City of Buena Park

FINAL REPORT

2010 Urban Water Management Plan

June 2011

carollo

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City of Buena Park
2010 Urban Water Management Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: June 6, 2011

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The Water supplier is a: **Municipality**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

CITY OF BUENA PARK

URBAN WATER MANAGEMENT PLAN

FINAL
June 2011

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CITY OF BUENA PARK
URBAN WATER MANAGEMENT PLAN

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Abbreviation	Description
AB	Assembly Bill
ADD	Average Day Demand
af	Acre Feet
afy	Acre Feet per Year
BPP	Basin Pumping Percentage
City	City of Buena Park
CDHS	California Department of Health Services
CDR	Center for Demographic Research
CIMIS	California Irrigation Management Information System
CRWQCB	California Regional Water Quality Control Board
CVP	Central Valley Project
DOF	Department of Finance
DMMs	Demand Management Measures
du/ac	Dwelling Units per Acre
DWR	Department of Water Resources
ETo	Evapotranspiration
FAR	Floor Area Ratio
GMP	Groundwater Management Plan
GPCD	Gallons per Capita per Day
gpm	Gallons per Minute
GWRS	Groundwater Replenishment System
IPR	Indirect Potable Reuse
IRP	Integrated Resource Plan
MDD	Maximum Day Demand
MG	Million Gallons
mgd	Million Gallons per Day
mg/l	Milligrams per Liter
MWDOC	Municipal Water District of Orange County
MWDSC	Metropolitan Water District of Southern County
OCF	Orange County Feeder
OCSD	Orange County Sanitation District
OCWD	Orange County Water District
SB	Senate Bill
SCAG	Southern California Association of Governments
SWP	State Water Project
TDS	Total Dissolved Solids
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WMP	Water Master Plan
WSDM	Water Surplus and Drought Management
WSRP	Water Shortage Response Plan

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2010 Urban Water Management Plan
City of Buena Park

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Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	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.	10620(d)(2)		Section 1.3 Appendix B
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.4 Appendix B
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.4 Appendix B
55	Provide supporting documentation that the water supplier has encouraged 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.	10642		Section 1.4 Appendix B
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.4 Appendix B
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 6.3 and 6.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to 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. This also includes amendments or changes.	10644(a)		Section 1.3 Appendix B
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.4 Appendix B
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Figure 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Sections 2.3 and 2.4
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.2
SYSTEM DEMANDS				
1	Provide 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.	10608.20(e)		Section 6.2 Section 5.1 Tables 6.1 to 6.5
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (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, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 5.2 through 5.4 Table 5.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	[To Be Included In Appendix B]
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 5.5 Table 5.4
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Chapter 3 Table 3.3
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 3.5
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 3.5
16	Describe the groundwater basin.	10631(b)(2)		Section 3.5
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 3.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Not Applicable
19	For groundwater basins that are not adjudicated, provide information as to whether DWR 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. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.5
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Table 3.2
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 3.6 Table 3.4
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 7.4
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 7.5.1
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 3.7
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Chapter 4
45	Describe 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.	10633(a)		Chapter 4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Table 4.1
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.6
48	Describe and quantify 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.	10633(d)		Section 4.6
49	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.	10633(e)		Sections 4.6
50	Describe the 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.	10633(f)		Section 4.6
51	Provide 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.	10633(g)		Not Applicable
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Chapter 3
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Sections 7.3 and 7.5
23	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.	10631(c)(2)		Section 7.3
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Chapter 8

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide 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.	10632(b)		Section 7.3
37	Identify 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.	10632(c)		Sections 8.6
38	Identify 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.	10632(d)		Section 8.4.1
39	Specify 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.	10632(e)		Section 8.3.2
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 8.4.2
41	Provide 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.	10632(g)		Section 8.5
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Section 8.2 Appendix F
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 8.7
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 7.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing 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. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 7.5
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.3
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 6.3
28	Provide 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 ability to further reduce demand.	10631(f)(4)		Section 6.3
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Not Applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not Applicable

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

2010 URBAN WATER MANAGEMENT PLAN

This executive summary provides an overview of the content included in the City of Buena Park's (City) 2010 Urban Water Management Plan (UWMP). The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions. This report, which was prepared in compliance with the California Water Code, and as set forth in the guidelines and format established by the Department of Water Resources, constitutes City's 2010 UWMP.

As required by the Urban Water Management Plan Act (Act), this document has been prepared with the participation of the public and in coordination with appropriate agencies. Specific coordination and participation details are included in Chapter 1.

Since the 2005 UWMP was prepared, several pieces of legislation have amended the Act. While all the applicable legislation is discussed in more detail in Chapter 1, the most notable of these is the 2009 Water Conservation Act (also known as SBx7-7) mandating a per-capita reduction in water consumption of 20 percent by the year 2020.

The City's service area is located in northwest Orange County and encompasses approximately 10 square miles. The majority of the City's land use is residential, with about 30 percent divided equally between commercial and industrial uses. The City's current population is estimated at 84,141 people. Since the City is fairly built out, projected growth is limited, with growth projections predicting about 2,000 additional people between 2015 and 2035.

The City's water system supplies water from local groundwater, pumped from the Orange County Groundwater Basin, and imported water from the Municipal Water District of Orange County (MWDOC). The City's 2010 demands were 14,019 afy, which are substantially reduced from the 2007 demands of 18,402 afy.

To establish the baseline per-capita demand and water conservation targets associated with the Water Conservation Act of 2009, a baseline period of 1995 through 2004 was selected. The corresponding baseline per-capita demand is 200 gpcd. Using Method 1, the City's 2020 per-capita target demand is 160 gpcd. Note that the per-capita target incorporates offsets for Indirect Potable Reuse (IPR). The development of the per-capita demand targets as well as the selection of the method for the conservation target is discussed in further detail in Chapter 6.

Chapter 1

INTRODUCTION

1.1 PURPOSE

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR) every five years. The UWMPs must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983 including amendments that have been made to the Act. The UWMPA requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet (af) of water annually, to prepare an UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This report, which was prepared in compliance with the California Water Code, and as set forth in the guidelines and format established by the DWR, constitutes the City of Buena Park (Buena Park) 2010 UWMP.

1.2 BACKGROUND

1.2.1 Urban Water Management Planning Act

In 1983, State Assembly Bill 797 modified the California Water Code Division 6, by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since 1983, have increased the data requirements and planning elements to be included in the 2005 and 2010 UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures, and a water shortage contingency plan. The UWMPA requires inclusion of a water shortage contingency plan, which meets the specifications, set forth therein. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the water shortage contingency plan with other urban water purveyors in the area, to the extent practicable. Each water supplier must also describe their water demand management measures that are being implemented, or scheduled for implementation.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summer, the key relevant regulations are:

- Assembly Bill 1420: Requires implementation of demand management measures (DMMs)/BMPs and meeting the 20-by-2020 targets to qualify for water management grants or loans.
- Assembly Bill 1465: Requires water suppliers to describe opportunities related to recycled water use and storm water recapture to offset potable water use.
- Amendments SB 610 (Costa, 2001), and AB 901 (Daucher, 2001), which became effective beginning January 1, 2002, require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply planning (Daucher) and Water Supply Assessments (Costa).
- Senate Bill 1087: Requires water suppliers to report single-family residential (SFR) and multi-family residential (MFR) projected water use for lower income areas separately.
- Amendment SB 318 (Alpert, 2004) requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004) requires urban water suppliers to submit their UWMPs to the California State Library.
- Senate Bill x7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. This water bill also extended the 2010 UWMP submittal deadline for retail agencies to July 1, 2011. DWR is still finalizing two of the four new methodologies that an agency can choose from to establish their intermediate (2015) and year 2020 water conservation targets.
- Senate Bill 1478: This bill was signed on September 23rd and extends the 2010 UWMP deadline for wholesale agencies, such as the Metropolitan Water District of Southern California (MWDSC) and Mojave Water Agency (MWA), to July 1, 2011, as SBx7-7 did for retail agencies.

1.2.2 Previous Urban Water Management Plan

Pursuant to the UWMPA, Buena Park previously prepared an UWMP in 2005, which was approved and adopted on December 13, 2005. Following adoption, the 2005 UWMP was submitted to DWR. DWR requested further information supplied in an addendum to the UWMP in 2008. The plan was then formally approved by DWR in July, 2009. The 2010 UWMP revises the 2005 UWMP prepared by Buena Park and incorporates changes enacted by legislation as discussed above.

1.3 COORDINATION WITH APPROPRIATE AGENCIES

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies.

Law

> *10620 (d) (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.*

Buena Park is the sole water supplier and water management agency for the area. While preparing the 2010 UWMP, Buena Park coordinated its efforts with relevant agencies to ensure that the data and issues discussed in the plan are presented accurately. Table 1.1 summarizes how the UWMP preparation was coordinated with different agencies in area.

Table 1.1 Coordination with Appropriate Agencies
2010 Urban Water Management Plan
City of Buena Park

Check at least one box on each row	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 Sent a Notice of Intention to Adopt	Not Involved/ Not Informed
California Department of Public Health						✓	
City of Anaheim						✓	
City of Cerritos						✓	
City of Fullerton						✓	
City of La Mirada						✓	
City of La Palma						✓	
County of Los Angeles						✓	
County of Orange						✓	
Golden State Water Company						✓	
Municipal Water District of Orange County	✓			✓		✓	
Orange County Water District						✓	
Suburban Water Systems						✓	

Note:
To be filled in during public participation phase of the 2010 UWMP preparation

1.4 PUBLIC PARTICIPATION AND PLAN ADOPTION

The UWMPA requires that the UWMP show the water agency solicited public participation.

Law

> 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 … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

In accordance with the UWMPA, Buena Park held a public hearing and adopted the 2010 UWMP on May 10, 2011. A copy of the adopting resolution and resolution of intent to adopt are included in Appendix B. The hearing provided an opportunity for Buena Park's customers, residents, employees, and diverse socio-economic population to learn and ask questions about the current and future water supply of Buena Park.

Two successive weeks prior to adoption; a notice of the public hearing was posted, notifying interested parties that the draft 2010 UWMP was available for review (Appendix B).

1.5 REPORT ORGANIZATION

The UWMP contains eight chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 - Introduction. This chapter presents the purpose of this UWMP, describes the efforts of Buena Park to coordinate the preparation of the UWMP with appropriate nearby agencies, and discusses the measures used to solicit public participation in the UWMP.

Chapter 2 - Service Area. This chapter presents a description of the water purveyor's service area and various aspects of the area served including climate, population, and other demographic factors.

Chapter 3 – Water Sources. This chapter presets a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies includes information on the groundwater usage such as water rights, determination if the basin is in overdraft and other relevant information.

Chapter 4 – Water Recycling. This chapter includes information on water recycling and its potential for use as a water source for the City of Buena Park in accordance with the Urban Water Management Planning Act (UWMPA).

Chapter 5 – Water Use. This chapter presents the quantity of water supplied to the agency's customers including a breakdown by user classification.

Chapter 6 – Water Conservation. This chapter is broken into two parts.

Part I addresses the requirements of the Water Conservation Bill of 2009

Part II includes a description of Buena Park's water demand management measures. This includes programs which are currently implemented or scheduled for implementation, water survey programs, water system audits, plumbing retrofits, conservation and water efficiency rebate programs and incentives, information and education programs, water pricing and other waste water prohibitions, and residential ultra low flush toilet replacement programs.

Chapter 7 – Reliability of Supply. In this chapter, the UWMP seeks to address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, there is an analysis of supply availability in a single dry year and in multiple dry years.

Chapter 8 – Water Shortage Contingency Plan. This chapter includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

1.6 ACKNOWLEDGEMENTS

Carollo Engineers wishes to acknowledge and thank the following City staff, in particular, Joan Lyle, P.E. (Public Works Associate Engineer), Rick Warsinski (City Manager), and Jim Biery, P.E. (Director of Public Works) for their cooperation and courtesy in obtaining the information necessary to complete this report.

The following staff of Carollo Engineers was involved in the preparation of this plan:

Gary Meyerhofer, P.E.	Principal-in-Charge
Inge Wiersema, P.E.	Project Manager
Brian Brenhaug, P.E.	Project Engineer
John Meyerhofer	Staff Engineer
Li-Chen Wang	GIS and graphics

SERVICE AREA

The UWMPA requires that the UWMP include a description of the water purveyor's service area and various aspects of the area served including climate, population, and other demographic factors.

Law

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

2.1 LOCATION

The City of Buena Park (City) is located in northwest Orange County, California as shown in Figure 2.1. The City is bounded by the Cities of La Palma and Cerritos to the west, the City of La Mirada to the north, the Cities of Fullerton and Anaheim to the east, and the Cities of Anaheim and Cypress to the south. The Cities of Cerritos and La Mirada are within Los Angeles County, while the other cities are in Orange County.

The City's water service area includes the Buena Park city limits (as shown in Figure 2.1), excluding three areas, which are within the city limits but served by the City of Fullerton and Suburban Water Systems. In addition, the City provides service to two locations that are outside the city limits: one area is in the City of Anaheim and the other is in the City of La Mirada. The Golden State Water Company (formerly Southern California Water Company) provides water service to the cities of Cypress and Stanton, south of the City. Suburban Water Systems provides water service to the City of La Mirada and a small segment of the City.

2.2 LAND USE AND DEVELOPMENT

Table 2.1 summarizes the General Plan land use categories along with corresponding acreages and percentage of the City. It should be noted that some General Plan land use categories were consolidated for clarity. The total area shown in Table 2.1 excludes street right of way and thus is less than the 10.3 square mile area of the City limits.

Table 2.1 Land Use Distribution
2010 Urban Water Management Plan
City of Buena Park

Land Use	Net Area[(1)] (acres)	Net Area[(1)] (square miles)	Percentage of Total
Residential			
Low Density (up to 7.2 du/ac)	2,420	3.8	42.6%
Medium Density (up to 10.0 du/ac)	226	0.4	4.0%
High Density (up to 20.0 du/ac)	360	0.6	6.3%
Commercial[(2)]	881	1.4	15.5%
Industrial	828	1.3	14.6%
Open Area	779	1.2	13.7%
Special/Other Designation[(3)]	190	0.3	3.3%
Total[(1)]	**5,681**	**8.9**	**100.0%**

Notes:
(1) General Plan GIS Layer provided by City. Street right-of-way is not included in these totals.
(2) Commercial includes General Plan designations Commercial, Commercial Service, Office Professional, Tourist Entertainment, and Regional Commercial.
(3) Includes Planned Development as well as empty designations (2.8 acres).

As shown in Table 2.1, the majority of the City's service area consists of residential land use designations. The remaining areas are evenly distributed between commercial, industrial, and open area land use types.

