - | 128,211 |
| 1997-98 | | 953 | 8,378 | 26,483 | 2,156 | 96,706 | - | - | 134,676 |
| 1998-99 | | - | 10,968 | 34,782 | 1,451 | 32,013 | - | - | 79,214 |
| 1999-00 | | 45,037 | 8,950 | 30,481 | 3,839 | 20,607 | - | - | 108,914 |
| 2000-01 | | 23,451 | 8,253 | 35,165 | 2,925 | 39,725 | - | - | 109,519 |
| 2001-02 | | 42,875 [d] | 8,474 | 50,194 | 1,928 | 17,000 | - | - | 120,471 |
| 2002-03 | | 22,365 [e] | 5,156 | 35,320 | 2,320 | 58,202 | - | - | 123,363 |
| 2003-04 | | 27,520 [f] | 8,195 | 34,033 | 2,697 | 30,467 | - | - | 102,912 |
| 2004-05 | | 25,145 [f] | 6,741 | 20,547 | 2,215 | 148,674 | - | - | 203,322 |
| 2005-06 | | 33,229 | 8,868 | 30,180 | 2,973 | 60,377 | - | - | 135,628 |
| 2006-07 | | 40,214 | 7,334 | 34,823 | 2,882 | 11,495 | - | - | 96,748 |
| 2007-08 | 1,510 | - [b] | 6,212 | 29,131 | 4,424 | 54,518 | - | - | 95,795 |
| 2008-09 | | - | 5,202 | 29,999 | 4,410 | 35,348 | - | - | 74,959 |
| 2009-10 | | 26,286 | 5,431 | 45,538 | 4,762 | 35,398 | - | - | 117,415 |
| TOTAL | 898,610 | 1,846,574 | 575,032 | 933,139 | 66,246 | | 150,000 | 57,300 | **7,379,207** |
| | Import: | 2,745,184 | | Recycled: | 1,574,417 | Local: 2,852,306 | Make-up: | 207,300 | |

*(a) Local water is stormwater or river baseflow captured at the Montebello Forebay Spreading Grounds.*
*(b) CBMWD purchased 1,510 af of imported water for spreading for Downey, Lakewood, and Cerritos.*
*(c) Includes State Project water imported by the San Gabriel Valley Municipal Water District.*
*(d) Includes 1,607 af of EPA extracted groundwater from Whittier Narrows considered imported water to WRD. Paid for in 2003.*
*(e) Includes 5,069 af of EPA extracted groundwater from W.N. considered imported water to WRD. Paid for in June 2005.*
*(f) includes 13,000 af of water banked by Long Beach under a storage agreement with WRD (792 af 02/03, 12,210 af 3/04).*
*(g)Pomona WRP data reliable starting 1989/90. May have been discharges to spreading grounds prior to this, but not verifiable.*

# HISTORICAL AMOUNTS OF WATER PURCHASED FOR INJECTION

(In Acre-feet)

| Water Year | West Coast Barrier (a) | | | Dominguez Gap Barrier (b) | | | Alamitos Barrier | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WRD | | | OCWD | | | Total | |
| | Imported | Recycled | Total | Imported | Recycled | Total | Imported | Recycled | Total | Imported | Recycled | Total | | |
| 1952-53 | 1,140 | | 1,140 | | | | | | | | | | | 1,140 |
| 1953-54 | 3,290 | | 3,290 | | | | | | | | | | | 3,290 |
| 1954-55 | 2,740 | | 2,740 | | | | | | | | | | | 2,740 |
| 1955-56 | 2,840 | | 2,840 | | | | | | | | | | | 2,840 |
| 1956-57 | 3,590 | | 3,590 | | | | | | | | | | | 3,590 |
| 1957-58 | 4,330 | | 4,330 | | | | | | | | | | | 4,330 |
| 1958-59 | 3,700 | | 3,700 | | | | | | | | | | | 3,700 |
| 1959-60 | 3,800 | | 3,800 | | | | | | | | | | | 3,800 |
| 1960-61 | 4,480 | | 4,480 | | | | | | | | | | | 4,480 |
| 1961-62 | 4,510 | | 4,510 | | | | | | | | | | | 4,510 |
| 1962-63 | 4,200 | | 4,200 | | | | | | | | | | | 4,200 |
| 1963-64 | 10,450 | | 10,450 | | | | | | | | | | | 10,450 |
| 1964-65 | 33,020 | | 33,020 | | | | 2,760 | | 2,760 | 200 | | 200 | 2,960 | 35,980 |
| 1965-66 | 44,390 | | 44,390 | | | | 3,370 | | 3,370 | 350 | | 350 | 3,720 | 48,110 |
| 1966-67 | 43,060 | | 43,060 | | | | 3,390 | | 3,390 | 490 | | 490 | 3,880 | 46,940 |
| 1967-68 | 39,580 | | 39,580 | | | | 4,210 | | 4,210 | 740 | | 740 | 4,950 | 44,530 |
| 1968-69 | 36,420 | | 36,420 | | | | 4,310 | | 4,310 | 950 | | 950 | 5,260 | 41,680 |
| 1969-70 | 29,460 | | 29,460 | | | | 3,760 | | 3,760 | 720 | | 720 | 4,480 | 33,940 |
| 1970-71 | 29,870 | | 29,870 | 2,200 | | 2,200 | 3,310 | | 3,310 | 822 | | 822 | 4,132 | 36,202 |
| 1971-72 | 26,490 | | 26,490 | 9,550 | | 9,550 | 4,060 | | 4,060 | 936 | | 936 | 4,996 | 41,036 |
| 1972-73 | 28,150 | | 28,150 | 8,470 | | 8,470 | 4,300 | | 4,300 | 883 | | 883 | 5,183 | 41,803 |
| 1973-74 | 27,540 | | 27,540 | 7,830 | | 7,830 | 6,140 | | 6,140 | 1,148 | | 1,148 | 7,288 | 42,658 |
| 1974-75 | 26,430 | | 26,430 | 5,160 | | 5,160 | 4,440 | | 4,440 | 658 | | 658 | 5,098 | 36,688 |
| 1975-76 | 35,220 | | 35,220 | 4,940 | | 4,940 | 4,090 | | 4,090 | 565 | | 565 | 4,655 | 44,815 |
| 1976-77 | 34,260 | | 34,260 | 9,280 | | 9,280 | 4,890 | | 4,890 | 885 | | 885 | 5,775 | 49,315 |
| 1977-78 | 29,640 | | 29,640 | 5,740 | | 5,740 | 4,020 | | 4,020 | 833 | | 833 | 4,853 | 40,233 |
| 1978-79 | 23,720 | | 23,720 | 5,660 | | 5,660 | 4,220 | | 4,220 | 898 | | 898 | 5,118 | 34,498 |
| 1979-80 | 28,630 | | 28,630 | 4,470 | | 4,470 | 3,560 | | 3,560 | 459 | | 459 | 4,019 | 37,119 |
| 1980-81 | 26,350 | | 26,350 | 3,550 | | 3,550 | 3,940 | | 3,940 | 524 | | 524 | 4,464 | 34,364 |
| 1981-82 | 24,640 | | 24,640 | 4,720 | | 4,720 | 4,540 | | 4,540 | 392 | | 392 | 4,932 | 34,292 |
| 1982-83 | 33,950 | | 33,950 | 6,020 | | 6,020 | 3,270 | | 3,270 | 1,946 | | 1,946 | 5,216 | 45,186 |
| 1983-84 | 28,000 | | 28,000 | 7,640 | | 7,640 | 2,440 | | 2,440 | 1,402 | | 1,402 | 3,842 | 39,482 |
| 1984-85 | 25,210 | | 25,210 | 7,470 | | 7,470 | 3,400 | | 3,400 | 1,444 | | 1,444 | 4,844 | 37,524 |
| 1985-86 | 20,260 | | 20,260 | 6,160 | | 6,160 | 3,410 | | 3,410 | 1,863 | | 1,863 | 5,273 | 31,693 |
| 1986-87 | 26,030 | | 26,030 | 6,230 | | 6,230 | 4,170 | | 4,170 | 2,887 | | 2,887 | 7,057 | 39,317 |
| 1987-88 | 24,270 | | 24,270 | 7,050 | | 7,050 | 3,990 | | 3,990 | 2,173 | | 2,173 | 6,163 | 37,483 |
| 1988-89 | 22,740 | | 22,740 | 5,220 | | 5,220 | 3,900 | | 3,900 | 1,674 | | 1,674 | 5,574 | 33,534 |
| 1989-90 | 20,279 | | 20,279 | 5,736 | | 5,736 | 4,110 | | 4,110 | 1,929 | | 1,929 | 6,039 | 32,054 |
| 1990-91 | 16,039 | | 16,039 | 7,756 | | 7,756 | 4,096 | | 4,096 | 1,818 | | 1,818 | 5,914 | 29,709 |
| 1991-92 | 22,180 | | 22,180 | 6,894 | | 6,894 | 4,172 | | 4,172 | 1,552 | | 1,552 | 5,724 | 34,798 |
| 1992-93 | 21,516 | | 21,516 | 4,910 | | 4,910 | 3,350 | | 3,350 | 1,565 | | 1,565 | 4,915 | 31,341 |
| 1993-94 | 15,482 | | 15,482 | 5,524 | | 5,524 | 2,794 | | 2,794 | 1,309 | | 1,309 | 4,103 | 25,109 |
| 1994-95 | 14,237 | 1,480 | 15,717 | 4,989 | | 4,989 | 2,883 | | 2,883 | 890 | | 890 | 3,773 | 24,479 |
| 1995-96 | 12,426 | 4,170 | 16,596 | 5,107 | | 5,107 | 3,760 | | 3,760 | 2,010 | | 2,010 | 5,770 | 27,473 |
| 1996-97 | 11,388 | 6,241 | 17,629 | 5,886 | | 5,886 | 4,015 | | 4,015 | 1,750 | | 1,750 | 5,765 | 29,280 |
| 1997-98 | 8,173 | 8,308 | 16,481 | 3,771 | | 3,771 | 3,677 | | 3,677 | 1,504 | | 1,504 | 5,181 | 25,433 |
| 1998-99 | 10,125 | 6,973 | 17,097 | 4,483 | | 4,483 | 4,012 | | 4,012 | 1,689 | | 1,689 | 5,700 | 27,280 |
| 1999-00 | 11,172 | 7,460 | 18,632 | 6,010 | | 6,010 | 4,028 | | 4,028 | 1,707 | | 1,707 | 5,735 | 30,377 |
| 2000-01 | 13,988 | 6,838 | 20,826 | 3,923 | | 3,923 | 3,710 | | 3,710 | 1,964 | | 1,964 | 5,674 | 30,423 |
| 2001-02 | 12,724 | 7,276 | 20,000 | 5,459 | | 5,459 | 3,961 | | 3,961 | 2,232 | | 2,232 | 6,193 | 31,652 |
| 2002-03 | 10,419 | 6,192 | 16,611 | 8,056 | | 8,056 | 3,445 | | 3,445 | 1,197 | | 1,197 | 4,642 | 29,309 |
| 2003-04 | 9,304 | 3,669 | 12,973 | 6,089 | | 6,089 | 3,876 | | 3,876 | 2,092 | | 2,092 | 5,968 | 25,030 |
| 2004-05 | 4,548 | 3,920 | 8,468 | 8,557 | | 8,557 | 2,870 | | 2,870 | 1,685 | | 1,685 | 4,555 | 21,580 |
| 2005-06 | 5,997 | 4,249 | 10,246 | 7,259 | 1,450 | 8,709 | 1,042 | 921 | 1,963 | 330 | 254 | 584 | 2,547 | 21,502 |
| 2006-07 | 4,373 | 10,960 | 15,333 | 5,510 | 1,733 | 7,243 | 1,568 | 219 | 1,787 | 543 | 165 | 708 | 2,495 | 25,071 |
| 2007-08 | 3,662 | 10,954 | 14,616 | 4,468 | 2,452 | 6,920 | 3,467 | 1,284 | 4,751 | 1,283 | 475 | 1,758 | 6,509 | 28,045 |
| 2008-09 | 7,178 | 6,434 | 13,612 | 4,550 | 2,414 | 6,964 | 4,145 | 1,275 | 5,420 | 1,518 | 535 | 2,053 | 7,473 | 28,049 |
| 2009-10 | 9,661 | 7,620 | 17,281 | 5,495 | 2,037 | 7,532 | 2,596 | 1,775 | 4,371 | 659 | 470 | 1,129 | 5,500 | 30,313 |
| TOTAL | 1,041,271 | 102,743 | 1,144,014 | 237,792 | 10,086 | 247,878 | 169,467 | 5,474 | 174,941 | 57,069 | 1,899 | 58,967 | 233,908 | 1,625,799 |

