REVISED DRAFT REPORT

2010 URBAN WATER MANAGEMENT PLAN

CITY OF BRENTWOOD, CALIFORNIA

PREPARED WITH ASSISTANCE FROM

ICF International

May 12, 2011
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City of Brentwood. 2011. *2010 Urban Water Management Plan*. Draft Report. May 12. Brentwood, CA. Prepared with assistance from ICF International, Sacramento, CA.

Executive Summary

2010 Urban Water Management Plan

ICF International has worked closely with the City of Brentwood (City) to develop this 2010 Urban Water Management Plan (UWMP), as required by the Urban Water Management Planning Act (CWC Section 10610). Since 2005, the City has been implementing the conservation measures put forth in its 2005 UWMP. However, it now must meet the more stringent water management targets of Senate Bill (SB) x7-7, the Water Conservation Act of 2009, a goal of which is a 20% statewide reduction in urban per capita water use by 2020. Compliance with UWMP requirements is overseen by the California Department of Water Resources (DWR).

The 2010 UWMP introduces the plan's purpose and development process, describes the existing water distribution system, summarizes historical water demand and estimates future water demand, describes system supplies and opportunities for water use reduction, introduces the City's water shortage contingency plan, and summarizes the City's demand management practices.

The City, with a 2010 service area population of 51,394, supplies water to approximately 16,000 water connections. The City's distribution system consists of three pressure zones; one wastewater treatment plant (WWTP); one potable water treatment plant, which was brought online in 2008; nine active groundwater wells; six water reservoirs; seven water booster pump stations; and 172 miles of water mains within the city limits. The City also purchases potable water from the Contra Costa Water District's (CCWD's) Randall-Bold Water Treatment Plant (RBWTP) and raw water from the East Contra Costa Irrigation District (ECCID). The City WWTP has produced recycled water for raw use since 2005.

According to the Water Conservation Act of 2009, the 2020 water use target will be calculated by using one of four methods. As an individual urban water retailer, the City has chosen Method 1 for its water use target, which aims to reduce consumption to 80% of the City's baseline per capita water use by 2020. To calculate this water use target, the City used gross water use data for the 10-year baseline period of 2001 to 2010. The City's annual baseline water use for this 10-year period was calculated as 235 gallons per capita per day (GPCD). The 10-year baseline water use targets were calculated as 211 GPCD by 2015 and 188 GPCD by 2020. Water use projections were estimated by using service area population projections provided by the City's Finance Department, which relied on estimates from the California Department of Finance.

One of the primary methods the City plans to reduce water use is through an increase in recycled water use. The City started to develop and deliver recycled water supplies in 2005. Recycled water use was subtracted from water use sector data (landscape and industrial) to reflect gross water use calculations adequately. Data reveal a decrease in recycled water deliveries between 2005 and 2010 because one of the largest recycled water users, Sunset Park, requested potable water for landscape irrigation. However, the City has also increased its recycled water accounts since 2005, growing from one customer to six customers, and the numbers still appear to be increasing. The plan concludes that the City will meet the 2015 and 2020 water use targets while delivering an adequate supply of water to its customers over the next 20- to 25-year planning period. The City's water use in 2010 was significantly lower than previous years. Thus, no reduction in use is needed to meet the 2015 or 2020 water use targets. However, reductions will be made by the City to maintain the 2020

water use target in future years. These reductions can be made primarily with increased use of recycled water in the landscape sector, such as existing and future parkways and golf courses, as well as through City fire hydrant use, which is included in the "other" water use sector. The City also plans to continue implementing several measures to reduce unaccounted-for water use volumes, such as repairing old water infrastructure to prevent from system leaks, efforts to reduce unauthorized connections, as well as meter replacement and addition. Water reductions will also continue to be made thanks to the City's successful water conservation program and further implementation of water-efficient technologies and practices. In addition, the City will continue its outreach and education efforts for residents, such as water audits and leak detection and prevention, and the City plans to upgrade its automatic meter reading system with a radio frequency wireless fixed base system that transmits information four times a day.

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Acronyms and Abbreviations

°F	degrees Fahrenheit
BMP	best management practice
BWWTP	City of Brentwood Wasterwater Treatement Plant
CCWD	Contra Costa Water District
City	City of Brentwood
COBWTP	City of Brentwood Water Treatment Plant
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
Delta	Sacramento–San Joaquin River Delta
DMMs	demand management measures
DOST	California Department of Water Resources' online submittal tool
DRU	Demographic Research Unit
DWR	California Department of Water Resources
ECCID	East Contra Costa Irrigation District
GPCD	gallons per capita per day
LAFCO	Local Area Formation Committee
mgd	million gallons per day
mgy	million gallons per year
mg/L	milligrams per liter
MOU	memorandum of understanding
RBWTP	Randall-Bold Water Treatment Plant
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
State Water Board	State Water Resources Control Board
TDS	total dissolved solids
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
WRCC	Western Regional Climate Center
WWTP	wastewater treatment plant

Chapter 1
Introduction

Purpose

The purpose of this Urban Water Management Plan (UWMP) is to ensure efficient use of urban water supplies in the City of Brentwood (City) and promote conservation. The UWMP discusses not only the availability of water but also water use, reclamation, and water conservation activities. This UWMP complies with the Urban Water Management Planning Act (UWMP Act) (California Water CWC Section 10610 et seq.), the Water Conservation Act of 2009 (CWC Section 10608), and the 20x2020 Water Conservation Plan, which are being implemented by the California Department of Water Resources (DWR) (California Department of Water Resources 2010).