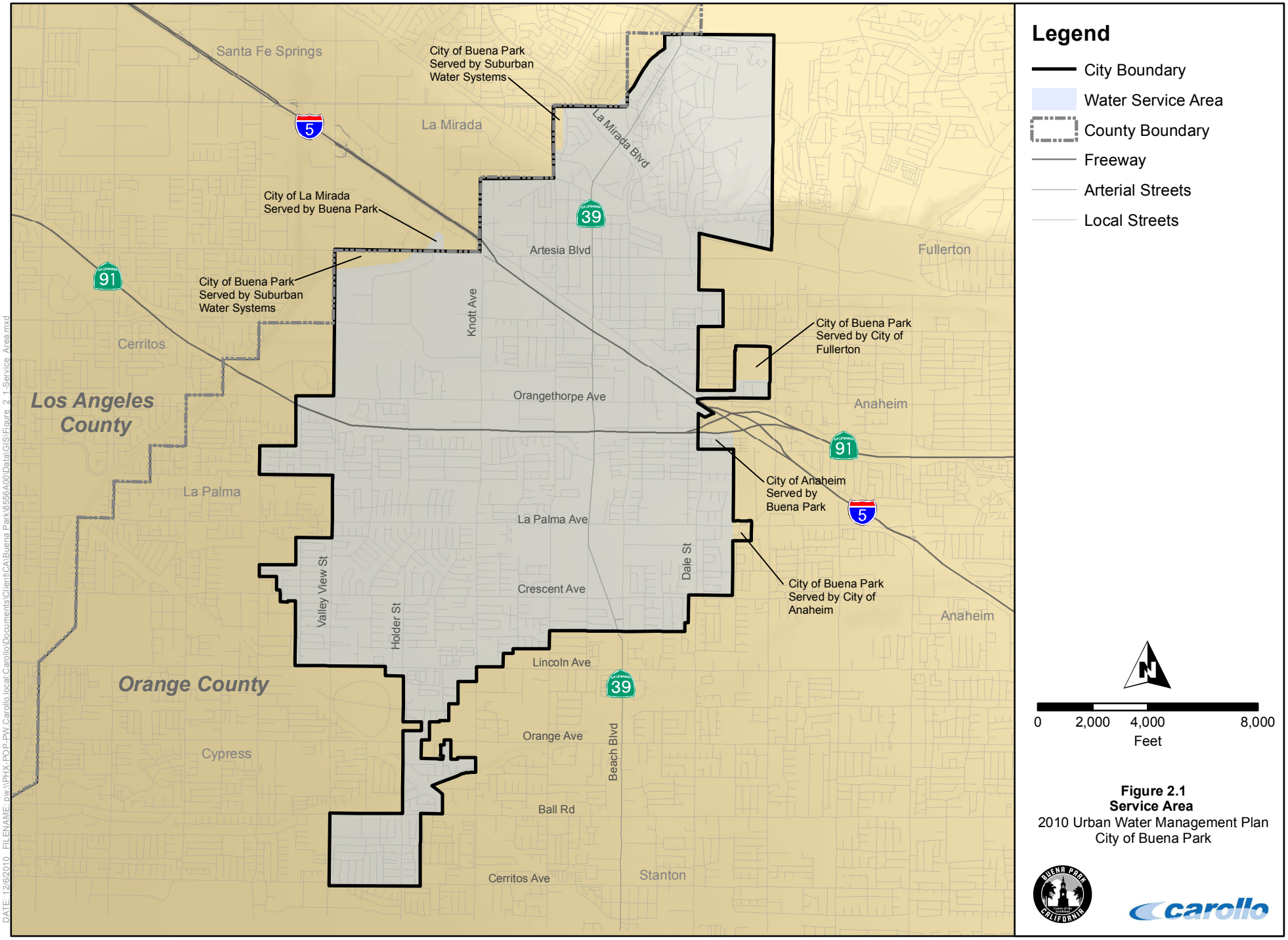

Figure 2.1
Service Area
2010 Urban Water Management Plan
City of Buena Park

2.3 POPULATION

Incorporated in 1953, The City encompassed 2.5-square miles. Throughout the 1950s, the City continued to grow with the construction of the Santa Ana Freeway, which bisected the City, and through annexations of farmland to construct residential and commercial areas. With the continued growth over the years, the City is nearing build-out conditions (98.5 percent built-out), and has few remaining vacant areas. Recently, older regions of the City have been redeveloped (BPGP, 2010).

Buena Park is a growing community with a population of approximately 84,141, as of January 1, 2010, according to the California Department of Finance (DOF) (DOF, 2010). Population projections, shown in Table 2.2, Table 2.3 and Figure 2.2, are used to forecast water requirements for Buena Park.

Table 2.2 Historic Population
2010 Urban Water Management Plan
City of Buena Park

Year	Population[(1)]
1990	68,784
1991	69,312
1992	70,221
1993	71,055
1994	71,997
1995	72,470
1996	72,756
1997	73,522
1998	74,669
1999	75,986
2000	77,962
2001	78,745
2002	79,475
2003	80,290
2004	80,574
2005	80,670
2006	81,082
2007	81,775
2008	82,332
2009	83,281
2010	84,141

Note:
(1) Based on SCAG data

The City's population grew from 68,784 in 1990 to 84,141 in 2010, an increase of 22 percent. This growth trend contrasts significantly to the future projections shown in Table 2.3.

Table 2.3 Projected Population
2010 Urban Water Management Plan
City of Buena Park

2010 UWMP Projected Years	2015	2020	2025	2030	2035
SCAG City Population Projection[(1)]	86,584	87,471	88,304	88,905	88,381
Service Area Population [(2)]	83,100	83,600	84,100	84,600	85,100

Notes:
(1) Center for Demographic Research data provided by the City (based on SCAG projections)
(2) From Cal State Fullerton's Center for Demographic Research

Service area population projections are shown from 2015 to 2035. The projected service area population for 2035 is 88,381, which is only five percent higher than the current 2010 service area population of 84,141. This yields an average yearly growth rate of 0.2 percent during this projected period. The UWMP uses the Southern California Association of Governments (SCAG) City Population Projection for further data analysis and projections. Table 2.3 also indicates that the service area population is about 3,000 less than the City's population, which reflects that some portions of the City are served by other water purveyors.

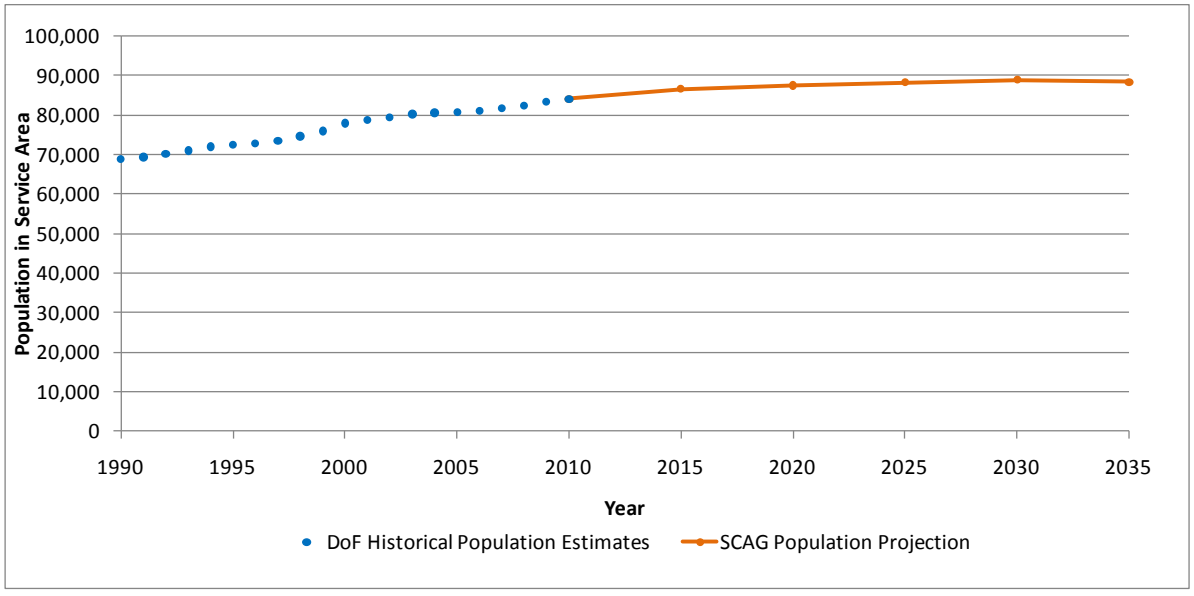

Figure 2.2 Historical and Projected Population

2.4 CLIMATE

The City's climate is a semi-arid environment with mild winters, warm summers and moderate rainfall, consistent with coastal Southern California. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or dry hot Santa Ana winds. Table 2.4 summarizes the standard monthly average evapotranspiration (ETo) rates, rainfall, and temperature. Buena Park's average monthly temperature ranges from 56.2 to 74.4 degrees Fahrenheit (°F), with an annual average temperature of 64.5°F. The daily extreme low and high temperatures have been measured to be 25°F and 111°F, respectively. Average annual rainfall and ETo are 12.0 inches and 46.3 inches, respectively.

Table 2.4 Climate Characteristics
2010 Urban Water Management Plan
City of Buena Park

Month	Monthly Average Rainfall[2] (inches)	Standard Monthly Average ETo[1] (inches)	Monthly Average Temperature[2] (°F)		
			Average	Minimum	Maximum
January	2.7	1.7	56.3	45.6	66.9
February	3.0	2.2	57.3	47.3	67.2
March	1.8	3.6	59.1	49.7	68.4
April	0.7	4.8	62.0	52.3	71.6
May	0.2	5.1	65.3	56.9	73.6
June	0.1	5.7	68.7	60.3	77.1
July	0.0	5.9	73.1	63.8	82.4
August	0.1	5.9	74.4	64.9	83.9
September	0.2	4.4	72.6	62.9	82.3
October	0.4	3.2	68.0	57.9	78.0
November	1.2	2.2	61.4	50.6	72.2
December	1.7	1.7	56.2	45.3	67.1
Annual	**12.0**	**46.3**	**64.5**	**54.8**	**74.2**

Notes:
(1) California Irrigation Management Information System (CIMIS, 2010)
(2) Western Regional Climate Council (WRCC, 2010)

As shown in Table 2.4, the historical annual average precipitation is approximately 12.0 inches. Records show that average monthly precipitation has been as high as 3.0 inches and as low as 0.0 inches. Most of the rainfall occurs during the period of November through April.

Chapter 3

WATER SUPPLY

3.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the agency's existing and future sources for the next 20 years. The description of water supplies must include detailed information on the groundwater basin such as water rights, determination if the basin is in overdraft, adjudication decree, and other information from the groundwater management plan (if available).

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (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 to 20 years or as far as data is available. (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:
>
> 10631 (b) (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.
>
> 10631 (b) (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 board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court of 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.

3.2 WATER SUPPLY FACILITIES

The City of Buena Park (City) currently uses local groundwater and imported water from the Municipal Water District of Orange County (MWDOC). The City's water system extracts groundwater from underground aquifers through active wells located throughout the City. The capacities of the City wells are listed in Table 3.1. Water is conveyed from the wells to the consumers via a distribution system with pipe sizes ranging between 4 and 36 inches in diameter. The City also has four MWDOC supply connections and one storage reservoir with a capacity of 20 million gallons (MG).

Table 3.1 Water Supply Wells
2010 Urban Water Management Plan
City of Buena Park

Well Name	Status	Year Drilled	Disinfection	Capacity (gpm)
Artesia[1]	Inactive	1955	N/A	N/A
Ball	Active	1995	Sodium Hypochlorite	1,500
Boisseranc	Active	1995	Sodium Hypochlorite	3,000
Caballero	Active	1964	Temporary Chlorine[3]	2,000
Freeway	Active	1964	Emergency Chlorine Only	1,500
Holder	Active	1964	Emergency Chlorine Only	1,800
Knott	Active	1964	Emergency Chlorine Only	1,000
Larwin[2]	Inactive	1954	Emergency Chlorine Only	N/A
Moss	Abandoned	1957	Emergency Chlorine Only	N/A
Smith Murphy	Active	1978	Emergency Chlorine Only	2,000
Linden	Active	2005	Sodium Hypochlorite	3,000
Total	**8**			**15,800**

Notes:
(1) Plans are in place to abandon this well due to high nitrate concentrations.
(2) Plans are in place to abandon this well due to low capacity.
(3) Plans are in place to implement permanent Sodium Hypochlorite disinfection treatment

3.3 IMPORTED WATER

MWDOC provides imported water from Metropolitan Water District of Southern California (MWDSC) to 30 cities and water districts, including the City. MWDSC imports water from Northern California via the State Water Project (SWP) and the Colorado River via the Colorado River Aqueduct to meet the needs of six Southern California counties. MWDOC receives between 225,000 and 250,000 acre-feet (af) of water from MWDSC each year and expects that to remain relatively stable through the planning horizon of 2030 (MWDOC, 2005).

The City receives water from MWDOC via four water connections from MWDOC's Orange County Feeder (OCF) transmission pipeline. They are: OC-16, OC-24, OC-25, and OC-31. The locations and capacities of connections are summarized in Table 3.2. OC-25 is the City's main source of imported water. The remaining three connections are secondary sources and used only if additional water is needed to supplement groundwater supplies. Most of the City's imported potable water is supplied through OCF from the OCF is supplied from MWDSC's F.E. Weymouth Water Treatment Plant (WTP) in La Verne. Water may

arrive from the Deimer Filtration Plant in Yorba Linda, and Joseph Jensen WTP in Granada Hills depending on supply availability and the delivery method. The plants receive water from the Colorado River and State Water Project Sources.

Table 3.2 Import Water Connections
2010 Urban Water Management Plan
City of Buena Park

Connection ID	Location	Capacity (cfs)	Control
OC-16	Crescent at Dale St.	15	Flow
OC-24	Artesia at Dale St.	4	Flow
OC-25	Lincolnshire at St. Andrews	15	Pressure
OC-31	Kass Dr. at Dale St.	10	Flow

Notes:
Source: 2005 Water Master Plan Study (Carollo, 2005)

3.4 GROUNDWATER BASIN

The groundwater basin underlying the City is the Orange County Groundwater Basin. The City obtains its well water from this large groundwater basin, which is recharged via the Santa Ana River. The Santa Ana River water also includes imported water from the upstream watershed areas that show up as irrigation runoff into the river, or via wastewater discharges. The Orange County Groundwater Basin is not adjudicated, but managed by the Orange County Water District (OCWD).

3.4.1 Basin Boundaries

The Orange County Groundwater Basin is located in the northern half of Orange County within the Lower Santa Ana River Watershed, underneath coastal alluvial plains (DWR, 2004). It covers an area of approximately 224,000 acres. To the north are consolidated rocks in the Puente and Chino Hills, to the east are Santa Ana Mountains, and to the south are the San Joaquin hills (DWR, 2004). To the west is the Pacific Ocean, and to the northwest is a low topographic divide that generally follows the Orange County - Los Angeles County line (DWR, 2004).

The DWR divided the basin into two hydrologic divisions: the Pressure and Forebay Areas. The City is located within the Pressure Area. In this area of the basin, surface water and near-surface groundwater are impeded from percolating in large quantities into the aquifers. Most of the coastal and central portions of the basin fall into this area. Water levels in wells penetrating these aquifers exhibit large seasonal variations in response to pumping because they are under confined conditions (OCWD, 2004).

Using 1969 as the benchmark year, the basin has a total capacity of approximately 66 million af. In November 2005, the basin overdraft was approximately 190,000 af (OCWD, 2009).

3.4.2 Basin Pumping Percentage

Each year OCWD sets a Basin Production Percentage (BPP) for the agencies that pump from the basin. The BPP is the maximum ratio of water produced from groundwater to all water produced by the agency. The BPP provides a limit on how much each agency can pump from the Orange County Groundwater Basin without paying a penalty.

The amount of groundwater pumped in the period fiscal year 2005/2006 (FY06) through 2009/2010 (FY10) and the contribution of groundwater as a percentage of the City's total potable water supply is summarized in Table 3.3.

Table 3.3 Amount of Groundwater Pumped
2010 Urban Water Management Plan
City of Buena Park

	Groundwater Pumped from Basin (afy)				
Basin Name(s)	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**
Orange County Groundwater Basin	7,458	12,125	13,258	11,241	11,648
% of Total Water Supply	45.42%	65.70%	75.96%	68.94%	69.04%

3.4.3 Groundwater Management Plan

The OCWD was formed in 1933 by a special act of the California Legislature (OCWD, 2009). OCWD last updated its Groundwater Management Plan (GMP) in July 2009, which provides a clear understanding of OCWD's groundwater management role within the county. It also documents the existing activities of OCWD and formalizes other proposed programs in a plan that is used to implement a monitoring and management program for conjunctive use, replenishment, and preservation of groundwater in the basin.

Since its creation, OCWD has achieved world-renowned status for its innovative approach to groundwater recharge, water quality protection, and groundwater resource management (OCWD, 2004). OCWD's objectives related to groundwater management are to protect groundwater quality and to increase the basin's sustainable yield (OCWD, 2004).

The GMP formally documents OCWD's groundwater management goals and describes programs in place that are designed to meet those goals. The following programs are recommended in the plan:

- Monitor the quality of recharge sources.
- Monitor groundwater quality using OCWD wells and wells owned by others.
- Monitor water management and recycling plans for impact on present and future Santa Ana River flow rates and quality.