*(a) Prior to 10/1/71, water was purchased by the State, West Basin Water Association, local water interests, Zone II of the LA County Flood Control District and WRD. After 10/1/71, all purchases have been by WRD*

*(b) In 1970-71, purchases were shared by WRD and Zone II. After 10/1/71, all purchases have been by WRD*

17,752 11,432 29,184 29,184

## HISTORICAL AMOUNTS OF THE IN-LIEU PROGRAM

(In Acre-Feet)

| WATER YEAR | CENTRAL BASIN | WEST COAST BASIN | TOTAL |
|---|---|---|---|
| 1965-66 | - | 745 | 745 |
| 1966-67 | - | 851 | 851 |
| 1967-68 | - | 850 | 850 |
| 1968-69 | - | 850 | 850 |
| 1969-70 | - | 900 | 900 |
| 1970-71 | - | 881 | 881 |
| 1971-72 | - | 756 | 756 |
| 1972-73 | - | 901 | 901 |
| 1973-74 | - | 901 | 901 |
| 1974-75 | - | 400 | 400 |
| 1975-76 | - | 400 | 400 |
| 1976-77 | - | 400 | 400 |
| 1977-78 | 11,316 | 4,815 | 16,131 |
| 1978-79 | 9,723 | 8,655 | 18,378 |
| 1979-80 | 10,628 | 4,333 | 14,961 |
| FISCAL YEAR | | | |
| 1980-81 | 17,617 | 6,206 | 23,823 |
| 1981-82 | 14,050 | 4,833 | 18,883 |
| 1982-83 | 13,813 | 5,939 | 19,752 |
| 1983-84 | 29,216 | 12,524 | 41,740 |
| 1984-85 | 23,246 | 13,594 | 36,840 |
| 1985-86 | 15,505 | 10,627 | 26,132 |
| 1986-87 | 16,205 | 12,997 | 29,202 |
| 1987-88 | 15,518 | 12,893 | 28,411 |
| 1988-89 | 11,356 | 14,069 | 25,425 |
| 1989-90 | 16,858 | 12,293 | 29,151 |
| 1990-91 | 11,886 | 10,153 | 22,039 |
| 1991-92 | 13,000 | 6,104 | 19,104 |
| 1992-93 | 37,652 | 15,654 | 53,306 |
| 1993-94 | 83,488 | 26,093 | 109,581 |
| 1994-95 | 32,904 | 17,994 | 50,898 |
| 1995-96 | 37,517 | 13,816 | 51,333 |
| 1996-97 | 34,547 | 4,847 | 39,394 |
| 1997-98 | 22,995 | 7,335 | 30,330 |
| 1998-99 | 13,213 | 10,303 | 23,516 |
| 1999-00 | 18,799 | 3,479 | 22,278 |
| 2000-01 | 18,364 | 2,817 | 21,181 |
| 2001-02 | 11,931 | 8,789 | 20,720 |
| 2002-03 | 6,866 | 4,339 | 11,205 |
| 2003-04 | - | - | - |
| 2004-05 | 6,000 | 1,804 | 7,804 |
| 2005-06 | 7,475 | 2,414 | 9,889 |
| 2006-07 | 5,779 | 3,480 | 9,259 |
| 2007-08 | - | - | - |
| 2008-09 | - | - | - |
| 2009-10 | - | - | - |
| TOTAL | 567,468 | 272,035 | 839,503 |

## HISTORICAL AMOUNTS OF WATER FOR REPLENISHMENT

(In Acre-feet)

| WATER YEAR | SPREADING | | | | | INJECTION* | | | IN-LIEU | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| | IMPORTED WATER | RECLAIMED WATER | LOCAL WATER | MAKEUP WATER | TOTAL | Imported | Recycled | Total | | |
| 1952-53 | | | | | | 1,140 | - | 1,140 | | 1,140 |
| 1953-54 | 30,000 | | | - | 30,000 | 3,290 | - | 3,290 | | 33,290 |
| 1954-55 | 24,800 | | | - | 24,800 | 2,740 | - | 2,740 | | 27,540 |
| 1955-56 | 54,500 | | | - | 54,500 | 2,840 | - | 2,840 | | 57,340 |
| 1956-57 | 50,000 | | | - | 50,000 | 3,590 | - | 3,590 | | 53,590 |
| 1957-58 | 105,100 | | 87,558 | - | 192,658 | 4,330 | - | 4,330 | | 196,988 |
| 1958-59 | 54,400 | | 31,787 | - | 86,187 | 3,700 | - | 3,700 | | 89,887 |
| 1959-60 | 80,900 | | 20,064 | - | 100,964 | 3,800 | - | 3,800 | | 104,764 |
| 1960-61 | 147,200 | | 9,118 | - | 156,318 | 4,480 | - | 4,480 | | 160,798 |
| 1961-62 | 208,100 | 1,178 | 39,548 | - | 248,826 | 4,510 | - | 4,510 | | 253,336 |
| 1962-63 | 80,600 | 12,405 | 14,565 | - | 107,570 | 4,200 | - | 4,200 | | 111,770 |
| 1963-64 | 104,900 | 13,258 | 9,992 | - | 128,150 | 10,450 | - | 10,450 | | 138,600 |
| 1964-65 | 160,100 | 14,528 | 13,097 | - | 187,725 | 35,980 | - | 35,980 | | 223,705 |
| 1965-66 | 121,700 | 15,056 | 45,754 | 6,500 | 189,010 | 48,110 | - | 48,110 | 745 | 237,865 |
| 1966-67 | 84,300 | 16,223 | 59,820 | - | 160,343 | 46,940 | - | 46,940 | 851 | 208,134 |
| 1967-68 | 95,400 | 18,275 | 39,760 | - | 153,435 | 44,530 | - | 44,530 | 850 | 198,815 |
| 1968-69 | 17,800 | 13,877 | 119,395 | - | 151,072 | 41,680 | - | 41,680 | 850 | 193,602 |
| 1969-70 | 68,900 | 17,158 | 52,917 | - | 138,975 | 33,940 | - | 33,940 | 900 | 173,815 |
| 1970-71 | 72,100 | 19,494 | 89,514 | - | 181,108 | 36,202 | - | 36,202 | 881 | 218,191 |
| 1971-72 | 34,450 | 17,543 | 17,688 | - | 69,681 | 41,036 | - | 41,036 | 756 | 111,473 |
| 1972-73 | 71,900 | 21,949 | 45,077 | 20,000 | 158,926 | 41,803 | - | 41,803 | 901 | 201,630 |
| 1973-74 | 68,200 | 20,449 | 29,171 | 23,900 | 141,720 | 42,658 | - | 42,658 | 901 | 185,279 |
| 1974-75 | 71,900 | 21,199 | 29,665 | - | 122,764 | 36,688 | - | 36,688 | 400 | 159,852 |
| 1975-76 | 50,800 | 21,456 | 22,073 | - | 94,329 | 44,815 | - | 44,815 | 400 | 139,544 |
| 1976-77 | 9,300 | 22,863 | 19,252 | 21,400 | 72,815 | 49,315 | - | 49,315 | 400 | 122,530 |
| 1977-78 | 39,900 | 19,101 | 147,317 | - | 206,318 | 40,233 | - | 40,233 | 16,131 | 262,682 |
| 1978-79 | 65,300 | 22,457 | 68,859 | - | 156,616 | 34,498 | - | 34,498 | 18,378 | 209,492 |
| 1979-80 | 10,200 | 24,383 | 106,820 | 10,900 | 152,303 | 37,119 | - | 37,119 | 14,961 | 204,383 |
| 1980-81 | 32,000 | 26,109 | 50,590 | 31,500 | 140,199 | 34,364 | - | 34,364 | 23,823 | 198,386 |
| 1981-82 | 4,600 | 29,418 | 47,930 | 30,900 | 112,848 | 34,292 | - | 34,292 | 18,883 | 166,023 |
| 1982-83 | 2,000 | 17,035 | 126,076 | 8,900 | 154,011 | 45,186 | - | 45,186 | 19,752 | 218,949 |
| 1983-84 | 1,500 | 27,784 | 60,710 | 20,800 | 110,794 | 39,482 | - | 39,482 | 41,740 | 192,016 |
| 1984-85 | 40,600 | 26,998 | 39,099 | - | 106,697 | 37,524 | - | 37,524 | 36,840 | 181,061 |
| 1985-86 | 21,500 | 25,314 | 66,966 | - | 113,780 | 31,693 | - | 31,693 | 26,132 | 171,605 |
| 1986-87 | 49,200 | 35,321 | 27,613 | 6,500 | 118,634 | 39,317 | - | 39,317 | 29,202 | 187,153 |
| 1987-88 | 23,300 | 41,767 | 50,068 | 5,800 | 120,935 | 37,483 | - | 37,483 | 28,411 | 186,829 |
| 1988-89 | 50,300 | 47,157 | 17,096 | 6,500 | 121,053 | 33,534 | - | 33,534 | 25,425 | 180,012 |
| 1989-90 | 52,700 | 50,109 | 9,388 | 13,600 | 125,797 | 32,054 | - | 32,054 | 29,151 | 187,002 |
| 1990-91 | 56,287 | 53,864 | 35,717 | 100 | 145,968 | 29,709 | - | 29,709 | 22,039 | 197,716 |
| 1991-92 | 43,103 | 46,903 | 136,357 | - | 226,363 | 34,798 | - | 34,798 | 19,104 | 280,265 |
| 1992-93 | 16,561 | 48,864 | 147,699 | - | 213,124 | 31,341 | - | 31,341 | 53,306 | 297,771 |
| 1993-94 | 20,411 | 53,981 | 55,896 | - | 130,288 | 25,109 | - | 25,109 | 109,581 | 264,978 |
| 1994-95 | 21,837 | 33,300 | 100,578 | - | 155,715 | 22,999 | 1,480 | 24,479 | 50,898 | 231,092 |
| 1995-96 | 17,961 | 53,862 | 62,920 | - | 134,743 | 23,304 | 4,170 | 27,473 | 51,333 | 213,549 |
| 1996-97 | 19,990 | 49,959 | 58,262 | - | 128,211 | 23,039 | 6,241 | 29,280 | 39,394 | 196,885 |
| 1997-98 | 953 | 37,017 | 96,706 | - | 134,676 | 17,125 | 8,308 | 25,433 | 30,330 | 190,439 |
| 1998-99 | - | 47,201 | 32,013 | - | 79,214 | 20,308 | 6,973 | 27,280 | 23,516 | 130,010 |
| 1999-00 | 45,037 | 43,270 | 20,607 | - | 108,914 | 22,917 | 7,460 | 30,377 | 22,278 | 161,569 |
| 2000-01 | 23,451 | 46,343 | 39,725 | - | 109,519 | 23,585 | 6,838 | 30,423 | 21,181 | 161,123 |
| 2001-02 | 42,875 | 60,596 | 17,000 | - | 120,471 | 24,376 | 7,276 | 31,652 | 20,720 | 172,843 |
| 2002-03 | 22,365 | 42,796 | 58,202 | - | 123,363 | 23,117 | 6,192 | 29,309 | 11,205 | 163,877 |
| 2003-04 | 27,520 | 44,925 | 30,467 | - | 102,912 | 21,361 | 3,669 | 25,030 | - | 127,942 |
| 2004-05 | 25,145 | 29,503 | 148,674 | - | 203,322 | 17,660 | 3,920 | 21,580 | 7,804 | 232,706 |
| 2005-06 | 33,229 | 42,022 | 60,377 | - | 135,628 | 14,628 | 6,874 | 21,502 | 9,889 | 167,019 |
| 2006-07 | 40,214 | 45,039 | 11,495 | - | 96,748 | 11,994 | 13,077 | 25,071 | 9,259 | 131,078 |
| 2007-08 | 1,510 | 39,767 | 54,518 | - | 95,795 | 12,880 | 15,165 | 28,045 | - | 123,840 |
| 2008-09 | - | 39,611 | 35,348 | - | 74,959 | 17,391 | 10,658 | 28,049 | - | 103,008 |
| 2009-10 | 26,286 | 55,731 | 35,398 | - | 117,415 | 18,411 | 11,902 | 30,313 | - | 147,728 |
| TOTAL | 2,745,184 | 1,574,417 | 2,852,306 | 207,300 | 7,379,207 | 1,505,597 | 120,202 | 1,625,799 | 839,503 | 9,844,510 |

** - Including Orange County sidc of Alamitos Barrier*

**HISTORICAL AMOUNTS OF GROUNDWATER PRODUCTION**

(In Acre-feet)

| YEAR | CENTRAL BASIN | WEST COAST BASIN | TOTAL |
|---|---|---|---|
| WATER YEAR | | | |
| 1960-61 | 292,500 | 61,900 | 354,400 |
| 1961-62 | 275,800 | 59,100 | 334,900 |
| 1962-63 | 225,400 | 59,100 | 284,500 |
| 1963-64 | 219,100 | 61,300 | 280,400 |
| 1964-65 | 211,600 | 59,800 | 271,400 |
| 1965-66 | 222,800 | 60,800 | 283,600 |
| 1966-67 | 206,700 | 62,300 | 269,000 |
| 1967-68 | 220,100 | 61,600 | 281,700 |
| 1968-69 | 213,800 | 61,600 | 275,400 |
| 1969-70 | 222,200 | 62,600 | 284,800 |
| 1970-71 | 211,600 | 60,900 | 272,500 |
| 1971-72 | 216,100 | 64,800 | 280,900 |
| 1972-73 | 205,600 | 60,300 | 265,900 |
| 1973-74 | 211,300 | 55,000 | 266,300 |
| 1974-75 | 213,100 | 56,700 | 269,800 |
| 1975-76 | 215,300 | 59,400 | 274,700 |
| 1976-77 | 211,500 | 59,800 | 271,300 |
| 1977-78 | 196,600 | 58,300 | 254,900 |
| 1978-79 | 207,000 | 58,000 | 265,000 |
| 1979-80 | 209,500 | 57,100 | 266,600 |
| 1980-81 | 211,915 | 57,711 | 269,626 |
| 1981-82 | 202,587 | 61,874 | 264,461 |
| 1982-83 | 194,548 | 57,542 | 252,090 |
| 1983-84 | 196,660 | 51,930 | 248,590 |
| 1984-85 | 193,085 | 52,746 | 245,831 |
| 1985-86 | 195,972 | 53,362 | 249,334 |
| 1986-87 | 196,660 | 48,026 | 244,686 |
| 1987-88 | 194,704 | 43,837 | 238,541 |
| 1988-89 | 200,207 | 44,323 | 244,530 |
| 1989-90 | 197,621 | 48,047 | 245,668 |
| 1990-91 | 187,040 | 53,660 | 240,700 |
| 1991-92 | 196,400 | 56,318 | 252,718 |
| 1992-93 | 150,495 | 40,241 | 190,736 |
| 1993-94 | 156,565 | 41,826 | 198,391 |
| 1994-95 | 180,269 | 41,729 | 221,998 |
| 1995-96 | 182,414 | 52,222 | 234,636 |
| 1996-97 | 187,561 | 52,576 | 240,137 |
| 1997-98 | 188,305 | 51,859 | 240,164 |
| 1998-99 | 204,418 | 51,926 | 256,344 |
| 1999-00 | 198,483 | 53,599 | 252,082 |
| 2000-01 | 195,361 | 53,870 | 249,231 |
| 2001-02 | 200,168 | 50,063 | 250,231 |
| 2002-03 | 190,268 | 51,946 | 242,214 |
| 2003-04 | 200,365 | 48,013 | 248,378 |
| 2004-05 | 188,707 | 41,297 | 230,004 |
| 2005-06 | 191,030 | 36,809 | 227,839 |
| 2006-07 | 198,115 | 37,655 | 235,770 |
| 2007-08 | 206,260 | 38,472 | 244,732 |
| 2008-09 | 198,156 | 45,246 | 243,402 |
| 2009-10 | 197,387 | 43,942 | 241,329 |
| TOTAL | 10,189,326 | 2,663,067 | 12,852,393 |

## HISTORICAL AMOUNTS OF TOTAL WATER USE IN THE WATER REPLENISHMENT DISTRICT*

(In Acre-feet)

| YEAR | GROUNDWATER PRODUCTION | IMPORTED WATER FOR DIRECT USE* | RECLAIMED WATER FOR DIRECT USE* | TOTAL |
|---|---|---|---|---|
| WATER YEAR | | | | |
| 1960-61 | 354,400 | 196,800 | | 551,200 |
| 1961-62 | 334,900 | 178,784 | | 513,684 |
| 1962-63 | 284,500 | 222,131 | | 506,631 |
| 1963-64 | 280,400 | 257,725 | | 538,125 |
| 1964-65 | 271,400 | 313,766 | | 585,166 |
| 1965-66 | 283,600 | 308,043 | | 591,643 |
| 1966-67 | 269,000 | 352,787 | | 621,787 |
| 1967-68 | 281,700 | 374,526 | | 656,226 |
| 1968-69 | 275,400 | 365,528 | | 640,928 |
| 1969-70 | 284,800 | 398,149 | | 682,949 |
| 1970-71 | 272,500 | 397,122 | | 669,622 |
| 1971-72 | 280,900 | 428,713 | | 709,613 |
| 1972-73 | 265,900 | 400,785 | | 666,685 |
| 1973-74 | 266,300 | 410,546 | | 676,846 |
| 1974-75 | 269,800 | 380,228 | | 650,028 |
| 1975-76 | 274,700 | 404,958 | | 679,658 |
| 1976-77 | 271,300 | 355,896 | | 627,196 |
| 1977-78 | 254,900 | 373,116 | | 628,016 |
| 1978-79 | 265,000 | 380,101 | 100 [a] | 645,201 |
| 1979-80 | 266,600 | 397,213 | 200 | 664,013 |
| 1980-81 | 269,626 | 294,730 | 300 | 564,656 |
| 1981-82 | 264,461 | 391,734 | 300 | 656,495 |
| 1982-83 | 252,090 | 408,543 | 400 | 661,033 |
| 1983-84 | 248,590 | 441,151 | 1,800 | 691,541 |
| 1984-85 | 245,831 | 451,549 | 2,000 | 699,380 |
| 1985-86 | 249,334 | 427,860 | 2,400 | 679,594 |
| 1986-87 | 244,686 | 478,744 | 2,300 | 725,730 |
| 1987-88 | 238,541 | 479,318 | 3,500 | 721,359 |
| 1988-89 | 244,530 | 466,166 | 5,300 | 715,996 |
| 1989-90 | 245,668 | 448,285 | 5,900 | 699,853 |
| 1990-91 | 240,700 | 485,109 | 5,000 | 730,809 |
| 1991-92 | 252,718 | 395,191 | 4,900 | 652,809 |
| 1992-93 | 190,736 | 388,949 | 824 | 580,509 |
| 1993-94 | 198,391 | 483,287 | 3,413 | 685,091 |
| 1994-95 | 221,998 | 437,191 | 6,143 | 665,332 |
| 1995-96 | 234,636 | 426,699 | 19,804 | 681,139 |
| 1996-97 | 240,137 | 436,569 | 25,046 | 701,752 |
| 1997-98 | 240,164 | 375,738 | 27,075 | 642,977 |
| 1998-99 | 256,344 | 396,655 | 30,510 | 683,509 |
| 1999-00 | 252,082 | 395,681 | 33,589 | 681,352 |
| 2000-01 | 249,231 | 395,024 | 32,589 | 676,844 |
| 2001-02 | 250,231 | 395,799 | 38,694 | 684,724 |
| 2002-03 | 242,214 | 381,148 | 38,839 | 662,201 |
| 2003-04 | 248,378 | 389,233 | 36,626 | 674,237 |
| 2004-05 | 230,004 | 402,660 | 33,988 | 666,652 |
| 2005-06 | 227,839 | 366,815 | 35,301 | 629,955 |
| 2006-07 | 235,770 | 376,492 | 41,899 | 654,161 |
| 2007-08 | 244,732 | 346,035 | 45,120 | 635,887 |
| 2008-09 | 243,402 | 320,711 | 43,153 | 607,266 |
| 2009-10 | 241,329 | 278,857 | 43,547 | 563,734 |
| TOTAL | 12,852,393 | 19,058,840 | 570,561 | 32,481,793 |

*(a) Los Coyotes on-line in 1979; Long Beach on-line in 1980*

** - Includes imported & recycled at seawater barriers, but not spreading grounds.*

## WRD GROUNDWATER BANKING PROGRAM

(In Acre-feet)

| WATER YEAR | CITY OF LONG BEACH | | | LONG BEACH/ALAMITOS BARRIER Seasonal Water | | | LONG BEACH/ALAMITOS BARRIER Tier 1 Water | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Banked | Called | Balance | Banked | Called | Balance | Banked | Called | Balance | Banked | Called | Balance |
| 2002-03 | 4,864 | - | 4,864 | - | - | - | - | - | - | 4,864 | - | 4,864 |
| 2003-04 | 8,136 | - | 13,000 | - | - | - | - | - | - | 8,136 | - | 13,000 |
| 2004-05 | - | - | 13,000 | 3,652 | - | 3,652 | - | - | - | 3,652 | - | 16,652 |
| 2005-06 | - | - | 13,000 | 1,324 | 56 | 4,919 | - | - | - | 1,324 | 56 | 17,919 |
| 2006-07 | - | - | 13,000 | 300 | 1,561 | 3,658 | - | - | - | 300 | 1,561 | 16,658 |
| 2007-08 | - | 2,416 | 10,584 | - | 1,498 | 2,160 | - | - | - | - | 3,914 | 12,744 |
| 2008-09 | - | 4,182 | 6,402 | - | - | 2,160 | 2,000 | - | 2,000 | 2,000 | 4,182 | 10,562 |
| 2009-10 | - | - | 6,402 | - | - | 2,160 | - | 2,000 | - | - | 2,000 | 8,562 |
| TOTAL | 13,000 | 6,598 | | 5,275 | 3,115 | | 2,000 | 2,000 | | 20,275 | 11,713 | |