- Conduct groundwater-level and hydrogeologic evaluations to provide information to manage the basin.
- Protect OCWD's interest in management of flow of the Santa Ana River.
- Evaluate the feasibility of water recharge supplies (such as water transfers).
- Evaluate the feasibility of additional conjunctive use or storage projects.
- Evaluate projects to increase OCWD's capacity to recharge water.
- Evaluate projects to maintain the recharge rate in the Santa Ana riverbed.
- Locate future recharge projects to maximize benefits to the basin and areas of low groundwater levels to the extent feasible.
- Manage natural resources in the watershed to sustain natural resources and secure the water supply.
- Prevent saltwater intrusion.
- Evaluation of emerging contaminates.
- Prevent future contamination through coordination with regulatory agencies and watershed stakeholders.
- Evaluate projects to control the movement of poor quality water.
- Evaluate and pursue projects to address existing areas of contamination.
- Evaluate projects to respond to and recover from droughts.
- Evaluate projects to control groundwater losses.
- Evaluate projects to reduce water demand through conservation and water use efficiency.

3.5 GROUNDWATER STUDY

OCWD continuously updates its GMP within the study area. The latest update was completed in July 2009.

3.5.1 Subsurface Geologic Conditions

The aquifers comprising the basin extend over 2,000 feet deep and form a complex series of interconnected sand and gravel deposits. In coastal and central portions of the basin, these deposits are more separated by extensive lower-permeability clay and silt deposits, known as aquitards. In the inland area, generally northeast of Interstate 5, the clay and silt deposits become thinner and more discontinuous, allowing larger quantities of groundwater to flow more easily between shallow and deeper aquifers (OCWD, 2009).

DWR characterizes the local subsurface geologic conditions as a deep structural depression containing an accumulation of fresh water bearing interbedded marine and continental sand, silt, and clay deposits (OCWD, 2009).

3.5.2 City Supply Wells

The City currently has 11 wells (eight active, one recently abandoned, and two inactive). The wells are located throughout the City and have a total supply capacity of 17.7 million gallons per day (mgd) or 12,300 gallons per minute (gpm). The City's firm production capacity, which is defined as the total capacity with the single largest well out of service, is approximately 14.4 mgd. Pumping rates for the City's wells range from 1,000 to 3,000 gpm. Pumping rates for two of the eight active wells exceed 2,000 gpm, Boisseranc and Linden.

3.5.3 Groundwater Levels

According to OCWD's 2009 GMP, water elevations in November 1969 for the Orange County Groundwater Basin are used as the baseline to represent near-full conditions. The net decrease in storage since 1969 represents the accumulated overdraft. In November 2005, the basin overdraft was approximately 190,000 af. The traditional full-basin benchmark of 1969 was revised in 2007, and the 2009 basin overdraft calculated to be 347,000 af (OCWD, 2009).

In both 1969 and 1983, the water level difference between coastal and Forebay endpoints was 170 feet. In 1983, the basin was at near-full conditions. In 2002, with increased basin production and an accumulated overdraft of 426,000 af, the water level difference between these endpoints was 260 feet. The steeper hydraulic gradient enables greater flow from the Forebay to the coastal areas, however the lowering of the coastal water levels increases the chances of saltwater intrusion (OCWD, 2004).

The accumulated overdraft was reduced by 120,000 af between 1992 and 1994, due to increased rainfall and increased Santa Ana River storm flow. During this time, the groundwater elevations in both the Pressure and Forebay areas rose approximately 20 feet. The similarity in water elevation change occurs because groundwater in the deep portions of both areas exists under confined conditions and changes in elevation are quickly transmitted through the aquifers (OCWD, 2004).

Groundwater elevations in the Forebay area rose 3 feet from 1999 to 2000, but declined 2 feet in the Pressure area. This may have been the result of a shift in the distribution of pumping.

3.5.4 Sources of Recharge and Discharge

OCWD also manages all recharge efforts in the basin. To accommodate increasing demand for water supplies, OCWD started actively recharging the groundwater basin over fifty years ago. In 1949, the District began purchasing imported Colorado River water from

the MWDSC, which was delivered to Orange County via the Santa Ana River upstream of Prado Dam. In 1953, OCWD began making improvements in the Santa Ana River bed and constructing off-channel recharge basins to increase recharge capacity. The District currently operates 1,067 acres of recharge facilities adjacent to the Santa Ana River and its main Orange County tributary, Santiago Creek (OCWD, 2009).

The Talbert and Alamitos saltwater barriers are each comprised of a series of injection wells. The injected water is comprised of deep well water, purified water, and imported water. The wells inject water at an average of 35 mgd into each of the four aquifer zones. Injecting the water into these zones creates a barrier to prevent seawater from migrating inland towards groundwater production (OCWD, 2009).

Recharge primarily consists of Santa Ana River baseflow and storm flow, but does include some imported water and purified water. The Santa Ana River flows below Prado Dam consist of perennial baseflow and seasonal stormflow. The baseflow is mostly tertiary treated wastewater from areas upstream of Orange County. Future increases in population upstream could result in an increase in baseflow, unless additional reclamation is implemented upstream.

OCWD and Orange County Sanitation District (OCSD) have sponsored the Groundwater Replenishment System (GWRS), which was brought online in January 2008. The system purifies secondary wastewater effluent from OCSD for injection into the Talbert seawater intrusion barrier and recharge into the Orange County Groundwater Basin, referred to as Indirect Potable Reuse (IPR). The GWRS project has a capacity of 64 mgd and provides a drought-proof supply for basin recharge. This system is further discussed in Chapter 4. As will be discussed in Chapter 6, the City can deduct IPR groundwater supply from its gross water use. To facilitate this deduction, groundwater pumped from the Orange County Groundwater Basin is split into two categories to separate out the portion deducted as IPR.

3.6 WATER SUPPLY PROJECTIONS

To provide adequate water supply facilities, the total water supply capacity must be large enough to meet the varying water demand conditions, as well as provide sufficient water during drought conditions and potential emergencies such as power outages.

3.6.1 Normal Production Capacity

In accordance with industry standard practices and the Department of Public Health (DPH) criteria for “Adequate Source Capacity” on water supply, the source should be sized to serve the maximum day demand (MDD). On the day of maximum demand, it is desirable to maintain a water supply rate equal to the MDD rate. Water required for peak hour demands (PHD) or for fire flows would come from storage.

Based on 2009 data, the City’s current average day demand (ADD) is approximately 14.7 mgd, and there is an instantaneous supply availability of 51.2 mgd (22.8 mgd is from wells

and 28.4 mgd is from MWDSC import water). The City's firm capacity, the system capacity with the largest supply source removed, is 41.5 mgd.

3.6.2 Standby Production Capacity

Standby production capacity is required for system reliability. Under normal operating conditions, one or two of the City's wells can be out of service during MDD conditions due to equipment malfunction, for servicing, or for water quality concerns. The DPH criterion for standby production capacity recommends considering the capacity of the largest well being out of service.

3.6.3 Future Supply Capacity

The adequate source of supply for the City will consist of groundwater wells and imported water, which provide combined production capacity that continues to meet the City's demands. Table 3.1 lists the projected water supply, in 5-year increments, through the planning horizon of 2035. As shown, groundwater is slated to compose approximately two thirds of the total supply.

Table 3.1 Current and Projected Water Supply
Urban Water Management Plan
City of Buena Park

Supply Source	Current and Projected Years - AFY					
	2010	**2015**	**2020**	**2025**	**2030**	**2035**
Wholesaler (MWDOC)	6,824	6,764	6,475	6,685	6,877	69,65
Groundwater (Non-IPR)	10,504	9,053	8,956	9,247	9,513	9,634
IPR Groundwater	630	1,983	3,069	3,168	3,260	3,301
Total	**17,958**	**17,800**	**18,500**	**19,100**	**19,650**	**19,900**

Note:
(1) Supply source projections based on the assumption that the City will pump their projected BPP, 62% through 2015 and 65% every year thereafter, before using imported water.

3.7 DESALINATED WATER

The UWMPA requires that the UWMP include information on desalinated water.

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (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

3.7.1 Brackish Water and/or Groundwater Desalination

The groundwater basins located under or near the City are not brackish in nature and do not require desalination. Therefore, there is no water of this nature available to the City for direct use. However, the City could provide financial assistance to other MWDOC agencies in exchange for supplies. Communities near the desalination plant would receive the desalinated water and a similar amount of MWDOC-supplied water would be exchanged and allocated to the City. Should the need arise, the City may consider this option.

3.7.2 Ocean Water

Because the City is not located in a coastal area, it is not practical or economically feasible to implement the City's own seawater desalination program.

Regionally, MWDOC is developing the South Orange Coastal Ocean Desalination Project (SOCOD), a 15-mgd reverse osmosis ocean desalination facility in south Orange County. The facility is expected to provide drought protection, system reliability, and improve water quality by providing a lower level of total dissolved solids (TDS) in the supply (MWDOC, 2010).

Chapter 4

WATER RECYCLING

4.1 INTRODUCTION

This chapter includes information on water recycling and its potential for use as a water source for the City of Buena Park (City) in accordance with the Urban Water Management Planning Act (UWMPA).

UWMPA:

> 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. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (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.
>
> 10633 (b) 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.
>
> 10633 (c) 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 determination with regard to the technical and economic feasibility of serving those uses, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
>
> 10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.
>
> 10633 (e) 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.
>
> 10633 (f) 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 and to promote recirculating uses.

4.2 ORANGE COUNTY SANITATION DISTRICT

Orange County Sanitation District (OCSD) provides wastewater collection and treatment for northern and central Orange County. Their service area encompasses 479 square miles, 21 cities, 3 special districts, and portions of unincorporated Orange County for an OCSD population of approximately 2.5 million residents (OCSD, 2011).

4.3 WATER FACTORY 21

Water Factory 21 was built in 1975 and operated until 2004. According to the 2004 Orange County Water District (OCWD) Groundwater Management Plan (GMP), it purified 4 mgd of clarified secondary wastewater effluent from OCSD using lime clarification, multimedia filtration, reverse osmosis, and UV treatment. The product water was then injected via 23 injection wells into the Talbert saltwater intrusion barrier.

Water Factory 21 was replaced by the Groundwater Replenishment System (GWRS), which is discussed in more detail below.

4.4 GROUNDWATER REPLENISHMENT SYSTEM (GWRS)

Orange County has a groundwater system in place to recharge the seawater intrusion barrier. As stated in the 2009 Orange County Water District (OCWD) Ground Water Report, the GWRS is a joint project of OCWD and the OCSD. The GWRS creates a new source of recharge water that will increase the reliability and sustainability of local groundwater supplies.

The GWR System augments existing groundwater supplies by producing purified water to recharge the basin and provide a reliable supply of water for the Talbert Seawater Barrier. As shown in Figure 4.1, the GWR System consists of three major components: (1) Advanced Water Treatment facilities and pumping stations, (2) a pipeline connection from the treatment facilities to existing recharge basins, and (3) expansion of the Talbert Barrier (OCWD, 2009).

Figure 4.1 Groundwater Replenishment System Map

Secondary-treated effluent from the OCSD Wastewater Reclamation Plant No. 1 in Fountain Valley is pumped to the AWT facilities instead of to the ocean for disposal. The advanced water purification plant purifies the water with microfiltration (MF); reverse osmosis (RO); and advanced oxidation processes (AOP), which consist of ultraviolet (UV) and hydrogen peroxide (H_2O_2).

The first step in the tertiary treatment process is MF membrane treatment. MF is a low pressure membrane process that removes small suspended particles, protozoa, bacteria and some viruses from the water. Sodium hypochlorite, a bleach solution, is added to the MF feed water to minimize MF membrane fouling.

Next, the MF filtrate is fed to the RO treatment system. Dissolved contaminants and minerals, including dissolved organics, total dissolved solids, silica, and virus, are removed in the RO treatment process.

The water then undergoes UV and H_2O_2 treatments. UV light penetrates the cell walls of microorganisms, preventing replication and inducing cell death. This provides an additional barrier of protection against bacteria and viruses. More importantly, UV with H_2O_2 oxidizes organic compounds. At this point, the product water is so pure that it can not be moved in conventional pipes. Small amounts of minerals are added back into the water so that it is stable in the concrete pipes.

Although the GWR System is projected to eventually produce 98,000 afy of water, the first year of operation actually produced less than 45,000 af of water. Operation of the system is limited by the supply of secondary-treated wastewater from OCSD. OCSD constructed a pump station which was scheduled to be completed before the end of 2009, in order to help provide additional flow into the GWR System. When the pump station is operational, District staff expects to operate the GWR System to full capacity.

In addition, OCSD anticipates that construction of an expansion to their secondary treatment processes will be complete in late 2011. With this increase of available supply of wastewater, OCWD plans to expand the GWR System. The initial expansion will be designed to increase production by 17,000 to 20,000 afy of water (OCWD, 2009). The effects of the GWRS on conservation targets is further discussed in Chapter 6.

4.5 ORANGE COUNTY SANITATION DISTRICT WASTEWATER

The Orange County Sanitation District (OCSD) provides wastewater collection and treatment for all wastewater generated within the City's boundary. The OCSD has two treatment facilities: Reclamation Plant No. 1, located within the City of Fountain Valley, and Treatment Plant No. 2, located within the City of Huntington Beach. The facility in Fountain

Valley treats all the flows generated within the City of Buena Park and is located approximately 10 miles south of the southern boundary of the City of Buena Park.

The volume of wastewater collected and treated by OCSD and the City's portion of these flows are listed in Table 4.1. Since the City does not meter its wastewater discharges to the OCSD, the City's portion of wastewater collected in the service area is based on the historical and projected water demand projections assuming a return-to-sewer ratio of 75 percent. The amount of wastewater collected as listed in this table represents the historical and projected combined flow of Reclamation Plant No. 1 and Treatment Plant No. 2.

Since the City's sewage flows are combined with all of OCSD's other members, it is not possible to calculate exactly how much of the City's wastewater is recycled. The total wastewater flows for all of OCSD are listed in Table 4.1 along with the associated amount of recycled water produced by OCSD through the GWR System.

Table 4.1 Wastewater Collection and Treatment
2010 Urban Water Management Plan
City of Buena Park

Type of Wastewater	2005 (afy)	2010 (afy)	2015 (afy)	2020 (afy)	2025 (afy)	2030 (afy)	2035 (afy)
Wastewater collected & treated in service area[1] (City's portion)	12,528	10,514	13,350	13,877	14,325	14,738	14,925
Wastewater collected & treated in service area[2] (entire OCSD flow)	282,276	296,838	-	323,721	-	332,682	-
Volume that meets recycled water standard[3]	-	72,000	72,000	72,000	72,000	72,000	72,000

Notes:
(1) Calculated from demand projections assuming a return-to-sewer ratio of 75 percent.
(2) Based on OCSD service area flow projections (OCSD 2006).
(3) Based on existing OCWD GWR flows (GWR 2010). OCWD's 2004 GWMP mentions an ultimate capacity of 130 mgd for the GWR, but does not predict the timeline for expansion of the system.

Historically, the majority of wastewater was treated to secondary effluent standards at Reclamation Plant No. 1, with the exception of a 10-mgd facility that provides tertiary treatment that is used for groundwater injection for the saline barrier project. Since January 2008, the OCSD provides 70 mgd of its effluent to the OCWD, who treats the secondary effluent to tertiary standard with a new reverse osmosis facility. This tertiary treated water is the distributed to the groundwater injection wells located along the coastline to provide a barrier for saline seawater intrusion. According to the GWRS website, the system currently replenishes 72,000 afy annually. In addition to tertiary treatment for groundwater recharge

and the seawater barrier uses, approximately 7 mgd of recycled water from OCSD is used in OCWD's Green Acres Project (OCWD 2009).

Currently, there is no excess tertiary treated water available that could be recycled within the City service boundary and no plans exist at this time to develop a recycled water infrastructure that could serve the City with recycled water in the foreseeable future. Recycled water uses and wastewater disposal are dealt with solely by the OCSD.

4.6 BUENA PARK RECYCLED USE AND PROJECTIONS

Table 4.2 summarizes current recycled water usage by use type (solely IPR through the GWRS) and presents a comparison between the projected use in the 2005 UWMP and the actual recycled water use.

Table 4.2 2005 UWMP Projected 2010 Recycled Water Use Compared to 2010
2010 Urban Water Management Plan
City of Buena Park

User Type	Treatment Level	Projected 2010 RW Demand (afy)	Actual RW Demand (afy)
Indirect Potable Reuse	Tertiary	n/a	492
Total		**n/a**	**492**

Note:
(1) Indirect Potable Reuse represents the City's portion of GWRS groundwater replenishment

As shown in Table 4.2, the City supplied 492 af of recycled water in 2010. Because it was impossible to determine the proportion of GWRS water that would be delivered to the City, recycled water use wasn't projected in the 2005 UWMP.

Shown in Table 4.3 are the projected demands broken down by use type, as determined by anticipate GWRS groundwater replenishment and projected groundwater pumping with the City.

Table 4.3 Recycled Water Uses – Actual and Potential

User Type	Treatment Level	Projected Future Use (afy)					
		2010	2015	2020	2025	2030	2035
Indirect Potable Reuse	Tertiary	492	1,983	3,069	3,168	3,260	3,301
Total		**492**	**1,983**	**3,069**	**3,168**	**3,260**	**3,301**

Note:
(1) Indirect Potable Reuse represents the City's portion of GWRS groundwater replenishment

There are no specific recycled water opportunities identified within the City, as it is more cost-effective for OCSD and OCWD to provide large scale treating and recycling in the vicinity of the Fountain Valley plant rather than constructing pipelines of over 10 miles to reach relatively small irrigation customers, such as local parks. Therefore, projecting specific future use of recycled water in the City and formulating methods to encourage recycled water use do not apply to the City.

Chapter 5

WATER DEMAND

5.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) identify the quantity of water supplied to the agency's customers including a breakdown by user classification.

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (b) (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 records.
>
> 10631 (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; and (I) Agricultural.
>
> (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

5.2 HISTORICAL WATER DEMANDS

Water demands represent water that leaves the distribution system through metered or unmetered connections or at pipe joints (leaks) or breaks. Water demands occur throughout the distribution system based on the number and type of consumers in each location. Annual historical water demands within the City of Buena Park's (City's) service area between 1990 and 2009 is presented in Table 5.1 along with population and per-capita demand. The demands shown in Table 5.1 are based on fiscal year consumption figures provided by the City, while the annual population was obtained from documents put together by the California Department of Finance (DOF). Water losses within the City's distribution system are estimated at 3 percent (based on water loss calculations for calendar year 2005) and listed as unmetered deliveries.

Table 5.1 Historical Water Use
2010 Urban Water Management Plan
City of Buena Park

Year	Water Demand (afy)	Population[(1)]	Per Capita Consumption (gpcd)
1990	16,103	68,784	209
1991	15,002	69,312	193
1992	13,510	70,221	172
1993	14,282	71,055	179
1994	16,064	71,997	199
1995	15,498	72,470	191
1996	16,148	72,756	198
1997	17,398	73,522	211
1998	15,977	74,669	191
1999	17,381	75,986	204
2000	19,375	77,447	223
2001	18,009	77,962	206
2002	17,586	79,475	198
2003	17,314	80,290	193
2004	18,314	80,574	203
2005	16,705	80,670	185
2006	16,419	81,082	181
2007	18,402	81,775	201
2008	17,453	82,332	189
2009	16,306	83,281	175
Average	**16,662**	**76,283**	**195**

Notes:

(1) Historic population estimates were obtained from the California Department of Finance (DoF, 2010).

(2) The historical water use does not include any water losses or otherwise unaccounted for water.

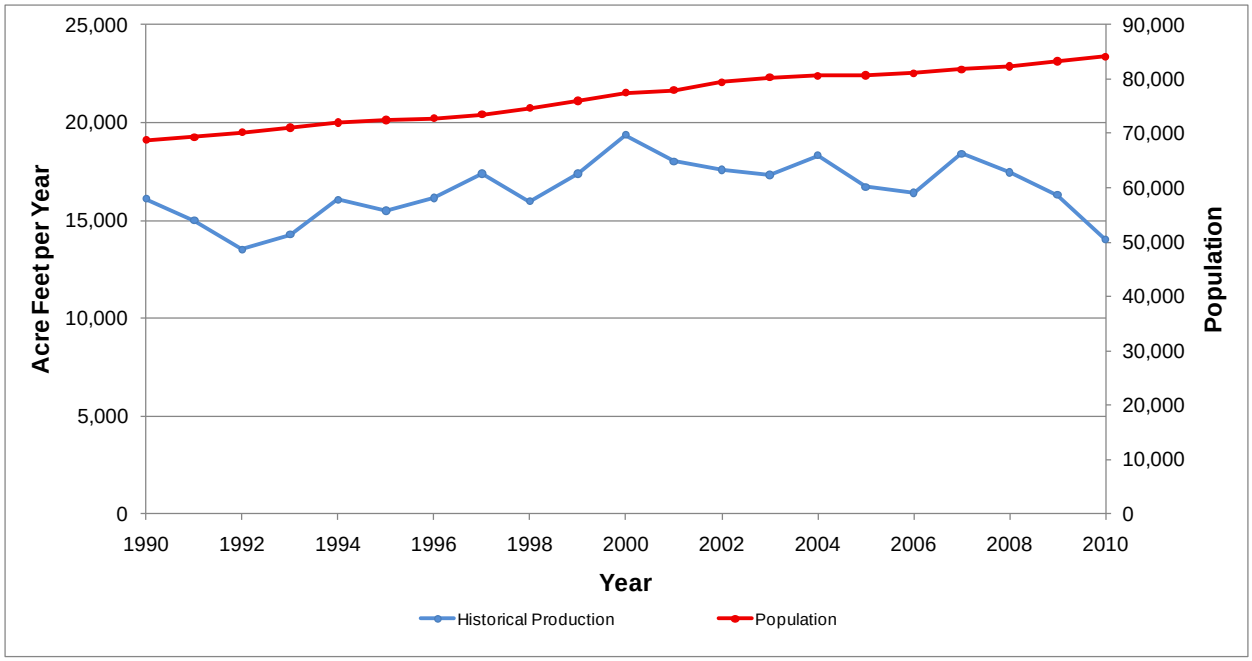

Figure 5.1 Historic Production and Population

As shown in Table 5.1, the City's demands have remained fairly consistent over the last 20 years, fluctuating between 13,000 and 20,000 afy, while the population has generally increased over the same time period, from about 69,000 to 83,000 presumably due to the increase in water conservation efforts by the City. Over the last four years, the City's water demands have decreased from over 18,400 afy to about 14,000 afy.

Per-capita demands are calculated by dividing the total system demands by the City's population. The resulting number is the average number of gallons consumed, per person, per day for that year (gpcd). Annual per-capita demands are included in Table 5.1. Over the last 20 years, the per-capita consumption has ranged between 170 and 225 gpcd. As shown, the City's average per-capita demand over the last 20 years is 195 gpcd. The average consumption in the period 2005-2009 was about 5% lower at 186 gpcd.

5.3 PROJECTED WATER USE

The City, in conjunction with MWDOC, provided demand projections based on internal estimates of growth over the next 25 years. These demand projections are shown in Table 5.2 along with the population projections for the years 2015 through 2035. The projected per-capita consumption estimates are also included for reference.

Table 5.2 Demand Projections 2010 Urban Water Management Plan City of Buena Park			
Year	**Demand (afy)**	**Population[(1)]**	**Per Capita Consumption (gpcd)**
2010	14,019[(2)]	84,141	149
2015	17,800	86,584	184
2020	18,502	87,471	189
2025	19,100	88,304	193
2030	19,650	88,905	197
2035	19,900	88,381	201

Notes:
(1) Population Projections from Table 2.2.
(2) 2010 demand based on historical data and is not a projection
(3) Projections in this table do not incorporate water conservation

As shown in Table 5.2, the City's demands are anticipated to increase from nearly 18,000 afy to just less than 20,000 afy by 2035. Over this same time period, the City's population is anticipated to grow by another 4,000 to over 88,000. The combination of these two projections results in an increase of the average per-capita consumption. It should be noted that the Table 5.2 dos not incorporate the 2020 water conservation targets.

5.4 WATER DELIVERIES

The current and projected water deliveries by billing classification are summarized in Table 5.3 along with those for 2005. As shown, the City does not have any unmetered accounts and is planning to continue installing meters for all future accounts.

Water losses within the City's distribution system are estimated at 3 percent (based on water loss calculations for calendar year 2005) and listed as unmetered deliveries. The City does not deliver water to other agencies.

Table 5.3 Water Demand Projections
2010 Urban Water Management Plan
City of Buena Park

Classification	2005		2010		2015		2020		2025		2030		2035	
	# of accounts	Demand[3] (afy)	# of accounts	Demand (afy)	# of accounts	Demand (afy)	# of accounts	Demand (afy)	# of accounts	Demand (afy)	# of accounts	Demand (afy)	# of accounts	Demand (afy)
SFR	15,850	7,897	15,800	7,758	15,900	7,690	15,900	7,992	15,900	8,251	15,950	8,489	15,950	8,597
MFR	200	2,724	880	2,676	1000	2,652	1050	2,757	1050	2,846	1,070	2928	1,090	2965
Comm.	3,700	3,565	1,292	3,502	1,310	3,471	1,320	3,608	1,320	3,725	1,320	3,832	1,320	3,881
Ind.[1]	-	-	-	1,993	-	1,976	-	2,054	-	2,120	-	2,181	-	2,209
Inst.[1]	-	1,517	-	-	-	-	-	-	-	-	-	-	-	-
Land.	-	-	495	1,490	505	1,477	510	1,536	510	1,585	525	1,631	525	1,651
Fire Prot.	-	-	385	-	390		400		400	-	400	-	400	-
Ag.	-	-	--	-	-	-	-	-	-	-	-	-	-	-
Other - Water Loss	-	549	--	539	-	534	-	555	-	573	-	589	-	597
Other – OOS Meters	-	-	300	-	300	-	300	-	300	-	300	-	300	-
Total	**19,750**	**18,280**	**19,152**	**17,958**	**19,405**	**17,800**	**19,480**	**18,502**	**19,480**	**19,100**	**19,565**	**19,650**	**19,585**	**19,900**

Notes:

(1) Industrial and Institutional accounts are classified as Commercial in the City's billing system.
Source: City billing and production figures and Buena Park 2010 Agency Projections

(2) Abbreviations: SFR – Single Family Residence, MFR – Multi-Family Residence, Comm – Commercial, Ind – Industrial, Inst – Institution, Land – Landscaping, Fire Prot – Fire Protection, Ag. – Agriculture, OOS – Out of Service

(3) Projected in 2005 UWMP; breakdown based on 2010.

Table 5.3 details the number of accounts, total deliveries to account types, and total water uses as well as water losses. As shown in Table 5.3, the City currently maintains approximately 19,152 water meters. There are approximately 300 meters that are out of service at any time throughout the City and the data for the customer type of these meters is currently unavailable. The inactive meters include unoccupied residencies or condos where the water has been turned off, disconnected meters that are still in the field, services that were installed and never activated, as well as industrial or commercial services that have been discontinued.

The City does not supply water to saline barriers, groundwater recharge, conjunctive use, or any other uses not indicated in Table 5.3.

5.4.1 Planned Projects

The UWMPA requires that the UWMP identify the major developments within the agency's service area that would require water supply planning.

UWMPA:

> 10910. (a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.
>
> 10912. For the purpose of this part, the following terms have the following meanings:
>
> 10912 (a) "Project" means any of the following:
> (1) A proposed residential development of more than 500 dwelling units.
> (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
> (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
> (4) A proposed hotel or motel, or both, having more than 500 rooms.
> (5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
> (6) A mixed-use project that includes one or more of the projects specified in this subdivision.
> (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Although there is planned redevelopment within the City including single-family residences, commercial centers, and motels, the City does not currently have any planned expansion projects, as defined in Water Code Section 10912 of the UWMPA.

The City does not anticipate additional future water demands specific to low income residential developments. Hence, separate per-capita demands are not listed separately for low income single-family residential (SFR) and multi-family residential (MFR) sectors.

5.5 LOW INCOME HOUSING

The UWMPA requires that the UWMP identify planned low income housing demands within the agency's service area.

UWMPA:

> 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

The City's 2009 General Plan provides information on Regional Housing Needs Allocation Progress (RHNA). This Housing Element of the General Plan update identify the need to construct a total of 134 very low income and 43 low income housing units between 2008 and 2014.

Assuming the 177 dwelling units reflect an average of 3.3 people per dwelling unit per the City General Plan and the projected 2020 per capita water usage of 202 gpcd, The total demands of 132 afy for low income housing water consumption will be realized by 2015.

Table 5.4 Low Income Projected Water Demands
2010 Urban Water Management Plan
City of Buena Park

	Demand (afy)				
	2015	**2020**	**2025**	**2030**	**2035**
Low Income Housing	132	132	132	132	132

Notes:
(1) Based on planned low income housing needs as described in the City of Buena Park's 2009 General Plan Housing Element. The General Plan projects housing needs through 2014. It is assumed that the projection of housing needs through 2014 will be applicable through 2035.

This demand is assumed for all years beyond 2015. The 2009 General Plan does not provide information on single family versus multi-family low income dwelling units, so the average number of people per dwelling unit was assumed to be 3.3.

Chapter 6

WATER CONSERVATION

6.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) demonstrate that sufficient water supplies will be available to meet the next 25 years of projected water demands.

> 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 the state, regional, or local agency population projections within the service area of the urban water supplier.

6.2 SBX7-7 WATER CONSERVATION

6.2.1 Overview

Senate Bill x7-7 is the new law governing water conservation in California that was enacted November 2009. This law requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita consumption within the state by 20 percent. The bill requires that the DWR develop certain criteria, methods, and standard reporting forms through a public process that can be used by water suppliers to establish their baseline water use and determine their water conservation goals. The DWR provided four different methods to establish water conservation targets. These four methods can be summarized as follows:

- **Method 1 – Baseline Reduction Method. T**he 2020 water conservation target of this method is defined as a 20 percent reduction of average per-capita demand during a 10-year continuous baseline period that should end between 2004 and 2010.
- **Method 2 – Efficiency Standard Method.** The 2020 water conservation target of this method is based on calculating efficiency standards for indoor use separately from outdoor use for residential sectors and an overall reduction of 10 percent for commercial, industrial, and institutional (CII) sectors. The aggregated total of the efficiency standards in each area is then used to create a conservation target.
- **Method 3 – Hydrologic Region Method.** This method uses the ten regional urban water use targets for the state. Based on the water supplier's location within one of these regions, a static water use conservation target for both 2015 and 2020 is assigned.

- **Method 4 – BMP based Method.** This method uses previous Best Management Practices (BMP) of a supplier in order to establish a conservation target for 2020. Depending on how aggressively the water supplier has pursued water reduction and conservation in the past, a new conservation target for 2020 will be assigned.

Based on this evaluation, the City decided to select Method 1 to establish their 2020 water conservation target for the City's 2010 UWMP.

6.2.2 City's Water Conservation Targets

Method 1 establishes baseline per-capita water consumption based on historical population and historical demand numbers. Any 10-year consecutive period between 1995 and 2010 can be selected to establish the baseline per-capita demand for the water supplier using the average consumption in gpcd from that 10-year period. If an agency uses 10 percent of more recycled water in year 2008, the baseline value can also be determined with a 15-year consecutive period between 1990 and 2010. As shown in Table 6.1, the City does not have a recycled water system. Thus, the baseline period must be 10 years in length and end between 2004 and 2010. Note that, through the Orange County Groundwater Replenishment System (GWRS), the City does utilize groundwater from indirect potable reuse, as will be discussed later in Section 6.4.