* Numbers were updated from last year's ESR following MWD accounting

FIGURES

# HISTORICAL RAINFALL
## DPW Station #107D - WRD Tracking Station

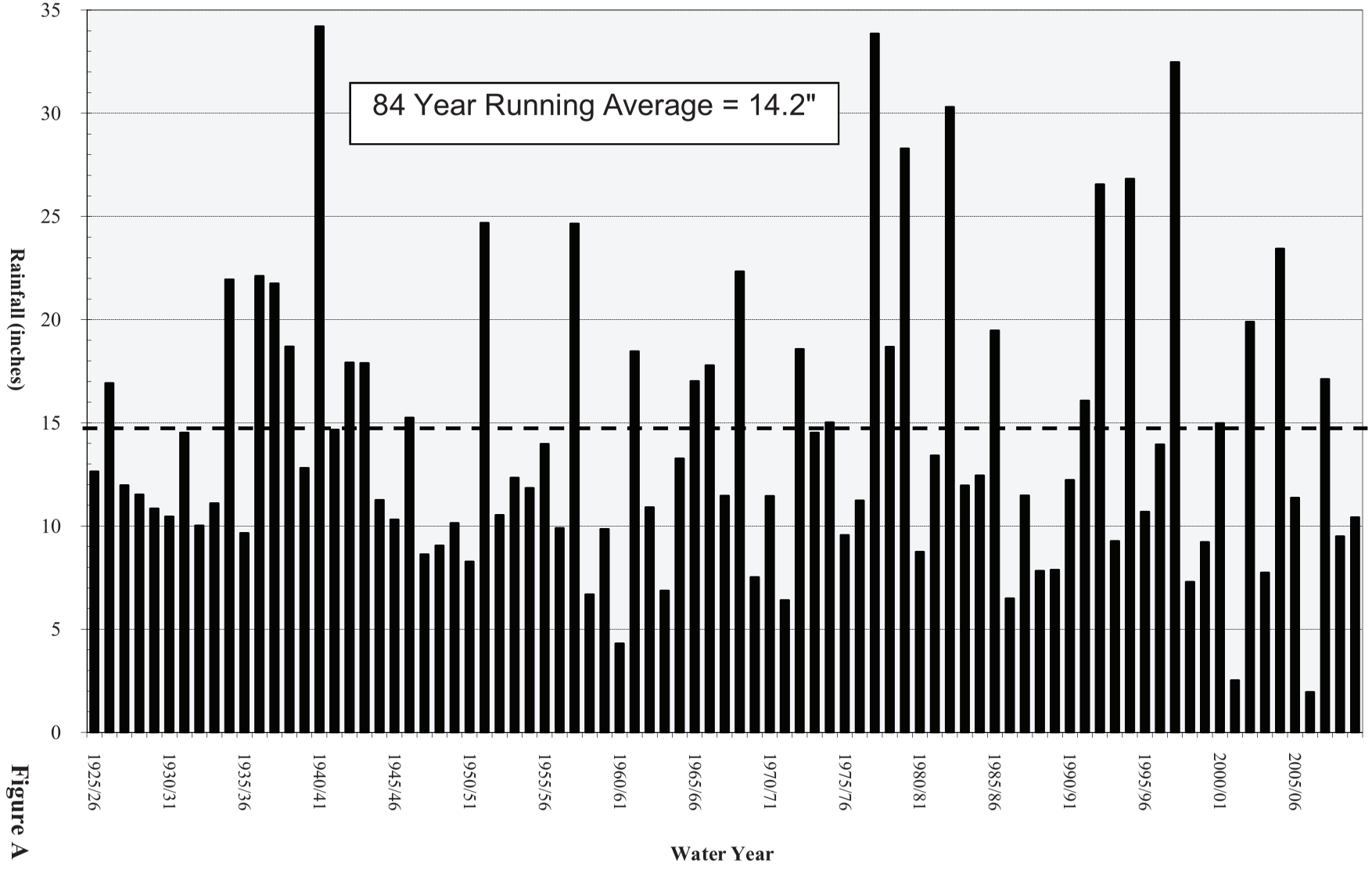
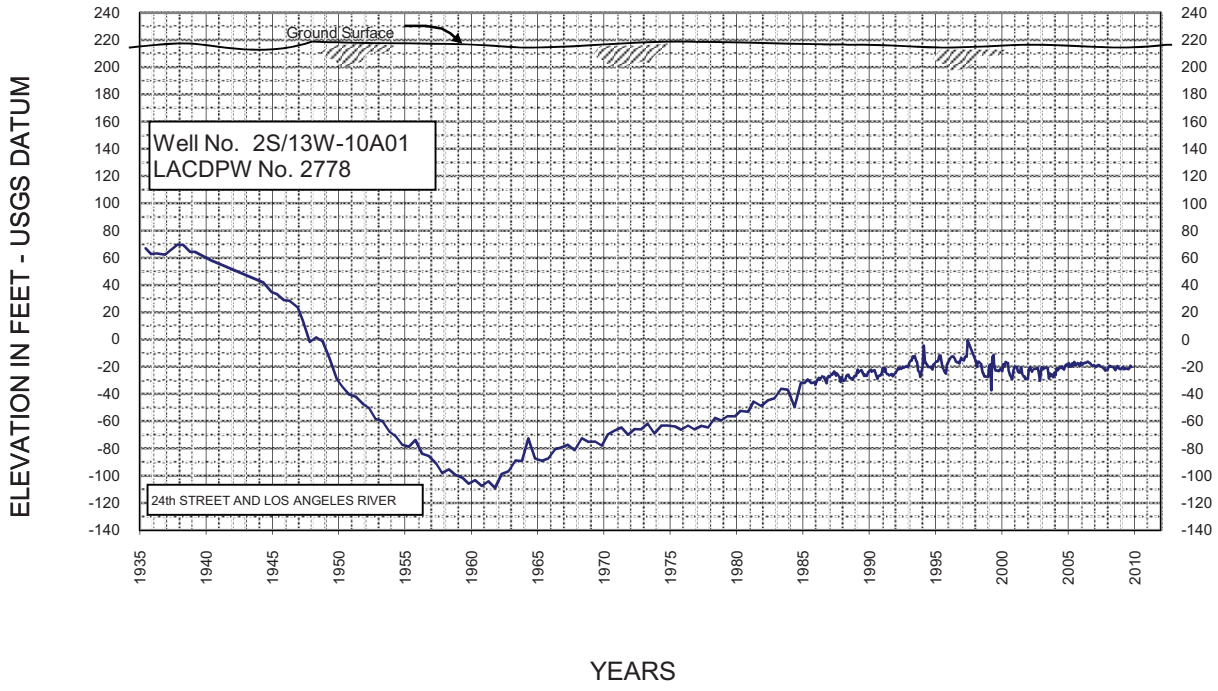


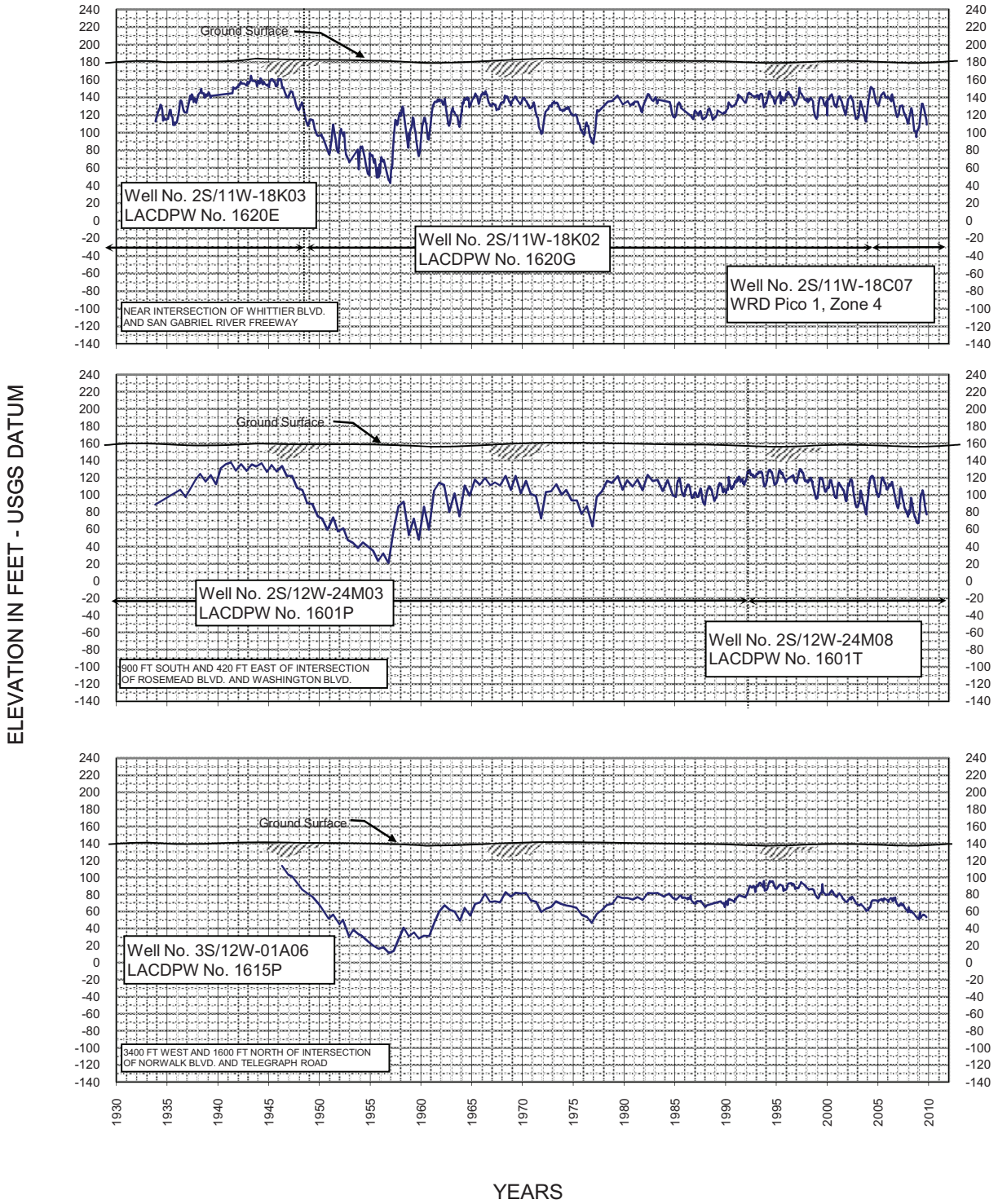

**Figure A**




**FLUCTUATIONS OF WATER LEVEL AT WELLS**

**LOS ANGELES FOREBAY**

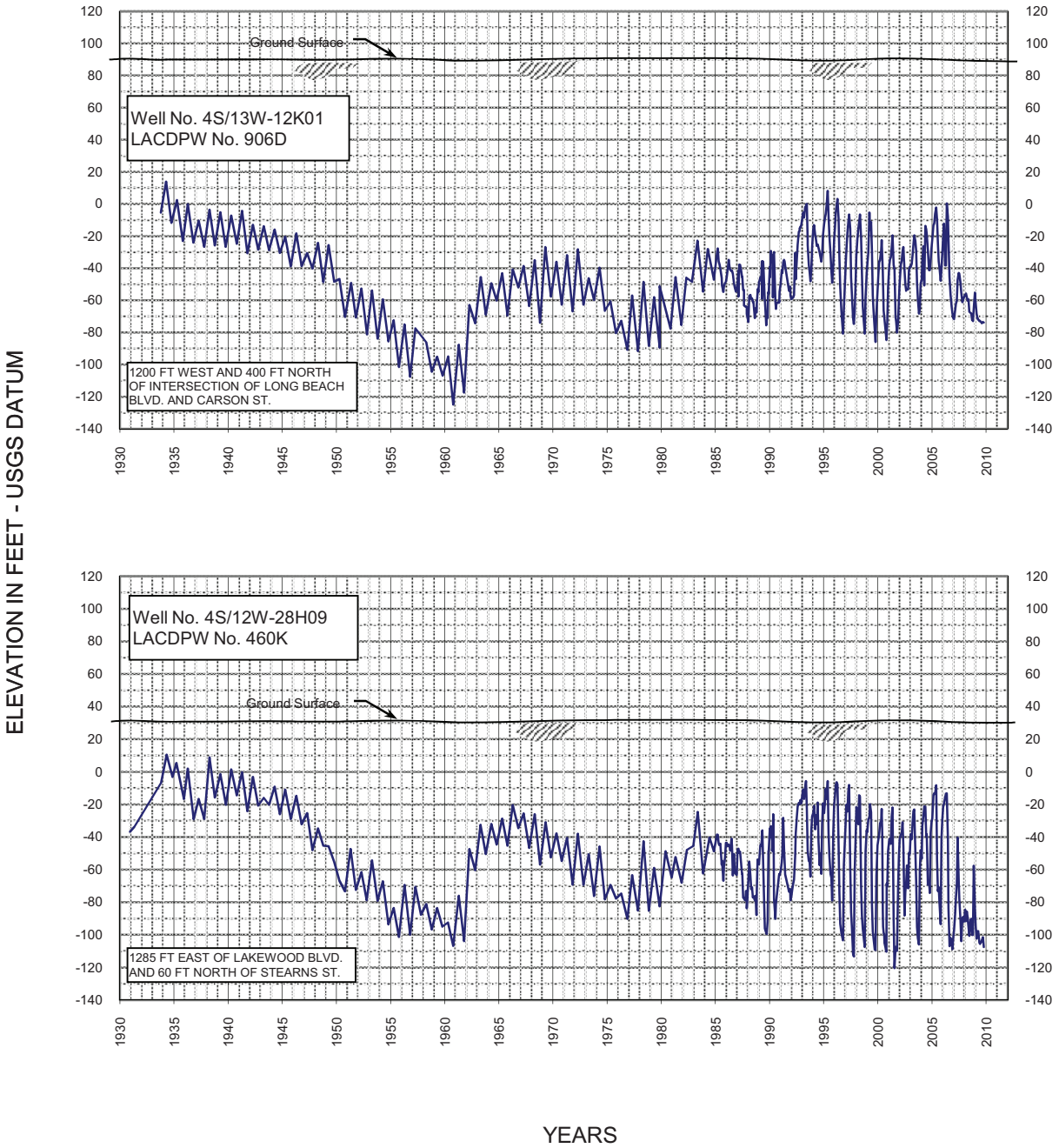
**Figure B**




**FLUCTUATIONS OF WATER LEVEL AT WELLS**

**MONTEBELLO FOREBAY**

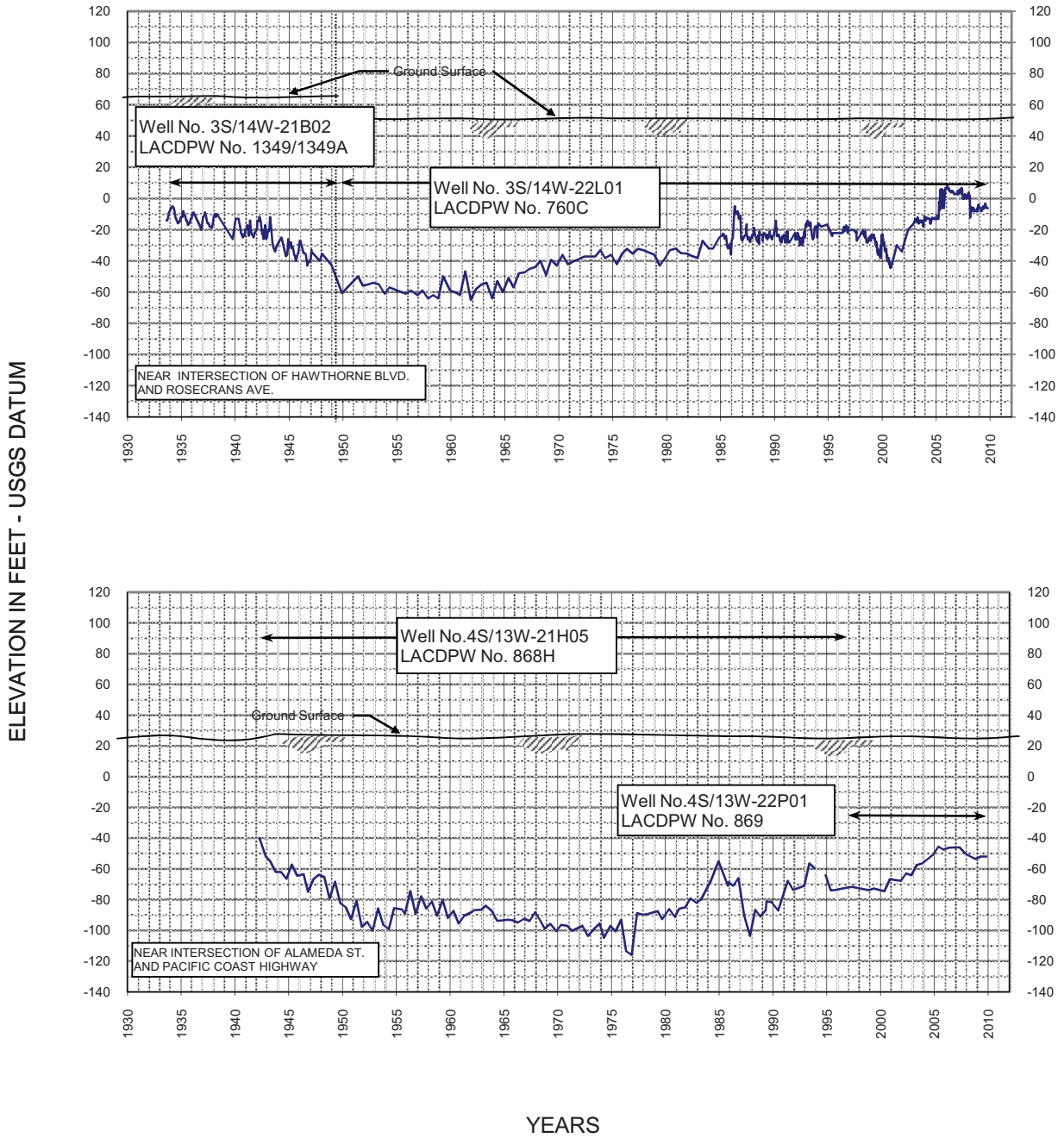
**Figure C**




**FLUCTUATIONS OF WATER LEVEL AT WELLS**

**CENTRAL BASIN PRESSURE AREA**

**Figure D**




**FLUCTUATIONS OF WATER LEVEL AT WELLS**

**WEST BASIN**

**Figure E**

PLATES

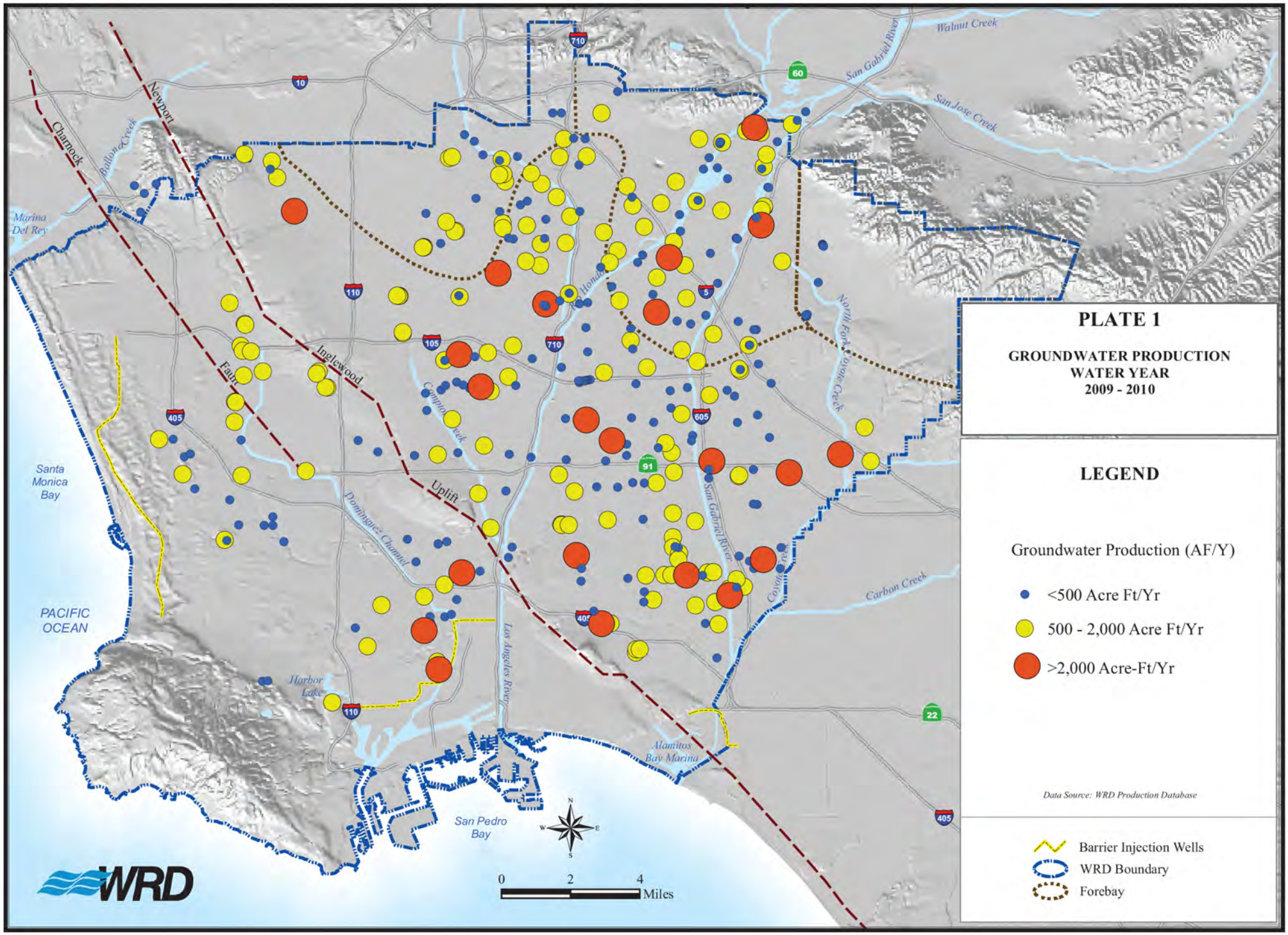


PLATE 1
GROUNDWATER PRODUCTION
WATER YEAR
2009 - 2010
LEGEND
Groundwater Production (AF/Y)
<500 Acre Ft/Yr
500 - 2,000 Acre Ft/Yr
>2,000 Acre-Ft/Yr
Data Source: WRD Production Database
Barrier Injection Wells
WRD Boundary
Forebay
Newport
Charnock
Inglewood
Fault
Uplift
Ballona Creek
Marina Del Rey
Santa Monica Bay
PACIFIC OCEAN
Harbor Lake
Dominguez Channel
Compton Creek
Los Angeles River
San Pedro Bay
Alamitos Bay Marina
San Gabriel River
Walnut Creek
San Jose Creek
North Fork Coyote Creek
Coyote Creek
Carbon Creek
0 2 4 Miles
WRD