The baseline value is then reduced by twenty percent to determine the year 2020 conservation target. The intermediate target for year 2015 is the mid-point value between the baseline and year 2010 target values.

In addition to the 10-year baseline period, a 5-year period needs to be selected in any year ending no earlier than 2007 to determine the minimum required reduction in water use. The selected 10-year and 5-year base period ranges are summarized in Table 6.1.

Table 6.1 Base Period Ranges
2010 Urban Water Management Plan
City of Buena Park

Base	Parameter	Value	Units
Water Deliveries	2008 total water deliveries	17,453	af
	2008 total volume of delivered recycled water	0	af
	2008 recycled water as a percent of total deliveries	0	%
10-year Base Period	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Table 6.1 shows the characteristics of the 10 and 5 year period selected as the baselines for the City in meeting the Water Conservation Bill of 2009.

The City's historical gpcd water consumption for the period 1995 through 2010 is shown in Figure 6.1. This figure also depicts the minimum, average, and maximum 10-year baseline values. As shown, the 10-year period with the highest baseline consumption starts in 1995 and ends in 2004.

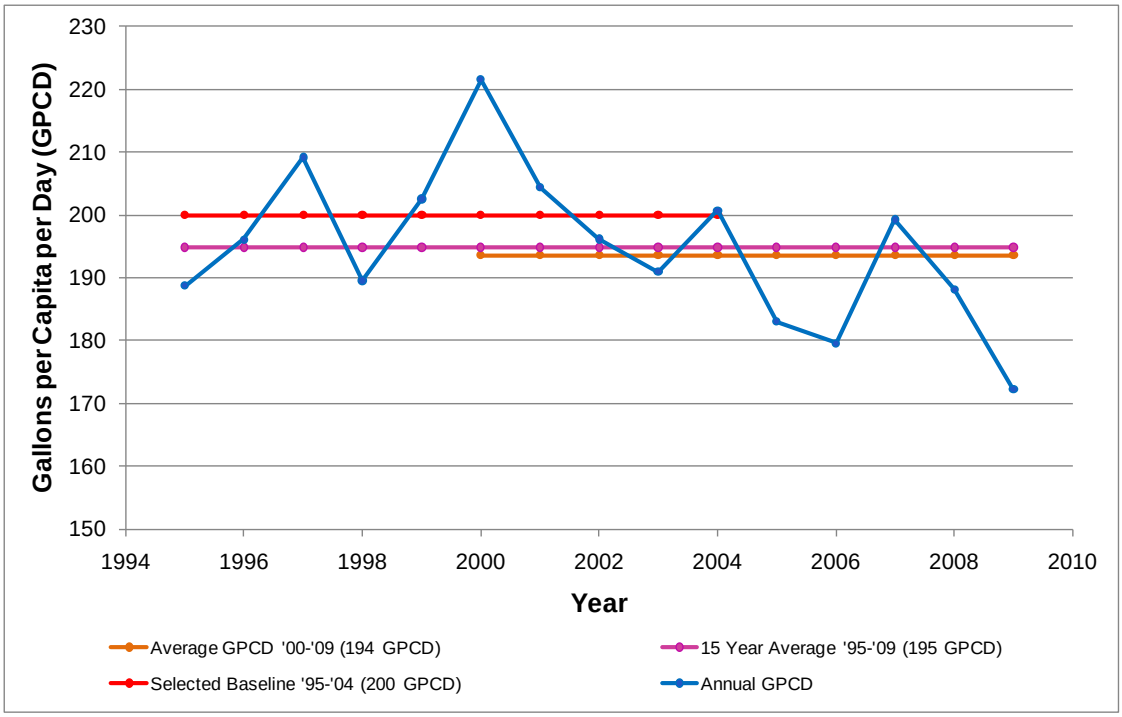

Figure 6.1 Historical Consumption

Table 6.2 shows the population, total volume of consumption, and the per-capita consumption of the 10-year baseline period. The average per-capita consumption during this period was 202 gpcd. Based on twenty percent reduction from this baseline period, the City's 2020 conservation target will be 161 gpcd.

Table 6.2 Base Daily Per Capita Water Use – 10-15 Year Range
2010 Urban Water Management Plan
City of Buena Park

Base Period Year						
Sequence Year	Calendar Year	Distribution System Population	Total Supply (afy)	IPR (afy)	Gross Water Use After IPR Deductions (afy)	Annual Daily Per Capita Water Use (gpcd)
Year 1	1995	72,470	15,498	175	15,323	189
Year 2	1996	72,756	16,148	165	15,984	196
Year 3	1997	73,522	17,398	170	17,228	209
Year 4	1998	74,669	15,977	123	15,854	190
Year 5	1999	75,986	17,381	142	17,240	203
Year 6	2000	77,447	19,375	151	19,224	222
Year 7	2001	77,962	18,009	158	17,850	204
Year 8	2002	79,475	17,586	119	17,467	196
Year 9	2003	80,290	17,314	142	17,171	191
Year 10	2004	80,574	18,314	196	18,118	201
Average	**n/a**	**76,515**	**17,300**	**154**	**17,146**	**200**

Table 6.3 shows the population, total volume of consumption, and the per-capita consumption of the five year baseline period. The five year baseline value is used to determine the minimum required reduction in water use of 192 gpcd by 2020.

Table 6.3 Base Daily Per Capita Water Use – 5 Year Range
2010 Urban Water Management Plan
City of Buena Park

Base Period Year						
Sequence Year	Calendar Year	Service Area Population	Total Supply (afy)	IPR (afy)	Gross Water Use After IPR Deductions (afy)	Annual Daily Per Capita Water Use (gpcd)
Year 1	2003	80,290	17,314	142	17,171	191
Year 2	2004	80,574	18,314	196	18,118	201
Year 3	2005	80,670	16,705	163	16,542	183
Year 4	2006	81,082	16,419	107	16,311	180
Year 5	2007	81,775	18,402	148	18,254	199
Average	**n/a**	**80,878**	**17,431**	**151**	**17,279**	**191**

As shown in Table 6.3, the average consumption in the period 2003-2007 was 193 gpcd. The minimum per-capita consumption for year 2020 is defined as 95 percent of this value, reflecting a minimum water conservation of five percent. This equates to a minimum water conservation target of 183 gpcd.

As the water conservation target from the 10-year baseline period (160 gpcd) is lower than the minimum water conservation target (181 gpcd), the City's water conservation targets are as follows:

- Year 2015 Target: 180 gpcd (10% reduction)
- Year 2020 Target: 160 gpcd (20% reduction)

6.2.3 Water Conservation Targets

The UWMPA requires urban water suppliers to determine the urban and interim water use targets for 2020 and 2015 respectively. Four target methods have been developed, and identify the specific steps water suppliers shall follow to establish these targets. A brief description of each method, as well as the water use calculated using each methodology is included below.

- **Method 1 – Baseline Reduction Method**

Method 1 requires an urban water supplier to first determine the base daily per capita use. In order to determine the target using Method 1, 80 percent of the base daily per capita use is calculated. Based on the daily per capita use of 200 gpcd determined previously, the target use for Method 1 is 160 gpcd.

- **Method 2 – Efficiency Standard Method**

Method 2 requires water suppliers to use baseline commercial, industrial, institutional, indoor residential, and landscaped area water use to calculate a water use target. Based on the nature of the data required to determine a target using Method 2, it is not feasible for the City to use this methodology. Specifically, the City lacks the detailed landscaped area estimates to calculate the landscaped area water use.

- **Method 3 – Hydrologic Region Method**

Method 3 requires water suppliers to use the hydrologic region target to calculate a water use target for 2020. In order to determine the target using Method 3, 95 percent of the region-specific conservation goal is calculated. Based on a regional conservation value of 150 gpcd for the South Coast region, the Method 3 target is 142 gpcd.

- **Provisional Method 4 – BMP based Method**

Development of Method 4 by DWR began in February 2010. The draft method was released on January 24, 2011. The draft method must be presented to several agencies

including the California Water Commission before being adopted in mid-February 2011 and being released along with DWR's final 2010 guidebook. DWR has stated that this is a provisional method, subject to later revisions during the 2015 UWMP cycle.

The methodology for the provisional draft method relies on the base daily per capita use in 2000 and reduction in the three urban use sectors:

- Residential indoor;
- Commercial, industrial, and institutional (CII); and
- Landscape use and water loss.

A discussion of each of these components, and the calculated savings in each of these sectors is included below.

Since residential indoor and outdoor water use is delivered through a single meter, an assumption of 70 gpcd has been provided by DWR for standard residential indoor water use. To determine indoor residential savings, the draft provisional method outlines two methodologies. First, a best management practices (BMP) calculator has been developed to sum the savings for four conservation elements including single and multi-family residential housing toilets, residential washers, and showerheads. Due to insufficient data on the implementation of these water-saving measures, it will not be discussed further or used to assess indoor residential savings for the City. Therefore the City will use what has been termed the "default option" to determine these savings. Based on the draft provisional method, this default value is 15 gpcd.

Baseline CII water can be easily established for the City since all commercial, industrial, and institutional connections were metered during the baseline period. The calculated baseline for CII use (over the 1996 through 2004 period) was 70 gpcd.

The draft provisional method estimates a default value for CII savings of 10 percent. The CII water savings are therefore 7 gpcd.

The landscape and water loss water use is determined by subtracting the default indoor water use of 70.0 gpcd and CII water use of 70 gpcd from the calculated base line per capita use. Based on calculated baseline per capita water use, the landscape and water loss use is 62 gpcd.

The draft provisional method estimates a default value for landscape and water loss savings of 21.6 percent. The landscape and water loss savings are therefore 13 gpcd.

Metered savings are considered in addition to the savings attributed to the three sectors previously discussed. Based on the provisional method, a meter savings of 20 percent is applied to the average delivery per unmetered connection in the midpoint of the baseline period. Because there are no unmetered connections in the City, savings from metering is assumed to be 0 gpcd.

Based on the steps above, the total water savings is estimated at 35 gpcd. When compared with the baseline demand of 200 gpcd, this would result in a water conservation target of 165 gpcd. A summary of baseline water use by sector and individual savings calculated using Method 4 is included in Table 6.4.

Table 6.4 Method 4 Target Determination Summary
2010 Urban Water Management Plan
City of Buena Park

Baseline Water Use (gpcd)				Water Savings (gpcd)				
Residential Indoor[1]	CII[2]	Landscape/ Water Loss	Total	Residential Indoor[3]	CII[4]	Landscape Water	Metered[6]	Total
70	70	60	200	-15	-7	-13	0	-35

Minimum Water Use Reduction Requirement

The final step in determining the applicability of the water use target for the City is to confirm the water use targets meet the minimum reduction requirements as defined by DWR.

To confirm the target, the 5-year average baseline previously determined (Table 6.3) is used. In order to meet the minimum criteria, the chosen use target must fall below 95 percent of the 5-year baseline, which for the City is 191 gpcd resulting in a minimum water use reduction of 181.

Summary of Baselines and Targets

Based on the water use targets calculated using the developed methodologies, the City's water use target for 2020 is 160 gpcd. Based on the 10-year baseline of 200 gpcd, the 2015 interim water use target is 180 gpcd. This target was determined using Method 1, which corresponds to 80 percent of the 10-year baseline. According to the DWR guidelines, this target is valid since it is less than the target confirmation criteria of 181 gpcd. A summary of the various baselines, use target determined based on various methodologies, and the final use target and interim target are summarized in Table 6.5.

Table 6.5 Baseline and Targets Summary
2010 Urban Water Management Plan
City of Buena Park

Baselines (gpcd)		Target Determination Methods (gpcd)						
10-Year	5-Year	1	2	3	4	Target Confirmation (gpcd)	Target (gpcd)	Interim Target (gpcd)
200	191	160	NA	142	165	181	160	180

As shown in Table 6.5, it is recommended that the City use Method 1 to establish its water conservation target, resulting in a 2015 interim target of 180 gpcd and a 2020 target of 160 gpcd.

6.2.4 Orange County 20x2020 Regional Alliance

According to the Water Conservation Act of 2009, group of suppliers may form a regional alliance in order to satisfy conservation requirements regionally and as a group. If the region-wide reduction target is met, then all agencies in the alliance are deemed compliant and do not need to meet individual reduction targets.

The City is a member of the Orange County 20x2020 Regional Alliance. In its Draft 2010 Regional Urban Water Management Plan, the Metropolitan Water District of Orange County (MWDOC) established the 2020 conservation target for the regional alliance at 157 gpcd with an interim target of 174 gpcd for 2015. While being a member of the Orange County 20x2020 Regional Alliance regional alliance allows the City to demonstrate compliance through region wide conservation efforts, the City can also meet conservation targets by reaching its individual target 2020 of 160 gpcd.

6.2.5 Demand Projections with Water Conservation

Table 6.6 shows the City demand projections with and without the water conservation targets proposed by the 2009 water conservation bill. The demand projections in acre-feet per year (afy) were derived from the population projections presented in Chapter 2 and the per-capita consumption targets described in 6.2.2. The year 2010 demand projections are based on demand projection data obtained from the City. The actual 2010 water demand of 14,019 af is much lower due to water conservation, weather and economic factors. The projections are still presented however, in order to keep the methodology consistent. It is likely that demands will increase to meet projected demands due to the projections reflecting long term trends.

Table 6.6	Demand Projections 2010 Urban Water Management Plan City of Buena Park		
Year	SCAG Population[1]	Water Demand without Conservation Targets[2] (afy)	Water Demand with Conservation Targets (afy)
2010	84,141	17,958[3]	17,958[3]
2015	86,584	17,800	17,617
2020	87,471	18,502	15,820
2025	88,304	19,100	15,970
2030	88,905	19,650	16,079
2035	88,381	19,900	15,984

Notes:
(1) Population Projections from Table 2.2.
(2) Non conservation projected demands from City.
(3) Projection demands shown, actual demands 14,019 af in 2010.

Year 2015 serves as an interim point, with projected per-capita consumption between the current usage amount and the 2020 conservation target.

As shown in Table 6.6 and graphically in Figure 6.2 the water conservation requirements of SB-7x7 reduce the projected water demand for year 2020 from nearly 20,000 afy to nearly 16,000 afy. The following section discusses the various water demand management measures (DMMs) that are available for the City's to achieve this reduction in water use.

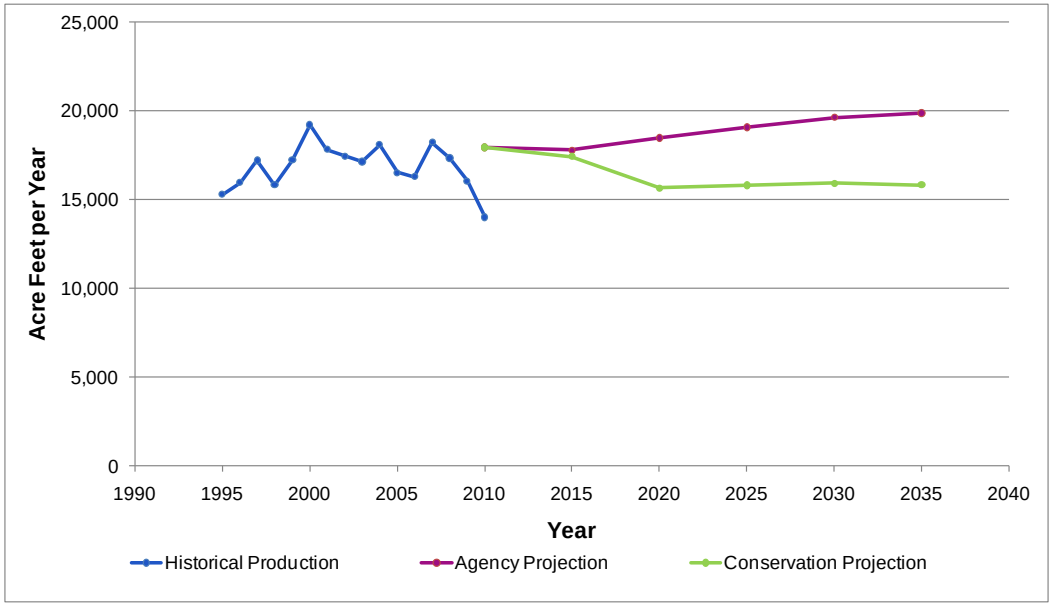

Figure 6.2 Projected Water Demands with and without Conservation

6.3 WATER DEMAND MANAGEMENT MEASURES

In 1991, a Memorandum of Understanding (MOU) regarding urban water conservation in California formed the California Urban Water Conservation Council (CUWCC). Council members can submit their most recent Best Management Practices (BMP) reports with their UWMP to address the urban water conservation issues in the UWMPA.