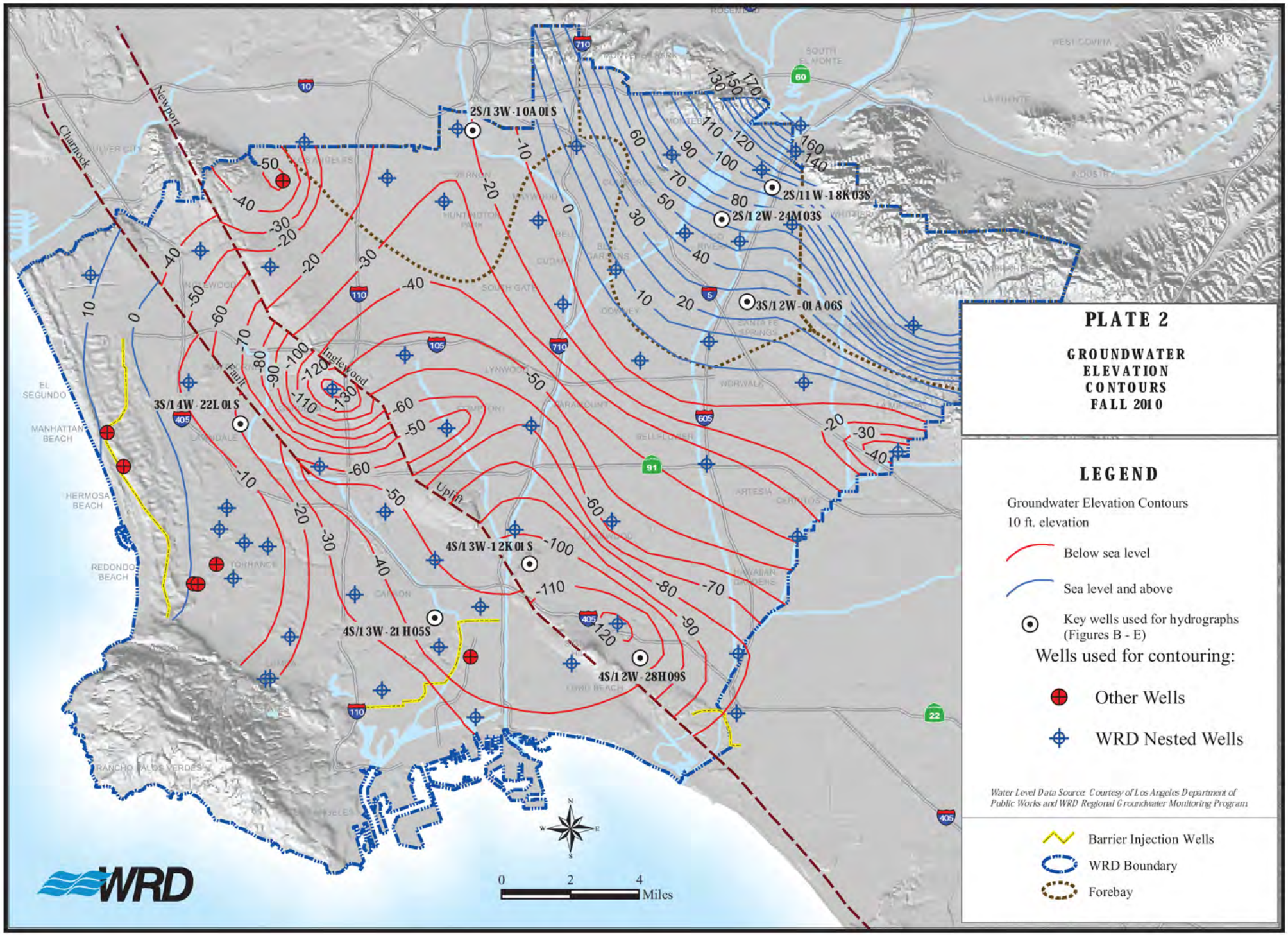


PLATE 2
GROUNDWATER ELEVATION CONTOURS FALL 2010
LEGEND
Groundwater Elevation Contours
10 ft. elevation
Below sea level
Sea level and above
Key wells used for hydrographs (Figures B - E)
Wells used for contouring:
Other Wells
WRD Nested Wells
Water Level Data Source: Courtesy of Los Angeles Department of Public Works and WRD Regional Groundwater Monitoring Program
Barrier Injection Wells
WRD Boundary
Forebay
2S/13W-10A01S
2S/11W-18K03S
2S/12W-24M03S
3S/12W-01A06S
3S/14W-22L01S
4S/13W-12K01S
4S/13W-21H05S
4S/12W-28H09S
Charnock
Newport
Inglewood
Fault
Uplift
EL SEGUNDO
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
0 2 4 Miles
WRD

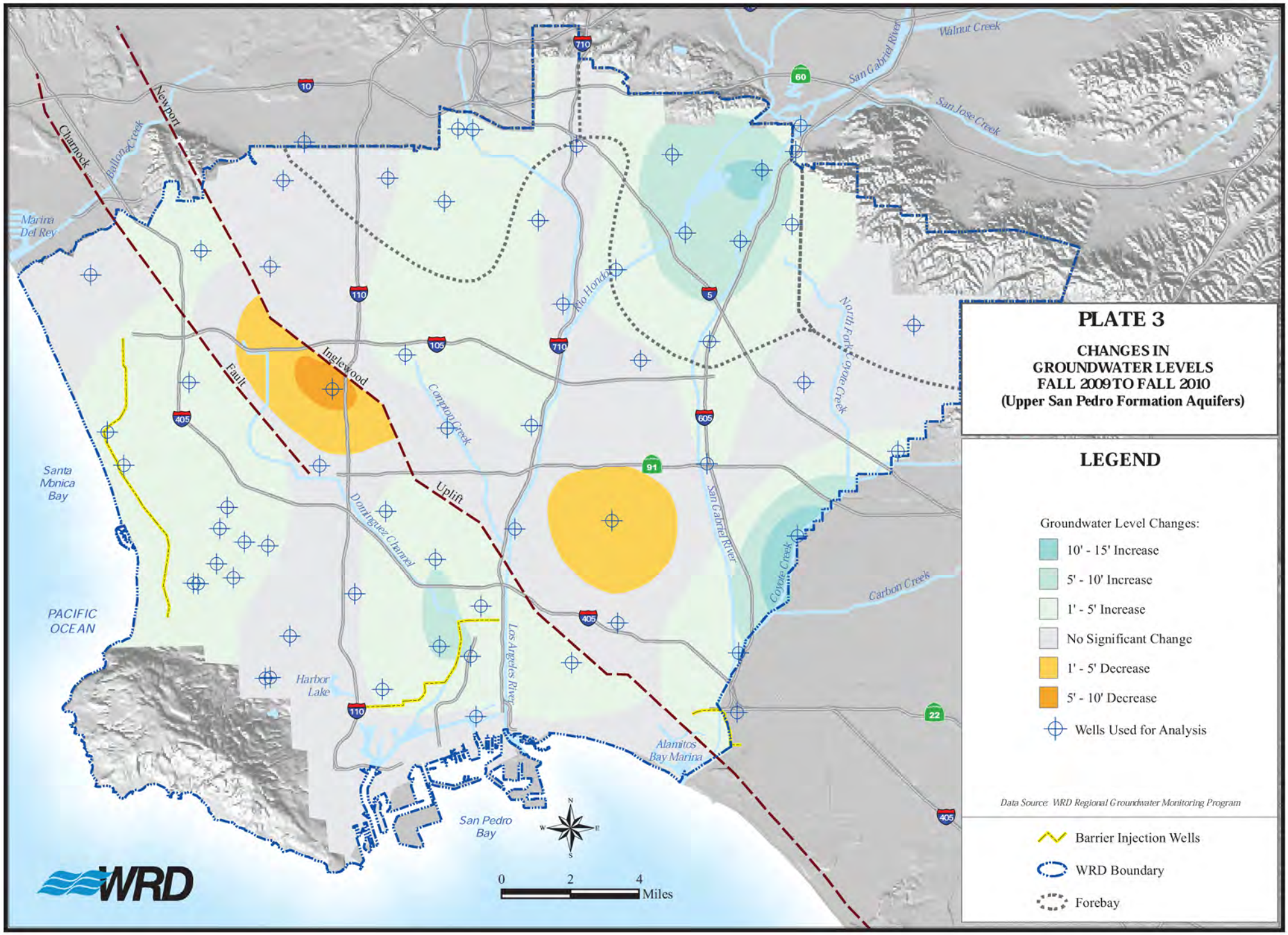


PLATE 3
CHANGES IN
GROUNDWATER LEVELS
FALL 2009 TO FALL 2010
(Upper San Pedro Formation Aquifers)
LEGEND
Groundwater Level Changes:
10' - 15' Increase
5' - 10' Increase
1' - 5' Increase
No Significant Change
1' - 5' Decrease
5' - 10' Decrease
Wells Used for Analysis
Data Source: WRD Regional Groundwater Monitoring Program
Barrier Injection Wells
WRD Boundary
Forebay
Walnut Creek
San Gabriel River
San Jose Creek
Charnock
Newport
Ballona Creek
Marina Del Rey
Rio Hondo
Inglewood
Fault
Uplift
Compton Creek
North Fork Coyote Creek
Santa Monica Bay
Dominguez Channel
San Gabriel River
Coyote Creek
Carbon Creek
PACIFIC OCEAN
Los Angeles River
Harbor Lake
Alamitos Bay Marina
San Pedro Bay
0 2 4 Miles
WRD

# Appendix H
# WRD Technical Bulletin Volume 12 – Summer 2007

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Technical Bulletin

Volume 12 ~ Summer 2007

# SURVIVING "THE BIG ONE" - WATER SUPPLY RECOVERY AFTER A MAJOR SOUTHERN CALIFORNIA EARTHQUAKE

**By: Ted Johnson, Chief Hydrogeologist**
**tjohnson@wrd.org**

## Introduction

Southern California is in earthquake country. Since 1933, there have been 23 significant quakes of magnitude 5.9 or greater. And more earthquakes are coming, including the infamous "Big One" that could shake 10 times harder than, and minutes longer than, the 1994 Northridge earthquake that caused at least 33 deaths and $40 billion in damage.

The San Andreas Fault, the major fault line running through California, is expected to be the source for the "Big One". It has on average a major earthquake every 150 years, but the southernmost segment has not had one since 1680, over 300 years ago (**Figure 1**). This is why scientists believe that a major earthquake is overdue.

The message is that earthquakes are expected in Southern California, and large ones can cause cause wide spread damage. Preparations are required to not only survive them, but to recover from them as quickly as possible (e.g. weeks instead of months).

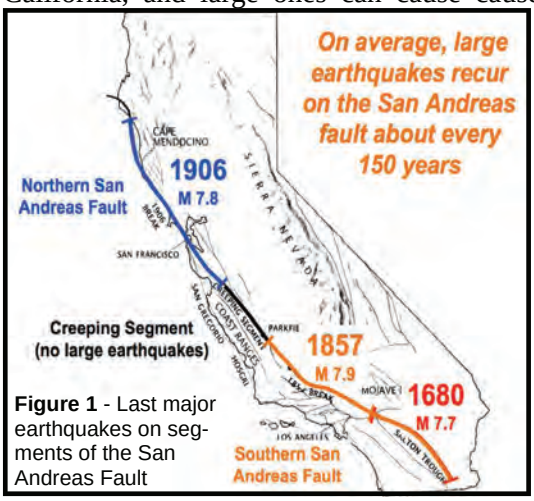



**Figure 1** - Last major earthquakes on segments of the San Andreas Fault

Although the focus of this Technical Bulletin is on the recovery of water supplies after a large temblor, all facets of life will be affected by a major earthquake. Proper advanced planning, however, can save lives and hasten the return of services to our communities.

## Southern San Andreas Fault Earthquake Scenario

The U.S. Geological Survey (USGS) is leading an effort along with the California Institute of Technology (Caltech) and others to create a hypothetical but possible earthquake scenario for a magnitude 7.8 temblor on the southern portion of the San Andreas Fault. If this massive earthquake hits, it is expected to cause loss of life and serious injuries. It will also cause major damage to lifelines that cross the fault or are affected by the intense shaking, including water and sewer lines, petroleum pipelines, fiber optics cables, bridges, buildings, dams, overhead transmission lines, roads and railways.

Even though Los Angeles is 60 miles from the San Andreas Fault, because it sits on a deep basin of sediments (which gives us our good groundwater aquifers), it will shake like a bowl of gelatin and the ground could shift up and down from 10 to 20 feet, causing severe damage to structures. Modeling of expected ground shaking shows how the shock waves will resonate from the epicenter near Palm Springs into the Los Angeles area (**Figure 2**).

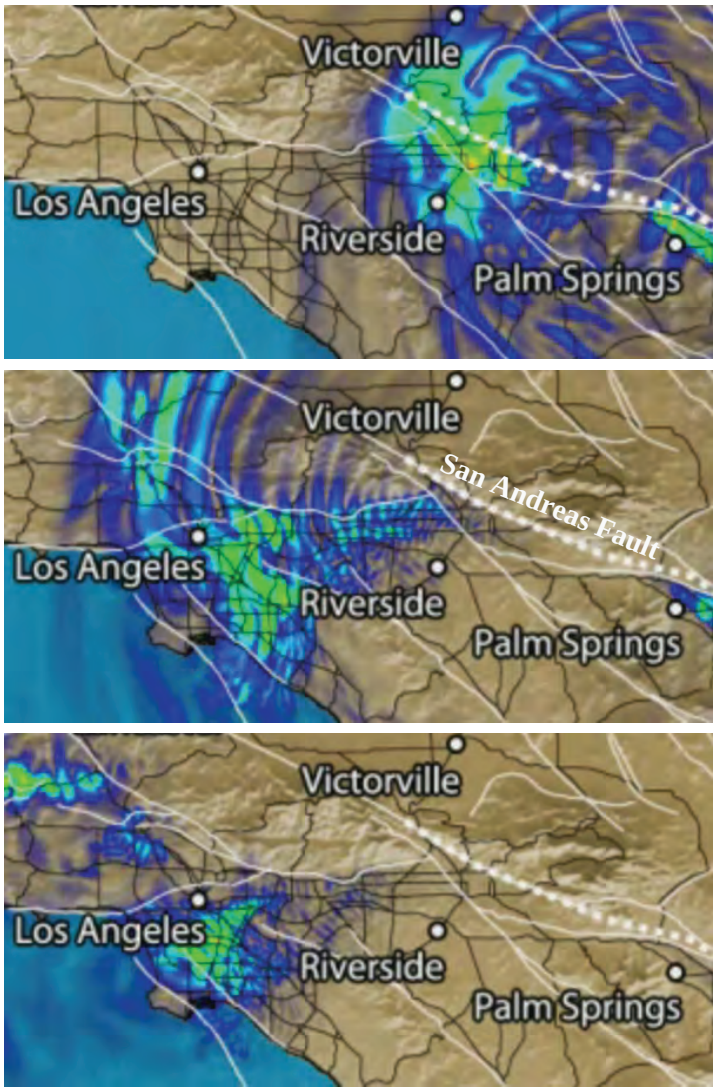



**Figure 2** - Modeled ground shaking after 60 seconds (above), 90 seconds (middle), and 120 seconds (bottom) of a M7.8 earthquake on the San Andreas Fault originating near Palm Springs and moving northwest

The result of the USGS/Caltech work will be a document that describes the expected effects of the earthquake. A detailed report is expected in Spring 2008 leading up to an area-wide disaster drill on November 13, 2008 at 10:00 am (simulated day and time that the "Big One" hits).

## Impact to Water Supply

As part of the scenario work, the USGS and Caltech convened a panel of water supply experts on July 31, 2007, to determine the potential effects that the major earthquake will have on water supplies. Members from the Water Replenishment District of Southern California (WRD), the Metropolitan Water District of Southern California (Met), Los Angeles Department of Water and Power (LADWP), and others participated in the half-day session.

The panel was asked questions about what infrastructure was in jeopardy (pipelines, water tanks, wells, aqueducts, reservoirs), how the damage would be assessed, how repairs would be conducted, how long water supply outages would occur, and where emergency water supply sources could be obtained. Some of the conclusions were:

- Fault movement will likely cause major damage of the infrastructure crossing it, including the main aqueducts bringing water to Southern California from Northern California and the Colorado River. Repairs may be hampered due to damaged roads and large scale-fires.
- The most severe damage will be closest to the fault, but even in the Los Angeles area there will be damage to pipelines and other infrastructure due to intense shaking. In addition, the Met / LADWP outages from aqueduct damage will impact the local water supply.
- In the first few days after the quake, there may be no water available due to infrastructure breaks and loss of power. After that, repairs will bring supplies online slowly. Each agency will be busy with their own systems, and repairs may take weeks to 6 months or more. New water pipelines may be in very short supply, as they are not in stock and will need to be manufactured.
- A "Potable Water Plan" should be devised to describe to the public how to use water during the first few days of the emergency, when treatment plants may be offline. Avoid "Boil Water Orders" because gas lines in homes may be ruptured and people with gas stoves may cause unintended explosions. Instead, a "Purified" or "Bottled" water order should be made to emphasize drinking treated water instead of boiling it.

## Groundwater Basins - Our Emergency Reservoirs

To paraphrase one panelist, "The groundwater basins are our savings account and can help us get by during this emergency. They can be tapped to make up the water shortages when imported supplies are unavailable." Met agreed and will request that groundwater users take more during an emergency to reduce the imported demand.

To prepare for these emergencies, the groundwater basins should be fully utilized as underground reservoirs and the overlying users prepared to tap into these reservoirs. Water wells should be maintained and have the ability to pump excess capacity. Interconnections should be made with adjacent municipalities to provide water distribution redundancy so that water can be re-routed if one community's system fails. Available aquifer storage space should be utilized. Emergency pumping ordinances should be in place to allow additional pumping in adjudicated basins.

Another study underway by the USGS is looking at how the Central and West Coast groundwater basins can be utilized in such an emergency. They are using computer models to assess land subsidence and seawater intrusion implications for over pumping the basins on a short term basis to provide the water needed during an imported water outage. The results of this two-year study are due in 2008.

"Dare to Prepare" is the slogan being used for the earthquake scenario, and those of us in the water supply business have the responsibility to prepare in order to quickly and properly respond in the aftermath of "The Big One".

## For More Information:

Additional information on the "Southern Andreas Fault Earthquake Scenario" can be obtained by contacting the author, or from scenario managers Dale Cox of USGS at dacox@usgs.gov, or Keith Porter of Caltech at keith@cohen-porter.net. Information on earthquake preparedness can be found at www.daretoprepare.org.

References Used for this Technical Bulletin:


1. Caltech panel on "Assessing the Impacts of a M7.8 Southern San Andreas Earthquake on Water Supply", July 31, 2007
2. Governor's Office of Emergency Services Statewide Exercise Program, PowerPoint presentation on Web. www.oes.ca.gov/Operational/OESHome.nsf/PDF/2008%20Southern%20California%20EQ%
3. *Long Beach Press Telegram*, August 11, 2007
4. National Earthquake Hazards Reduction Program, *Seismic Waves*, February 2007, www.nehrp.gov/pdf/SeismicWavesFeb07.pdf
5. Southern California Earthquake Center, www.scec.org



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*Copies of this and previous Technical Bulletins can be found on our web site www.wrd.org*

# Appendix I
# CBMWD School Education Current and Future Programs

made available throughout Central Basin's service area.

**HET Direct Installation Programs**
Since 2005, Central Basin has completed more than 5,000 High-Efficiency Toilet (HET) direct installations in single family, multifamily, and commercial, industrial and institutional (CII) facilities throughout Central Basin's service area.

**Local HET Partnership Programs**
Central Basin receives requests to participate in various local partnerships to provide disadvantaged residents with HETs. Central Basin's service area is home to many disadvantaged residents, and the need for free, water-conserving toilets remains high. Given the current economic down-turn, the conservation coordinator is focusing attention on securing additional sources of funding to make HET programs possible.

## 6.4. 15 ADDITIONAL CONSERVATION PROGRAMS

### CONSERVATION PARTNERSHIPS

Central Basin continues to take advantage of opportunities to achieve additional water savings through new and creative partnerships with local cities, schools, government agencies and non-profit organizations. One such partnership with the Los Angeles County Conservation Corps brought free, educational gardening workshops to local residents. The workshops, which are offered in English and Spanish, provide information on California native plants and gardening tips for residents, business owners, and local landscapers. In another example, ongoing partnerships with Southern California Edison and the Gas Company have made it possible to provide educational conservation programs to sixth grade students throughout the service area.

These partnerships have proven to be diverse in nature and valuable in strengthening the conservation efforts within Central Basin's service area, particularly within the more disadvantaged areas.

**Water Wasting Prohibition City Ordinances**
Following the call for increased conservation efforts under the state's 20X2020 Plan, the District formed a *Shut Your Tap!* Water Conservation Ordinance Task Force to advocate the adoption of mandatory water conservation ordinances in each city in the District's service area. As a result of the efforts of the Task Force's efforts, 18 cities now have mandatory conservation ordinances in place.

## 6.4. 16 GRANT PROGRAMS

Central Basin has been successful in receiving grant funding for conservation programs at the federal, state, and local levels through agencies such as the United States Department of Energy (DOE), the Department of Water Resources (DWR), and MWD. The following list provides a brief summary of the individual water conservation grants that have been implemented since 2005:

**MWD Grant (Innovative Conservation Program Grant) - 200 HET Direct Install**
Central Basin has successfully completed a MWD Innovative Conservation Grant Program, installing 200 HETs in multi-family homes and commercial facilities. The total budget for this grant was $43,800.

**MWD Grant (Innovative Conservation Program Grant) – Bell Gardens: California Friendly City – A Model for Inner City Transformation**
In 2006, Central Basin was awarded $102,250 to transform the City of Bell Gardens into the first California Friendly City in the State of California through the installation of water saving devices and systems throughout the City's public facilities. These included high-efficiency toilets, urinals, synthetic turf at the public soccer field, water-brooms, native plants and a weather-based irrigation system.

**MWD (Enhanced Conservation Program Grant) – Landscape High Efficiency Living Program (HELP)**
In 2008, Central Basin was awarded a MWD Enhanced Conservation Program Grant in the amount of $90,000 to provide HELP Landscape Workshops to local residents to teach the benefits of utilizing an MP Rotator irrigation device and planting low water-use plants. The use of MP Rotators alone can save 4.16 to 16.8 gallons of water per minute.

**DWR Grant (Prop 50) – High Efficiency Living Program (HELP) 10,000 HET Direct Install**
In 2007, Central Basin was awarded a DWR grant in the amount of $1,563,900. The grant program provides funding to market, purchase and install 10,000 HETs in multi-family residential units throughout the service area. The water savings for this program will reach 242 acre-feet annually for 25 years.

**DWR Grant (Prop 50) - Conservation Outreach Targeting Multicultural Communities**
In 2007, Central Basin was awarded a DWR grant program in the amount of $100,000 to provide cities and water retailers with conservation outreach training and tools. The funding provides for website design, research services and bill-stuffer templates to be used by the District's water retailers. The purpose of the program is to promote water conservation within the multicultural and multilingual communities prevalent in the service area.