However, the City is not currently a signatory of the MOU and is therefore not a member of CUWCC. The City realizes the importance of the BMPs to ensure a reliable future water supply and is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

The City's previous Urban Water Management Plan (2005 Plan) provided information regarding the City's conservation measures already in place and those that would improve the efficiency of water use within the City.

This chapter addresses the following requirements of the UWMPA.

UWMPA:

> 10631 (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 prohibitions
>
> (N) Residential ultra-low-flush toilet replacement program

The California Department of Water Resources (DWR) has assigned an enhanced terminology to the BMPs. Accordingly; this chapter will refer to them as Demand

Management Measures (DMMs). The current implementation status of the City's DMMs is summarized in Table 6.7. As shown, the City has started the implementation of all DMMs with the exception of water conservation pricing (DMM 11). A more detailed description of each DMM is provided in the following paragraphs.

Table 6.7 Demand Management Measures 2010 Urban Water Management Plan City of Buena Park

Demand Management Measure	Implemented	Planned for Implementation	Not Applicable
DMM 1 - Water Survey Programs	✓		
DMM 2 - Residential Plumbing Retrofit	✓		
DMM 3 - Water System Audits	✓		
DMM 4 - Metering with Commodity Rates	✓		
DMM 5 - Landscape Irrigation Programs	✓		
DMM 6 - Washing Machine Rebate Program	✓		
DMM 7 - Public Information Program	✓		
DMM 8 - School Education Program	✓		
DMM 9 - Commercial, Industrial, and Institutional Conservation Programs	✓		
DMM 10 - Wholesale Agency Programs			✓
DMM 11 - Conservation Pricing	✓		
DMM 12 - Water Conservation Coordinator	✓		
DMM 13 - Water Waste Prohibition	✓		
DMM 14 - Ultra Low Flush Toilet Replacement	✓		

6.3.1 DMM 1 - Water Survey Programs

This program consists of offering water audits to single-family and multi-family residential customers. Audits include reviewing water usage history with the customer, identifying leaks inside and outside the home, and recommending improvements.

Upon request, City personnel will perform on-site inspection of residences and businesses for potential internal leaks. Leak detection kits are available and are provided to residents free of charge, upon request.

The City may consider expanding the program to include free landscaping audits to residential users.

6.3.2 DMM 2 - Residential Plumbing Retrofit

This program consists of installing physical devices to reduce the amount of water used or to limit the amount of water that can be served to the customer. In accordance with State law, low-flow fixtures have been required on all new construction since 1978. In addition, State legislation enacted in 1990 requires all new buildings after January 1, 1992 to install Ultra-Low-Flush Toilets (ULFT).

Several studies suggest that water use savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gpd per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tend to produce more savings, while newer multi-family homes tend to produce fewer saving per housing unit.

6.3.3 DMM 3 - System Water Audits, Leak Detection, and Repair

A water audit is a process of accounting for water use throughout a water system in order to quantify the unaccounted-for water. Unaccounted-for water is the difference between metered production and metered usage on a system-wide basis.

In 1985, the City conducted a leak detection program that investigated the distribution system for loss. The City randomly selected large and small water meters, and computed all water uses in water loss such as large fires, water main leaks, and fire hydrants (hit by vehicles). The overall system loss at that time was less than 5 percent. The City continues to investigate the water system for increases in water loss and continues to minimize water leaks.

Based on water loss calculations for calendar year 2010, the water losses (or unmetered water deliveries) within the City's distribution system were estimated at 3 percent. This quantity is at the low end of the typical water loss spectrum, usually 5-10 percent, therefore this program does not provide opportunities to substantially decrease the per-capita water use.

6.3.4 DMM 4 - Metering with Commodity Rates

This DMM requires that water meters be installed for all new connections to allow billing by volume of use. This program also applies to retrofitting any existing unmetered connections.

Currently, all connections within the City are metered and customers are billed according to the amount of water used. In 2000, the City completed a meter change out program that replaced 16,000 old meters with new meters. The new meters are more accurate than the old ones and allow the City staff to maintain more accurate usage figures.

As the City continues to install meters at all its new connections, this program will not provide foreseeable water conservation opportunities for the City.

6.3.5 DMM 5 - Large Landscape Conservation Programs

This DMM calls for agencies to start assigning reference evapotranspiration (ETo) -based water budgets to accounts with dedicated irrigation meters and to provide water-use audits to accounts with mixed-use meters.

All new development in the City is conditioned to ensure that landscaped areas are graded and irrigated properly to obtain the most efficient use of metered irrigation supply to minimize water run-off. The City's parks employ a "smart" irrigation program in order to achieve this efficiency.

Financial incentives, including regional funding from Metropolitan Water District of Southern California (MWD) through MWDOC, are also available to improve landscape water use efficiency.

Based on 2010 agency data, the City currently has 495 accounts with dedicated irrigation meters that have a combined annual water demand of 1,490 afy. This equates to an average water use of 3 afy per landscape customer. To date, the City has implemented 101 large landscape programs. Assuming that these landscape customers could save 33 percent of their water use or 1 afy through more efficient watering techniques and ET_o sensors, the City could potentially save nearly 400 afy by implementing landscape conservation programs with the remaining 394 landscaping customers. This is about 15 percent of the 2,682 afy water conservation goal for year 2020.

Although a more detailed water conservation analysis would be required to obtain a more accurate water conservation estimate, it can be concluded that this DMM has the potential to contribute significantly towards achieving the City's water conservation goals.

6.3.6 DMM 6 - High-Efficiency Washing Machine Rebate Program

This program provides financial incentives, typically in the form of rebate offers, to qualifying customers who install high-efficiency washing machines in their homes.

MWDOC has taken the lead in offering rebates to the City's customers. MWDOC offers a $100 rebate for each high-efficiency clothes washing machine (HECW) purchased and installed properly. These machines typically use 15 to 25 gallons less water per load than typical washers, with savings of up to 7,000 gallons per year (assuming 1 load per day).

Currently, over 700 City customers have qualified for this rebate, resulting in a water savings of almost nearly 1.5 million gallons per year.

Assuming that currently approximately 50 percent of the remaining single-family residential customers in the City do not own HECWs, the City could potentially add about 7,500 HECWs. At an average of 1 load per day and 20 gallons of water savings per load, this program could potentially add 165 afy of water savings, which is about 6 percent of the 2,682 afy water conservation goal for year 2020.

6.3.7 DMM 7 - Public Information Programs

This program consists of distributing information to the public through a variety of methods including brochures, radio, television, school presentations and videos, and websites.

In 2008, the City started a public information program to promote water conservation through water bill inserts and the City's website. However, all promotional pamphlets and newspaper articles were promoted and paid for by MWDOC and OCWD. The planned activities, expenditures and projected expenditures by the City for the period 2006-2010 are therefore listed as zero. One of the City's conservation information pamphlets is available in Appendix G.

Future public outreach efforts on the part of MWDOC include including Home Owners Associations (HOAs) in the effort to disseminate information into the community through seminars and other events.

6.3.8 DMM 8 - School Education Program

This DMM requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance.

MWDOC traditionally offers water education programs to Orange County public and private schools. They also supply each school with instructional manuals, videotapes, cassettes, and cartoon books that illustrate water conservation tips and techniques. MWDOC provides teachers with handbooks and work materials on class instruction on the water cycle and drought measures. Recently, MWDOC has implemented a cafeteria programs to aid in education, and the City will participate in this effort.

6.3.9 DMM 9 - Conservation Programs For CII Accounts

MWDOC has implemented a water conservation program for the City's commercial, industrial, and institutional (CII) accounts in years 2006 and 2007. As listed in Table 5.3, in 2010 the City had 1,295 CII accounts with a combined water use of nearly 5,500 afy, which equates to about 28 percent of the City's total water use.

Since 2005, the City has implemented several industrial process water use reduction programs including smart timers, rotating nozzles, turf installation, hotel programs, and industrial process water use reductions. The total estimated cumulative water savings for these programs has been 323 af, or 16 afy per program.

The City is planning to implement additional CII programs in the period 2010-2015. Assuming that the City has the potential to implement ten (10) new CII programs with similar savings by year 2020, the total savings of the CII program could be around 160 afy, which is about 6 percent of the 2,682 afy water conservation goal for year 2020.

6.3.10 DMM 10 - Wholesale Agency Programs

This DMM applies to wholesale agencies and defines a wholesaler's role in terms of financial, technical, and programmatic assistance to its retail agencies implementing DMMs.

The City is not a wholesale agency, so this DMM does not apply.

6.3.11 DMM 11 - Conservation Pricing

The City has adopted a tiered water rate system for single family residential customers that became effective January 1, 2010. The new rate structure consists of the following three separate charges:

- Water Capacity Charge, which is a fixed rate depending on the meter size and is charged whether or not you use any water.
- Commodity Charge, which is the only tiered charge and dependent on your water usage as shown in Table 6.8.
- Capital Charge, which is ten percent of the sum on the Capacity and Commodity charges.

Table 6.8 Tiered Water Rate Structure
2010 Urban Water Management Plan
City of Buena Park

Commodity Charge[(1)]	Units of Water Consumed (HCF)	Price per Unit ($/HCF)
Tier I	0-8	$1.02
Tier II	9-21	$1.88
Tier III	22-99	$2.52
Tier IV	100+	$3.54

Notes:
(1) Applies to Residential Customers only. Price per unit for all other customers is $1.88.

6.3.12 DMM 12 - Water Conservation Coordinator

The Public Works Director is responsible for coordinating and expanding the City's water conservation program and providing residents with useful water conservation information. The City currently allocates the water conservation coordinator responsibilities to the Associate Engineer in the Public Works / Utilities Division. This assignment was implemented in 1992. As water conservation is an added responsibility to an existing position, the associated expenditures are listed as zero. The position is currently held by Joan E. Lyle, Associate Engineer.

6.3.13 DMM 13 - Water Waste Prohibition

Section 6 of City Ordinance 1533 (see Appendix F) prohibits consumers from wasting or misusing water. The City may discontinue service if repeated violations occur.

Violators of the water conservation prohibitions will be penalized. Further details on prohibitions and penalties are explored in Chapter 8.

6.3.14 DMM 14 - Residential Ultra-Low-Flush Toilet Replacement Programs

State legislation requires the installation of efficient plumbing in new construction and, effective in 1994, requires that only ultra low flow toilets (ULFTs) be sold in California.

Over the past 10 years, MWDOC has had two types of ULFT programs. The first is a rebate program, which provides a rebate as an incentive to replace a less water-efficient toilet with a ULFT. The second program was a distribution program. Starting in 2002, ULFTs were distributed at no charge within the City as a joint effort by MWDOC and Orange County Water District (OCWD).

There have been over 8,000 ULFTs installed through this program in the City since 1994 and over 4,500 since 2002. Assuming 3 people per household, 5 flushes per person per day, and 1 gallons savings per flush, this has resulted in a water savings of approximately 140 afy.

Over time this program combined with the natural replacement of toilets with ULFTs could increase the City's water savings substantially. Assuming a current market saturation of 50 percent, there are about 7,500 single family residences remaining to install ULFTs. Once all toilets in these homes are replaced, the City would save approximately another 130 afy which is about 5 percent of the 2,682 afy water conservation goal for year 2020.

6.4 MEETING PER-CAPITA DEMAND TARGETS

As discussed in Chapter 4, the City indirectly participates in the Orange County Groundwater Replenishment System (GWRS). This program involves sending wastewater through a purification process which allows the water to be returned to the regional groundwater basin through injection and percolation. Groundwater from the artificially recharged supply is called Indirect Potable Reuse (IPR). Based on DWR's guidelines, IPR can be deducted from gross water use, for the purposes of calculating the baseline and water conservation targets.

In 2020, the GWRS is projected to replenish 98,000 af of groundwater to the Orange County Groundwater Basin. The Orange County 20x2020 regional alliance allocates the supply from the IPR evenly among all its members. This calculation is outlined in the

Metropolitan Water District of Orange County's (MWDOC) 2010 Regional Urban Water Management Plan (RUWMP).

In order to calculate the portion of the GWRS supply that should be deducted from each agency's gross water usage, the five year average amount of groundwater generated through the GWRS is divided by the total production for the basin in that year, to generate an average percentage to apply to each agency's groundwater pumping amounts for that year. Assuming a 2020 groundwater production of 384,000 af for the entire groundwater basin, and a GWRS replenishment of 98,000 afy, the percentage applied to each agency's groundwater pumping amounts would be 25.5 percent. (The calculation applies a 96.5 percent loss factor to recharged water)

Based on a 2020 pumping projection of 12,025 af of groundwater, the City would deduct 3,069 afy from its 2020 gross water use as supply from IPR. Based on overall demands of 18,502 af in 2020, the gross water use would be reduced to 15,200 afy after factoring in IPR supplies. Note that these projections are based on an assumed basin pumping percentage, discussed in Chapter 3, as the actual basin pumping percentage cannot be accurately projected.

A similar equation can be performed for the year 2015. Based on projected replenishment of 69,000 afy by GWRS and projected groundwater pumping of 11,036 afy by the City, it is estimated that the City will receive 1,983 af of IPR supply through groundwater pumping. This would have the effect of reducing measured gross water consumption in 2015 to 15,817 af.

Table 6.9 Indirect Potable Reuse Breakdown
2010 Urban Water Management Plan
City of Buena Park

Description	2015 (afy)	2020 (afy)	2025 (afy)	2030 (afy)	2035 (afy)
Projected Replenishment	69,000	98,000	98,000	98,000	98,000
Total Basin Pumping[(1)]	384,000	384,000	384,000	384,000	384,000
Total Groundwater Pumped by City	11,036	12,025	12,415	12,773	12,935
Indirect Potable Reuse	1,983	3,069	3,168	3,260	3,301

Notes:
(1) To generate a conservative IPR estimate, total basin pumping assumed to be max historical value (384,000 af in year 2000). In the event of less total basin pumping, the percentage of the basin which is GWRS water would increase, thereby increasing the percentage of City groundwater that is considered IPR.

It is important to note that integrating IPR into gross water use also involves back calculating historical values and deducting IRP. Because Water Factor 21, OCSD's old replenishment system, produced relatively less water for recharge, preliminary calculations

indicate that historic use will only decrease by approximately one or two gpcd. Future gross water use is projected to decrease by approximately 30 gcpd.

This projected use reduces the gross water usage of users in the area, as outlined in DWR guidelines.

As shown in Figure 6.3, the IPR component of the City's projected water supply is estimated to lower gross usage enough to meet future water conservation targets. IPR reduction shifts the calculated (strictly potable) water use down below future conservation targets. The City's DMMs will still play an important role in future water demands however, as a secondary source of water conservation. It is possible that if the GWRS does not expand as currently planned, water conservation will be needed to meet 2020 targets. Further, growth beyond what is current projected could raise future demands from what is currently projected, again necessitating the active implementation of DMMs.

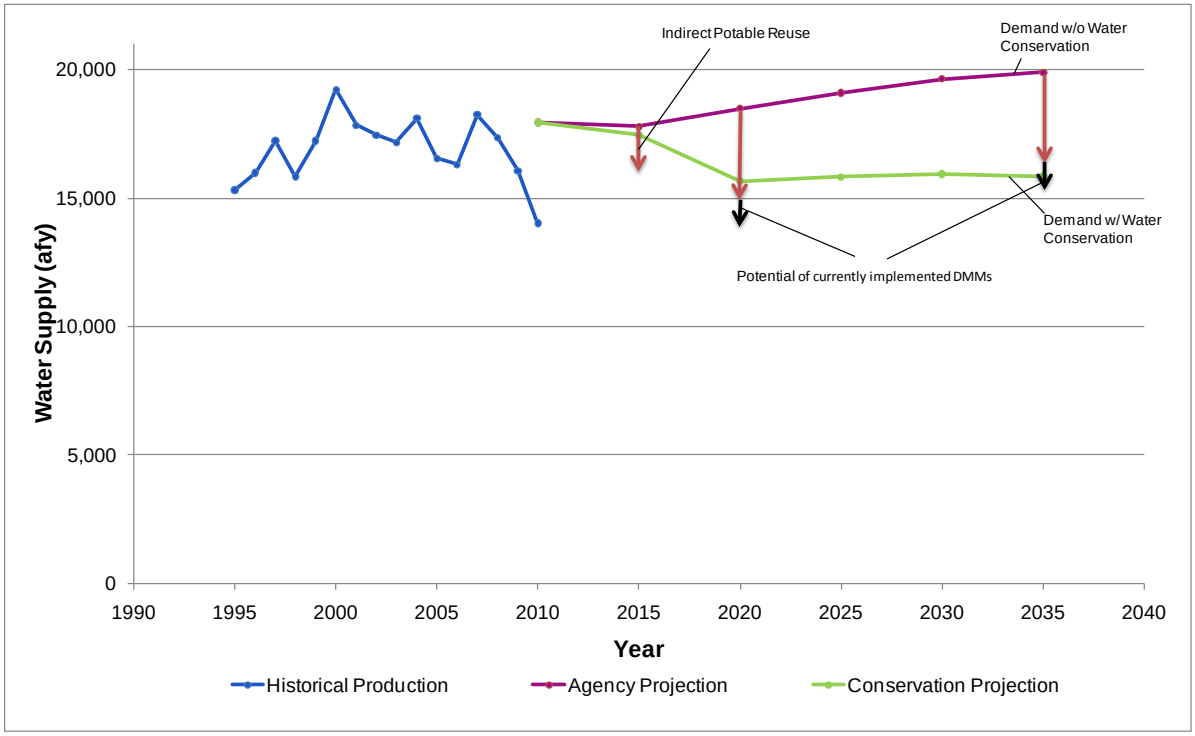

Figure 6.3 Projected Water Demands with Conservation, without Conservation, and Compared against Indirect Potable Reuse

As shown in Figure 6.3, the water conservation savings estimated for the five DMMs that were quantified in this Chapter only account for 855 af of the 2,682 afy of conservation needed to reach the water conservation target in 2020 (and a City-wide demand of the 15,820 afy). However, there are 8 other DMMs (discounting DMM 10) which the City can use to reduce water consumption. These DMMs include for example school education and water surveying, which are also viable strategies to reduce water consumption and meet the City's water conservation targets.

WATER RELIABILITY PLANNING

7.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, an analysis must be included to address supply availability in a single dry year and in multiple dry years.

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.
>
> 10631 (c) 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 replace that source with alternative sources or water demand management measures, to the extent practicable.
>
> 10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.
>
> 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:
>
> 10632 (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.

The UWMPA also requires that the UWMP include information on the quality of water supplies and how this affects management strategies and supply reliability.

UWMPA:

> 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 management strategies and supply reliability.

7.2 WATER SUPPLY RELIABILITY

There are two aspects of supply reliability that should be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods. This chapter considers the City of Buena Park's

(City's) water supply reliability during three scenarios: normal water year, single dry water year, and multiple dry water years. Reliability estimates take into account the City's location in relation to the Santa Ana Watershed. These scenarios are defined as follows:

- **Normal Year**:
  The normal year is a year in the historical sequence that most closely represents median runoff levels and patterns. The supply quantities for this condition are derived from historical average yields.
- **Single Dry Year**:
  This is defined as the year with the minimum useable supply. The supply quantities for this condition are derived from the minimum historical annual yield.
- **Multiple Dry Years**:
  This is defined as the three consecutive years with the minimum useable supply. Water systems are more vulnerable to these droughts of long duration, because they deplete water storage reserves in local and state reservoirs and in groundwater basins. The supply quantities for this condition are derived from the minimum historical three consecutive years' annual average yields.

The City's supply capacities can be found in the following table. While the rest of the chapter details supply and demand projections, Table 7.1 can be referenced in order to demonstrate the City's capacity to get water compared with what future demands might be.

Table 7.1 Supply Capacity
2010 Urban Water Management Plan
City of Buena Park

Water Supply Source	Capacity (mgd)
Groundwater	24.2
Imported Water	28.3
Total	**52.5**

As show in Table 7.1 the total supply capacity of Buena Park is 52.5 mgd. Currently, this potential supply is split 46 percent groundwater and 54 percent imported water. Given that the City is nearing build-out, it is unlikely that this supply will be insufficient to meet any future demand.

7.3 SUPPLY RELIABILITY AND PLANNING

The City's water supply reliability under average/normal year conditions, single dry year conditions, and multiple dry year conditions is summarized in Table 7.3, while the basis of water year data is provided in Table 7.2.

Table 7.2 Basis of Water Year Data
2010 Urban Water Management Plan
City of Buena Park

Water Year Type	Base Year(s)
Average Water Year	1922 to 2009
Single-Dry Water Year	1961
Multiple-Dry Water Years	1959- 1960- 1961

Note:
Source:

The City's water supply consists of both imported and ground water. The data presented in Table 7.3 is obtained from the 2005 Regional UWMP prepared by MWDOC listing the water use information for Buena Park specifically, and then averaging that data with the City's water use statistics from 2005 through 2009.

Table 7.3 Supply Reliability
2010 Urban Water Management Plan
City of Buena Park

Average / Normal Water Supply	Average Water Year	Single Dry Year	Multiple Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Groundwater (afy)	14,220	13,488	14,633	13,849	13,488	N/A
% of Normal	100%	95%	103%	97%	95%	N/A
Imported Supply (afy)	4,569	6,464	5,185	5,557	6,464	N/A
% of Normal	100%	141%	113%	122%	141%	N/A
Total (afy)	**18,788**	**19,952**	**19,818**	**19,406**	**19,952**	**N/A**
% of Normal	**100%**	**106%**	**105%**	**103%**	**106%**	**N/A**

Note:
Source: historical climate data pulled from regional (MWDOC) UWMP

The single and multiple dry year data in Table 7.3 are the historical water use data from 1959, 1960, and 1961. These three years represent the most severe dry year sequence on record, and are used to demonstrate how usage of the City's two water sources will shift during such an event. The final year of the three year drought, 1961, is also the single driest

year on record, and therefore serves as a reference for how usage of the City's two water sources will shift during a single dry year.

Based on the water supply capacity data listed in Table 7.1 and the usage data in Table 7.3, it can be concluded that the City currently has sufficient supply availability. During dry years, imported water usage increases to offset the depletion of groundwater storage due to continued pumping while groundwater recharge is reduced in periods with less rainfall.

Since the allocation of the City's groundwater supplies are based on the basin pumping percentage (BPP) set by the OCWD, reliability of the City's two supplies are inherently interrelated. Table 7.4 presents a list of water supply issues which have the potential to create an inconsistency in supply. The OCWD and MWDSC have developed extensive plans to mitigate each potential inconsistency of supply as discussed following Table 7.4.

Table 7.4 Factors Resulting in Inconsistency of Supply
2010 Urban Water Management Plan
City of Buena Park

Water Supply Sources	Specific Source Name	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
Groundwater	OC Groundwater Basin			X		X	
Imported	MWDOC		X	X		X	

For the City's groundwater supplies, OCWD describes the reliability of the groundwater supplies in its 2009 GWMP Update (OCWD, 2009), which includes a discussion on water quality and drought related factors which would result in a reduced supply.

Since the OCWD sets the BPP for all its member agencies uniformly, it is not possible to quantify the drought related reduction in supply for a specific water agency or city. In its 2009 GWMP Update, OCWD estimated the reduction in recharge water supplies as 55,000 afy for the entire basin, which is about 15 to 20 percent of the average groundwater production from the basin.

OCWD has developed several approaches to implement during droughts, including decreasing demands through water conservation, decreasing the BPP, and increasing groundwater recharge. OCWD considers protection of the water quality within the groundwater basin one of its primary responsibilities. While some of the key water quality concerns within the basin are salinity, nitrate, colored water, and synthetic organic contaminants, OCWD did not identify the portion of the basin underlying the City of Buena Park as being of particular concern. Management and remediation programs for each of

these concerns are also described in the GWMP. OCWD has followed the development associated with contaminants of emerging concern (CEC) and is actively committed to tracking CECs and informing its member agencies as research is continued and analytical methods are developed.

The City purchases its imported water supplies from MWDOC, who in turn obtains its imported water from MWDSC. MWDSC describes factors affecting supply reliability in its 2010 UWMP and 2010 Integrated Water Resources Plan Update (MWD, 2010b). In its 2010 UWMP, MWDSC reiterates its "reliability goal that states that full service demands at the retail level would be satisfied under all foreseeable hydrologic conditions through 2020". MWDSC plans to meet its supply reliability goal through:

- Existing Colorado River Aqueduct supplies and implementation of the Quantification Settlement Agreement (SQA) for the Colorado River Aqueduct
- State Water Project (SWP) supplies, as described in the 2009 SWP Delivery Reliability Report
- Resolving supply interruptions associated with the Bay-Delta through the Delta Action Plan
- Surface water storage facilities

The supply reliability factors mentioned by MWDSC in its Integrated Water Resources Plan Update include drought, climate change, energy use, greenhouse gas emissions, and endangered species protection. The strategy MWDSC outlines to address these concerns consists of reliance on its core resources (the State Water Project, Colorado River Aqueduct, Water Conservation, and Local Resource Projects), creation of a supply buffer, and development of "foundational actions" to prepare additional resources for potential use during specific needs in the region in event of shortages.

7.3.1 Climate-Related

Based on OCWD's GWMP, an extended drought period in the central California/Nevada area of the Colorado River watershed may cause the availability of supplemental replenishment water from the MWDSC to be reduced. This may lead to increased demands on the basin. In addition, one of the primary results of an extended drought period is the reduction in MWDSC's recharge water for the basin. These events will require more aggressive demand management practices (OCWD 2009).

7.4 WATER TRANSFER AND EXCHANGE

The regional water transfer and exchange opportunities are described in the 2005 Regional UWMP prepared by MWDOC. There are currently no water transfer opportunities identified for the City. Such an analysis would only applicable to the regional agency and not included in this report.

7.4.1 Standby Production

As described in the previous chapter, standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be out of service at any time, even during maximum day demand (MDD) conditions due to equipment malfunction, servicing, or water quality concerns.

The California Department of Public Health (DHP) criteria recommend using the capacity with the largest well out of service to determine standby production capacity.

In addition to this scenario, the 2005 Water Master Plan (WMP) has a list of criteria that will be addressed to provide adequate emergency storage. The WMP provides recommendations to mitigate the potential impact of lost production capabilities for the following emergency scenarios:

- The loss of the largest well for a period of 7 days of average day demands (ADD).
- The loss of electricity for 2 days with MDD conditions.

The City's current supply capacity is 52.5 mgd. The City has upgraded some of the water supply facilities to include redundancy provisions for standby production and source reliability, such as permanent generators, connection points for portable generators, and building a new well (Buena Park Well No. 2) to replace one of a lower capacity. The operation of the City's groundwater wells depends on electricity. Therefore, these facilities may not be as reliable as the existing MWDOC connections. Backup or alternative energy sources (i.e., backup generators that run on propane, diesel, or natural gas) help to improve the reliability of the groundwater wells and booster pumping station. In addition, the distribution of the City's multiple wells provides added reliability in this supply source, thus reducing the likelihood that all groundwater wells will be out of service simultaneously.

7.5 SUPPLY AND DEMAND COMPARISON

The City currently has the water supply capabilities to meet required demand while also providing adequate standby production capacity to provide reliable service.

Comparisons of projected supplies and demands are shown for normal years, a single dry year, and multiple dry years in Table 7.5 through Table 7.8. These tables indicate that the City's supply capacity will consistently meet the demand requirements for all the planning years through 2035.

Table 7.5 Normal Year Supply and Demand Comparison (afy)
2010 Urban Water Management Plan
City of Buena Park

	2015	2020	2025	2030	2035
Local Groundwater Supply	9,053	8,956	9,247	9,513	9,634
Indirect Potable Reuse	1,983	3,069	3,168	3,260	3,301
Import Water Supply Totals	11,036	12,025	12,415	12,773	12,935
Total Supply	17,800	18,500	19,100	19,650	19,900
Total Demand	17,800	18,500	19,100	19,650	19,900
Difference as % of Demand	0%	0%	0%	0%	0%
Difference as % of Supply	0%	0%	0%	0%	0%

Notes:
(1) Source: Buena Park 2010 Agency Projections
(2) Assumes that projected GWRS recharge totals will not decrease in single or multiple year drought conditions

Table 7.6 Dry Year Supply and Demand Comparison (afy)
2010 Urban Water Management Plan
City of Buena Park

	2015	2020	2025	2030	2035
Local Groundwater Supply	9,660	9,556	9,866	10,151	10,279
Indirect Potable Reuse	2,116	3,274	3,381	3,478	3,522
Import Water Supply Totals	7,217	6,909	7,133	7,338	7,432
Total Supply	18,993	19,740	20,380	20,967	21,233
Total Demand	18,993	19,740	20,380	20,967	21,233
Difference as % of Demand	0%	0%	0%	0%	0%
Difference as % of Supply	0%	0%	0%	0%	0%

Notes:
(1) Source: Buena Park 2010 Agency Projections
(2) Assumes that projected GWRS recharge totals will not decrease in single or multiple year drought conditions

Table 7.7 Multiple Dry Year Supply and Demand Comparison – Year 2 (afy) 2010 Urban Water Management Plan City of Buena Park					
	2016	**2021**	**2026**	**2031**	**2036**
Local Groundwater Supply	9,833	9,618	9,923	10,176	10,305
Indirect Potable Reuse	2,154	3,296	3,400	3,487	3,531
Import Water Supply Totals	7,156	6,954	7,174	7,357	7,451
Total Supply	19,142	19,868	20,497	21,020	21,287
Total Demand	19,142	19,868	20,497	21,020	21,287
Difference as % of Demand	0%	0%	0%	0%	0%
Difference as % of Supply	0%	0%	0%	0%	0%

Notes:
(1) Source: Buena Park 2010 Agency Projections
(2) Assumes that projected GWRS recharge totals will not decrease in single or multiple year drought conditions

Table 7.8 Multiple Dry Year Supply and Demand Comparison – Year 3 (afy) 2010 Urban Water Management Plan City of Buena Park					
	2017	**2022**	**2027**	**2032**	**2037**
Local Groundwater Supply	10,006	9,680	9,980	10,202	10,331
Indirect Potable Reuse	2,192	3,317	3,420	3,496	3,540
Import Water Supply Totals	7,094	6,998	7,215	7,375	7,470
Total Supply	19,291	19,996	20,614	21,073	21,341
Total Demand	19,291	19,996	20,614	21,073	21,341
Difference as % of Demand	0%	0%	0%	0%	0%
Difference as % of Supply	0%	0%	0%	0%	0%

Notes:
(1) Source: Buena Park 2010 Agency Projections
(2) Assumes that projected GWRS recharge totals will not decrease in single or multiple year drought conditions

In all projected supply and demand comparisons, the City anticipates purchasing or pumping only as much water is it needs, therefore supply is set equal to demand.

Dry year effects are simulated through the “Demand ‘Bump’ Factors for 2010 UWMP” methodology formulated by MWDOC, found in Appendix H. The methodology indicates that dry year demand increases above normal or average levels by a flat percentage increase, or “bump.” According to MWDOC, the percentage “bump” for both single and multiple dry

years for the City is 6.7 percent. Therefore, projected supply and demand comparisons are formulated by increasing existing demand projections by 6.7 percent for dry years.