**DWR Grant (Prop 50) – Urban City Makeover Program**
Through the DWR Prop 50 Urban City Makeover Program, grant funding in the amount of $113,746 will provide nine disadvantaged cities with a number of

water-saving resources. These include: high-efficiency toilets (HETs), Waterfree urinals, native plants, weather-based irrigation controllers and water brooms. The participating cities are: Bell Gardens, Commerce, Cudahy, Hawaiian Gardens, Huntington Park, Lynwood, Maywood, Paramount, and South Gate.

**DWR Grant (Prop 50) – Helping Our People and Environment (HOPE) 3,000 HET Direct Install**

Since 2009, Central Basin has administered the "Helping Our People and Environment" (HOPE) grant program on behalf of the City of Maywood. This Prop 50 grant program provides funding to install 3,000 High-Efficiency Toilets (HETs) in residences throughout the city of Maywood.

**DWR Grant (Prop 50) – Zero Water Consumption Urinal Retrofit Program – 2,600 Urinal Retrofit Program**

In 2003, Central Basin secured a DWR grant entitled Zero Water Consumption Urinal Retrofit Program in the amount of $780,000. The program provided no-cost installations of 2,600 water-free urinals to qualified commercial, industrial, and institutional buildings located within the Central Basin service area.

**DWR Grant (Prop 50) – Commercial Landscape Wireless Valve End Use Management Research Project**

The Commercial Landscape Wireless Valve End Use Management Research Project awarded to Central Basin by DWR in the amount of $302,052, involves the implementation of wireless valve evapotranspiration (ET) controllers in non-residential sites. The research goal is to enhance water management and water efficiency at the local, regional, and statewide levels.

**DWR Grant (Prop 50) – Large Landscape Water Conservation, Runoff Reduction and Educational Program**

The Large Landscape Water Conservation, Runoff Reduction and Educational Program provides $900,000 in funding for the implementation of a water management program using weather-based irrigation controllers and wireless technologies to significantly reduce the amount of runoff from large landscapes, street medians, and residential properties.

Included in the grant funding are five large community demonstration gardens. Central Basin will partner with local public agencies such as cities and school Districts to create Demonstration Gardens that enrich the environmental awareness of the community and promote the benefits of water efficient gardens.

**U.S. D.O.E. (Energy Efficiency Conservation Block) Water and Energy Emergency End Use Demand Management Measures Grant**

The Water and Energy Emergency End Use Demand Management Measures Grant in the amount of $2,000,000 was awarded to Central Basin under the United States Department of Energy Recovery Act - Energy Efficiency and Conservation Block Grant Program. Under this program, funding will be provided to purchase and install a series of wireless (ET) controllers in residential and commercial settings that utilize radio commands for periodic pressure and management adjustments. A second element of the grant addresses water and energy demand management in recycled pipelines.

## 6.5 CURRENT AND FUTURE EDUCATION PROGRAMS

### 6.5. 1 CURRENT PROGRAMS

**Water Squad Investigations (Grades 4 – 12)**

Launched in September 2006, Water Squad Investigations is a collaborative environmental education program that joins Central Basin, the Los Angeles County Sanitation Districts and LA County's Whittier Narrows Center to provide students with a fun-filled day of water awareness. By the end of June 2010, over 5,000 primary through secondary school students will have participated in the program. Table 6-1 shows the number of students who have participated in Central basin education programs since 2005.

Each Friday morning throughout the school year, participating students are driven from their school to the San Jose Creek Water Recycling Plant (SJCWRP), and later, to the Whittier Narrows Nature Center in a charter bus provided by Central Basin. At these sites, students are introduced to the concepts of water recycling and conservation through multimedia presentations, fun activity book exercises and guided tours of the facilities.

By the day's end, students gain a solid understanding of how water recycling can help conserve valuable drinking water and about the simple but effective ways they can conserve at home.

From September 2005 through June 2010, 5,835 students have participated in Water Squad Investigations.

**Water Wanderings (Grades 4 – 5)**

Water Wanderings is a collaborative classroom visitation program between Central Basin and the S.E.A. Lab in Redondo Beach, a program of the Los Angeles Conservation Corps. This collaborative hands-on classroom program takes fourth and fifth graders on a 2 ½-hour journey through California's water.

Each class that participates will have the opportunity to visit three action-packed stations where they will experience a multimedia game called California Water Jeopardy, a food chain/food web activity and touch live marine animals and plants on board the "traveling tidepool," a van outfitted with touch tanks.

Water Wanderings is correlated to many of the fourth through fifth grade State standards for social science and science. By participating in this free program, students learn to appreciate California's water as a scarce, valuable resource.

From September 2005 through June 2010, 26,670 students have participated in Water Wanderings.

**Think Watershed (Grades 4 – 6)**
Think Watershed educates students about the San Gabriel River Watershed's impact on our coastal waters and inspires them to become stewards of the environment. Students participate in hands-on activities to see how human behavior affects the quality of air, water, and habitat, as well as plant, animal, and human life.

*Components of Think Watershed include:*

Floating Lab Boat Trip – On a 3-hour cruise through the Long Beach Harbor, with a morning or an afternoon departure, students will participate in: a plankton lab, ocean bottom sediment study, water visibility testing, water chemistry interactions, and wildlife observation.

Curriculum – Aligned to the California Content Standards, a Think Watershed Teacher's Guide is distributed to all participating classroom teachers. The guide includes: pre-trip activities, cruise plan and preparation guidelines, and post-trip activities such as website data reporting and service learning projects.

Bus Transportation – Free transportation from the students' school to the Long Beach Harbor is provided to schools that qualify.

From September 2008 through June 2010, over 5,000 students have participated in Think Watershed.

**Think Earth! It's Magic (Grades K – 5)**
What does a magician have to do with water conservation? On the surface, it wouldn't seem like much, but *Think Earth! It's Magic* is a collaborative program between Central Basin and the Think Earth Environmental Education Foundation that uses an award-winning curriculum and magic shows to teach elementary school students about their environment.

As the magician makes water disappear, he teaches the importance of water conservation. As he makes a rabbit disappear, he explains the effects of toxic waste on the environment. The magician's show follows the curriculum of the Think Earth Environmental Education Foundation and correlates to the California State Content Standards in the areas of Language Arts, Science, Social Science, and Mathematics. The Think Earth Environmental Education Foundation is a non-profit organization dedicated to developing and maintaining a sustainable environment through education.

Each year, elementary schools throughout Central Basin's service area enhance their Think Earth curriculum with this exciting magic show. It is an opportunity to reinforce the classroom lessons and remind students about the importance of implementing environmentally sound practices around their homes and schools.
From September 2005 through June 2010, 37,800 students have participated in Think Earth! It's Magic.

**Think Water! It's Magic (After School Program for Grades K – 5)**
*Think Water! It's Magic* is a **FREE** environmental education program for students in extended daycare/after school programs. This innovative program features an energetic *Think Water! It's Magic* assembly by eco-magician Paul Cash that students will remember for many years.

The *Think Water! It's Magic* shows are approximately 45-minutes in duration. While performing magic tricks and illusions, eco-magician Paul Cash engages students in a fun way and teach them about the limited water availability on Earth, the water cycle, water quality, and water recycling. Most importantly, Mr. Cash also teaches students about the amount of water used during everyday tasks and how they can conserve water by just making some simple behavioral changes.

This exciting environmental education assembly program is offered **FREE** to all Central Basin elementary schools (K-5) that have an extended daycare/after school program.

From September 2008 through June 2010, over 6,000 students have participated in Think Water! It's Magic.

**"Water Is Life" Poster Contest (Grades 4 – 8)**
As part of an annual recognition of Water Awareness Month, the "Water Is Life" Poster Contest is a collaborative arts program between Central Basin and the MWD. Celebrated every May, Water Awareness Month encourages wise water use, conservation, recycling, and water education. Students in grades 4 – 8, are encouraged to depict on posters various water uses and/or wise water use at home or school, in industry or business, in the environment, in agriculture, or in recreation. Central Basin then selects a grand-prize winner who is awarded a fully-loaded laptop computer and receives a special recognition at Central Basin's headquarters. The grand-prize winner's poster is then submitted to MWD to be included in calendars, and featured on water bottles, screen savers, mouse pads, etc.

From September 2005 through June 2010, over 80,000 students have had an opportunity to participate in the "Water Is Life" Poster Contest.

**Waterlogged (Grades 9 – 12)**

Waterlogged is a collaborative high school visitation program between Central Basin and the Roundhouse Marine Studies Lab and Aquarium, an oceanographic teaching station. Through specimen dissections, examples of current aquatic/marine science research, and practical hands-on activities, students will learn more about the scientific method, habitats and inhabitants of the Pacific Ocean, and the overall effect of unintended human impacts on the aquatic/marine environment.

Waterlogged offers five exciting classroom visitation topics, which are each aligned to the California State Science Content Standards.

This exciting aquatic/marine science education program is offered FREE to all Central Basin Waterlogged High Schools.

From September 2007 through June 2010, 15,925 students have participated in Waterlogged.

**Sewer Science (Grades 9-12)**
Sewer Science is an award-winning, hands-on laboratory program that teaches high school students in Central Basin's service area about wastewater treatment.

During a week-long lab course, students create fake wastewater and employ physical, biological and chemical treatment methods and procedures to test its quality. The lab is facilitated by biologists and chemists from the County Sanitation Districts of Los Angeles County, allowing students the opportunity to learn first-hand from experienced science professionals.

From September 2005 through June 2010, 8,875 students have participated in Sewer Science.

## 6.5. 2 FUTURE PROGRAMS

**Conservation Connection: Water & Energy in Southern California**
**(Grades 5 – 8)**

We turn the tap and water flows out. We turn on a lamp and light fills the room. We depend on water and energy. We need the water and energy to live in Southern California and elsewhere in the world too. But where do we get the water and energy that we use? Will we always have enough to meet our needs?

Conservation Connection answers those questions, showing the connections between California, our water and energy supply, and us. But providing information is only part of Conservation Connection. The goal of the curriculum is to get students actively involved – in their homes and at school – in conserving water and energy. Within the program, students have the opportunity to survey their family's water and energy use and survey water and energy use at their school.

After gathering data, analyzing their findings and reviewing recommendations, students make, implement, and monitor plans to decrease water and energy use. By participating in this action-based curriculum, students will learn to look critically at important environmental issues and take responsibility for finding solutions.

**Water for the City: Southern California's Urban Water Cycle (Grades 4 – 8)**
Water for the City: Southern California's Urban Water Cycle is a partnership between Central Basin, Los Angeles County Sanitation District, Water Replenishment District, MWD, Los Angeles County Office of Education, and the Center for Global Environmental Education at Hamline University. This interactive, multi-media water education curriculum has lessons for upper elementary through middle school students, as well as a teacher's guide. Lessons and animation elements will cover the following topics: Watershed Awareness, Where Southern California gets its water from, Surface and Ground Water, Water Storage and Delivery, A Raindrop's Journey, Water Recycling, Water Conservation, Water Planning, Dams and Reservoirs, Point and Non-Point Pollution, and an interactive Urban Water Cycle game that will address water supply and management issues.

**Table 6-1**
**School Education Program**
**(Number of Participating Students)**

| Grade Level | FY 05-06 | FY 06-07 | FY 07-08 | FY 08-09 | FY 09-10 | Total |
|---|---|---|---|---|---|---|
| K - 3rd | 3,360 | 3,100 | 6,460 | 8,828 | 6,140 | 27,888 |
| 4th - 6th | 6,040 | 9,520 | 11,163 | 14,499 | 13,825 | 55,047 |
| 7th - 8th | 500 | 0 | 105 | 105 | 0 | 710 |
| 9th - 12th | 905 | 1,925 | 4,900 | 9,265 | 8,015 | 25,010 |
| Total | 10,805 | 14,545 | 22,628 | 32,697 | 27,980 | 108,655 |