For multiple dry year estimates, the 5-year incremental demand projections were linearly interpolated to determine intermediate yearly demand projections. These intermediate demand projections were then increased by the same "bump" factor of +6.7 percent to find dry year projects for years 2 and 3 of each multi-dry year estimate.

The City's projected wholesale water deliveries from MWDOC are summarized in Table 7.9.

Table 7.9 Retail agency demand projections provided to wholesale suppliers
2010 Urban Water Management Plan
City of Buena Park

Wholesaler	2010	2015	2020	2025	2030	2035
MWDOC (afy)	6,278	6,764	6,475	6,685	6,877	6,965

The projected water deliveries to the City provided by the wholesaler (MWDOC) for the next 20 years are summarized in Table 7.10.

Table 7.10 Wholesaler existing and planned sources of water
2010 Urban Water Management Plan
City of Buena Park

Wholesaler	2010	2015	2020	2025	2030	2035
MWDOC (afy)	6,278	6,764	6,475	6,685	6,877	6,965
Total (afy)	**6,278**	**6,764**	**6,475**	**6,685**	**6,877**	**6,965**

7.5.1 Future Water Supply Projects

The City does not have any water supply projects currently planned which do not relate to the DMMs discussed in Chapter 6.

7.6 WATER QUALITY

The United States Environmental Protection Agency (EPA) is currently considering implementing several new or revised drinking water standards. The Groundwater Rule (GWR) contains measures to establish multiple barriers to further protect against bacteria and viruses in drinking water from the groundwater sources. The GWR will specify when corrective action is required to further protect consumers served by groundwater systems from bacteria and viruses.

7.6.1 Local Groundwater Quality

The City disinfects approximately 40 percent of its groundwater well supply with sodium hypochlorite. Approximately 50 to 75 percent of the City's water is obtained by the City's deep-water wells that are located in various locations throughout the City. OCWD manages

the groundwater basin in this area and is also responsible for groundwater replenishment. This large groundwater basin that lies underneath northern Orange County is supplied via the Santa Ana River, which also includes imported water from the upstream watershed areas that show up as irrigation runoff into the river, or via wastewater discharges. The remainder of the City's water supply is from MWDSC connections. The City's imported water supplies originate from two sources, the Colorado River and Northern California delivered via the east branch of the California State Water Project (SWP). The City safeguards its water supply, and the water delivered to residents and businesses meets or exceeds the standards required by state and federal regulatory agencies. Therefore, the availability of supply is not hindered by water quality impacts.

7.6.2 Imported Water Quality

The City's imported water is supplied by the MWDOC. Details of MWDOC's water quality are found in the wholesaler's 2010 UWMP.

Chapter 8

WATER SHORTAGE CONTINGENCY PLAN

8.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include an urban water shortage contingency analysis that describes stages of action to by undertaken in the event of water supply shortages. The water shortage contingency plan needs to includes a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction. This chapter describes each of these components.

8.2 WATER SHORTAGE CONTINGENCY ORDINANCE/ RESOLUTION

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that includes a draft water shortage contingency resolution or ordinance.

UWMPA:

> 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:
>
> 10632 (h) A draft water shortage contingency resolution or ordinance.

The City adopted ordinance number 2533, its Water Conservation and Water Supply Shortage Implementation Plan, on June 14, 2009. A copy of the ordinance is included in Appendix F. The City began implementing the ordinance in August 2009. The City has started a campaign to educate consumers on the provisions of the Ordinance and to encourage voluntary water conservation measures. The Ordinance is posted in its entirety on the City website along with water saving tips and links to other water efficiency websites. The City has published an article about the Ordinance in the Buena Park quarterly publication Buena Park Today and produced public service announcements for the City's Government Access Channel. The mayor is planning an informal televised special on the Ordinance and water conservation. In addition, a separate special mailing was sent out to all the City's customers to explain the Ordinance, its purpose, implementation and violation consequences.

8.3 STAGES OF ACTIONS

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that identifies water shortages stages up to 50 percent reduction in water supplies

and the associated water reduction mechanisms. In addition, the administration of the water shortage program is described herein

UWMPA:

> 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:
>
> 10632 (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.

8.3.1 Water Shortage Stages and Reduction Objectives

As discussed in Chapter 7, the supply capacity is designed to meet maximum day demand (MDD) with the largest supply source out of service (firm supply capacity). This chapter also demonstrated that the City's production facilities can meet the average day demands through the planning horizon of 2030.

Water agencies relying largely on groundwater, such as the City of Buena Park (City), are less likely to experience severe water shortages than those agencies relying solely on imported water supplies. Nevertheless, it is still important for the City to reduce production during drought years to avoid excessive overdraft of the groundwater basin.

The City has developed a four-stage rationing plan that will be invoked during declared water shortages. This plan is summarized in Table 8.1. Each stage includes a water reduction objective, expressed as a percentage of reduction in normal consumer demands. The rationing plan is dependent on the cause, severity, and anticipated duration of the water supply shortage.

8.3.2 Water Reduction Stage Triggering Mechanisms

The City has identified triggering methods for the stages of water shortages listed in Table 8.1. The declaration and notification of each stage is as follows:

- **Stage 1:** The existence of stage 1 water supply shortage conditions may be declared by a resolution from the City and adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation requirements applicable to stage 1 conditions will take effect on the 10th day after the data the shortage stage is declared.
- **Stage 2:** If water supplies continue to decline beyond 10 percent reduction and stage 1 measures are not sufficient, Stage 2 can be declared by resolution at a public meeting held in accordance with State law. Similar to stage 2, the Stage 2 mandatory conservation measures will be take effect on the 10th day after the shortage stage is declared.

- **Stage 3:** A Stage 3 water supply shortage emergency condition may be declared in accordance with the procedure specified in water code sections 351 and 352. The mandatory conservation requirements applicable to Stage 3 conditions will take effect on the 10th day after the date of the shortage phase is declared.
- **Stage 4:** A State 4 condition goes into effect when the City declares a water shortage emergency condition pursuant to California Water Code Section 350 and notifies its residents and business that more than a 30 percent and up to 50 percent consumer demand reduction is required.

Table 8.1 Water Shortage Stages and Reduction Measures
2010 Urban Water Management Plan
City of Buena Park

Stage	Description	Mandatory Reduction Measures
1	10% Reduction	• Limits on Watering Days • Obligation to fix leaks, breaks or malfunctions • Other prohibited uses
2	20% Reduction	• Obligation to fix leaks, breaks or malfunctions • Water allocations • Watering days • Limits on filling residential swimming pools and spas • Limits on washing vehicles • Limits on filling ornamental lakes or ponds • Other prohibited uses
3	30% Reduction	• The City may reduce water allocations in all categories to meet the available water supply • No watering or irrigating • Obligations to fix leaks, breaks or malfunctions • No new potable water service • Discontinue or limit service • Other prohibited uses
4	30% to 50% Reduction	• The City may reduce water allocations in all categories to meet the available water supply • The City may shut off all non-essential water uses • Other prohibited uses

Notes:
(1) Source: City of Buena Park, Ordinance No. 1533. See Appendix

The declaration will be based on their judgment concerning the degree of the immediate or future supply deficiency (Ordinance No. 1533).

8.3.3 Administration of Water Shortage Program

The administration of a water shortage program as described in this section would involve coordination among a number of City departments. It is anticipated that the Public Works Department would have primary responsibility for managing the program, since it is responsible for the City's water system. The Director of Public Works would be the primary coordinator of water shortage activities.

An appropriate organizational structure for water shortage management team would be determined based on the actual situation. Figure 8.1 presents the organizational structure as of February 2010. Specific individuals would be designated to fill the identified roles. The City would probably not have to hire additional staff or outside contractors to implement the program.

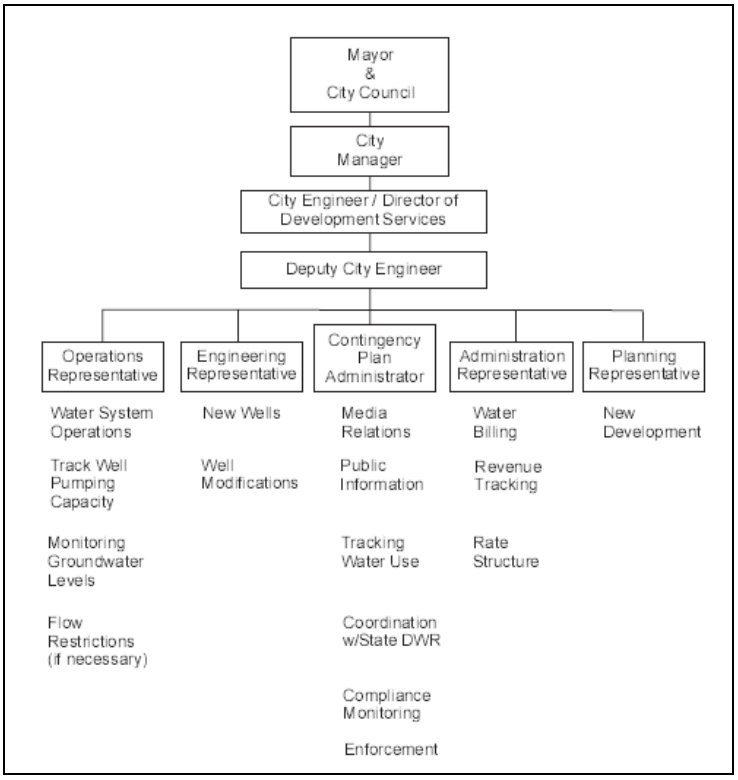

Figure 8.1 City of Buena Park Organizational Structure

The major elements to be considered in administering and implementing the water shortage program include:

- Identifying the City staff members to fill the key roles on the water shortage management team. It is anticipated that the Public Works Director would designate the appropriate individuals, including the Program Manager.
- Intensifying the public information program to provide comprehensive information on the water shortage, including necessary actions that must be undertaken by the City and by the public. By reviewing published references, especially those published by

the Department of Water Resources (DWR), and researching successful aspects of the current programs conducted by neighboring water agencies, the City can develop the scope of the public information program. A public information hotline may be advisable to answer any questions regarding the program.

- Monitoring program effectiveness. Ongoing monitoring will be needed to track supply availability and actual water user reductions. This procedure will allow the City to continuously reevaluate the situation and make informal decisions regarding whether another reduction level is needed.
- Enforcing program requirements. From the 10- to 25-percent reduction programs, enforcement of water use prohibitions and water use allocations will become even more important to achieving the program goals. Inspectors and enforcement personnel could be identified among City staff that are in the community on other business, such as police, Parks Division, street maintenance, meter readers, etc. Addressing equity issues that might arise from the mandatory restrictions or higher water rates. Depending on the level of restriction, there may be a need to address specific concerns of individual customers who might have special conditions or extenuating circumstances and are unduly affected by the program. A procedure should be identified for dealing with such special requests and/or for reviewing specific accounts.
- Adjusting water rates. Revenues from water sales should be reviewed periodically to determine whether an increase in rates might be needed to cover revenue shortfalls due to the decrease in water sales.
- Addressing new development proposals. During periods of severe water shortage, it may be necessary to impose additional requirements on new development to reduce new demand or to temporarily curtail new hook-ups.

It is required that the water shortage contingency plan undergo a formal public review process including a public hearing. A thorough public review process will help minimize future objections when mandatory prohibitions are needed.

8.4 PROHIBITIONS, CONSUMPTION REDUCTION METHODS, AND PENALTIES

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption.

UWMPA:

> 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:
>
> 10632 (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.
>
> 10632 (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.
>
> 10632 (f) Penalties or charges for excessive use, where applicable.

8.4.1 Permanent Mandatory Prohibitions on Water Wasting

Permanent mandatory prohibitions on water wasting are effective at all times. The City has defined the certain restrictions on water use it its Ordinance 1553. Violations of these restrictions are considered to be water wasting or an unreasonable use of water. These restrictions are:

- Limits on watering hours: Watering or irrigating with potable water is prohibited between 10 a.m. and 4 p.m.
- Limits on watering durations: Watering or irrigating with potable water is limited to no more than 15 minutes per day per station.
- No excessive water flow runoff from watering or irrigating
- No washing down hard or paved surfaces
- Obligation to fix leaks, breaks or malfunctions: Excessive loss of water through breaks or leaks should be corrected within a reasonable period of time since discovery.
- Re-circulating water required for water fountains and decorative water features: Operating a decorative water feature that does not use re-circulated water is prohibited.
- Limits on washing vehicles: Using water to wash a vehicle, except by use of a hand-held bucket or similar container or hand held hose equipped with a self-closing device is prohibited.
- Drinking water served upon request only: Eating or drinking establishments are prohibited from providing drinking water to any person unless expressly requested.
- Commercial lodging establishments must provide option to not launder linen daily
- No installation of single pass cooling systems in buildings

- No installation of non-re-circulating in commercial car wash and laundry systems
- Restaurants required to use water conserving dish wash spray valves
- Commercial car wash systems must use re-circulating water systems

8.4.2 Excessive Use Penalties

Customers violating the regulations and restrictions on water use set forth in Ordinance No. 1533 are subject to penalties. Each day that a violation of the Ordinance occurs is considered as a separate offense. The City's current actions and penalties are as follows:

- First Violation – The City will issue a written warning and deliver a copy of the ordinance by mail to the current billing address.
- Second Violation – A second violation within 12 calendar months of the first violation is punishable by a fine of $100.
- Third Violation – A third violation within 12 calendar months of any violation under the ordinances is punishable by a fine of $250. In addition to the fines, City staff may install a water flow restrictor device and may disconnect a customer's water service for willful violations of mandatory restrictions.
- Fourth and subsequent violations – A fourth or subsequent violation within 12 calendar months of any violation under the ordinance is punishable by a fine of $500.
- Misdemeanor – Any violation of the Ordinance may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than 30 days, or by a fine not exceeding one thousand ($1,000) dollars, or by both.

8.4.3 Review Process

Provisions have been made in the Ordinance to provide customers with a hardship waiver process and with the right of appeal.

8.5 REVENUE AND EXPENDITURE IMPACTS/MEASURES TO OVERCOME IMPACTS

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales.

UWMPA:

> 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:
>
> 10632 (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.
>
> 10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.

The majority of operating costs for most water agencies are fixed rather than a function of the amount of water sold. As a result, when significant conservation programs are undertaken, it is frequently necessary to raise water rates because the revenue generated is based on lower total consumption while the revenue required is basically fixed.

To cover any revenue shortfall expected from a drought, the City Council can appropriate the use of reserves. Reductions in water demands, especially peak demands, can delay the need to develop costly new water sources in growing communities. Therefore, to help offset some lost revenues, expansion projects can be delayed.

8.6 ACTIONS DURING A CATASTROPHIC INTERRUPTION

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

UWMPA:

> 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:
>
> 10632 (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.

During declared shortages, or when a shortage declaration appears imminent, the Director of Public Works will activate a water shortage response team. The team may include: public works, water, fire, planning, health, and emergency services. Other actions and procedures to follow during catastrophic events will be developed.

8.7 REDUCTION MEASURING MECHANISM

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

UWMPA:

> 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:
>
> 10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The simplest method to monitor the total water reduction during a catastrophic event would be to compare total production records of the City's groundwater wells and imported water connections during the water supply interruption with the total water production on a similar day (weekday/weekend day) and under similar weather conditions without any water supply interruptions.

However, to obtain a more detailed look at the actual water reduction of various meter classifications and size, the City could also use the water meter records. The City's water system currently has water meters on all connections. These meters record the amount of water consumed at each account. These meters are typically read on a bi-monthly basis. However, the City could also use these meter to monitor the citywide actual reductions in water use during a catastrophic interruption of water supplies. To use water meters for this purpose, the meters read just before the supply interruption would need to be re-read once the catastrophic outage is ended. This will provide detailed water use reduction data for those accounts only. The remaining accounts will show a reduction over the entire 2-month billing period, but it would be impossible to quantify the exact water use reduction during the temporary outage.