Since 2005, the City has been implementing the conservation measures put forth in its 2005 UWMP. However, numerous relevant state laws have changed since that time. For example, with enactment of the Water Conservation Act of 2009 and other legislation, the UWMP Act has changed. Therefore, the City now must meet the more stringent water management targets of the Water Conservation Act of 2009.

Urban Water Management Planning Act

The City's UWMP was prepared as required by the UWMP Act (Appendix A), which states that any urban water supplier that provides water to 3,000 or more customers, or more than 3,000 acre-feet of water annually, should make every effort to ensure the appropriate level of reliability in its water service to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The UWMP Act outlines the required contents of the UWMP and describes how urban water suppliers should adopt and implement the plan.

The overall intent of the UWMP Act is for urban water suppliers to document their water supplies and conservation efforts. The primary changes to the UWMP Act since 2005 are related to water conservation (through Water Conservation Act of 2009) and demand management measures (DMMs) (through Assembly Bill 1420). Several other changes are described in Table B-1 of Part II, Section B, of the draft *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* (California Department of Water Resources 2011b).

The Water Conservation Act of 2009

In November 2009, Senate Bill (SB) x7-7, the Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. This legislation, which addresses both urban and agricultural water conservation, sets a goal of achieving a 20% statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets (20x2020).

The Water Conservation Act of 2009 requires certain information to be included in the UWMP of an urban water supplier. For example, it requires the supplier to report base daily per capita water use (baseline), urban water use target, interim urban water use target, and compliance daily per capita water use estimates. The bill directs DWR to develop technical methodologies and criteria to ensure

the consistent implementation of the act and provide guidance to urban retail water suppliers with respect to developing baseline and compliance water use. These technical methodologies, which are described in the *Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use* document (California Department of Water Resources 2011a), were developed through a public process with stakeholder input.

20x2020 Water Conservation Plan

The final 20x2020 Water Conservation Plan was released by DWR in February 2010 in response to the urban provisions in the Water Conservation Act of 2009. The 20x2020 Water Conservation Plan developed estimates of statewide and regional baseline per capita water use and outlined recommendations to the governor regarding how a statewide per capita water use reduction plan could be implemented. In addition to the 20x2020 Water Conservation Plan, DWR and the State Water Resources Control Board (State Water Board) convened the 20x2020 Agency Team on Water Conservation.

The need for a 20x2020 Water Conservation Plan was presented initially in February 2008 when Governor Arnold Schwarzenegger introduced a seven-part comprehensive plan for improving the Sacramento–San Joaquin River Delta (Delta). A key component of his plan was a goal to achieve a 20% reduction in per capita water use statewide by 2020. The governor's inclusion of water conservation in the Delta plan emphasizes the important role conservation plays in reducing demand on the Delta and the overall California water supply.

Previous Reports

Several reports have been prepared that address issues related to water supply and demand for the City. An understanding of the results of these previous studies will provide a broader context for preparing an updated water supply plan for the future.

2005 Urban Water Management Plan

The City's 2005 UWMP was prepared by Brown and Caldwell and submitted to DWR on January 4, 2006 (City of Brentwood 2006b). The plan concluded that the water supplies that are available to the City's water transmission system, as well as its customers, would be adequate over the next 20-year period. The City's ongoing water conservation program and planned conservation measures were presented in the 2005 plan. The City has implemented several of these measures in the last 5 years. In addition, the new City of Brentwood Water Treatment Plant (COBWTP) became operational in 2008, which provides an additional 16,162 acre-feet of capacity per year and reduces the City's need for water supplies from the Randall-Bold Water Treatment Plant (RBWTP). The City also has a strong water recycling program.

2006 Water Master Plan

The City adopted its most recent Water Master Plan: Model Update, Water System Analysis, and Water System Facilities in March 2006 as a technical memorandum (City of Brentwood 2006a). The technical memorandum provides an update regarding system-wide water demand, the model, planning criteria, water system analysis, and water system facilities (existing and future facilities).

2007 Water and Wastewater Municipal Services Review

In 2007, the Contra Costa Local Area Formation Committee (LAFCO) produced its *Water and Wastewater Municipal Services Review for East Contra Costa County* report, which was approved in December 2007 (Contra Costa Local Area Formation Committee 2007). Section 3.0 of the report addresses the City's water and wastewater services and provides an overview of the City's water services, growth and population projections, infrastructure needs, water supply and demand, water infrastructure, and financial constraints and opportunities for existing and planned water services.

2001 General Plan

The current general plan was adopted in 1993 and updated in 2001 (City of Brentwood 2001). It now covers the time period from 2001 to 2021. The plan describes the current state of the City and describes the City's vision through 2021. It includes growth projections as well as land use, economic development, housing, and other elements relevant to this UWMP. The City's 2001 General Plan states the following policies for water conservation:

POLICY 1.3—Provide incentives for water conservation measures in new housing (p. 2-21).

In fulfilling this policy, the City has committed to continue implementation of the City's water conservation program. The program promotes the use of water conservation devices in existing structures, including low-flow toilets and showerheads, and water-conserving landscaping. The City requires the submission of landscape plans in conjunction with all residential developments. Plans are reviewed to ensure the use of drought-tolerant plant materials and reduce the use of turf in all front yards. The City also reviews proposed irrigation details, inspects installation, and checks the timing of automatic sprinklers to ensure that front-yard irrigation is conducted efficiently.

The following goals and policies were also established to address the City's plans for conservation and open space in its planning area:

Goal 4: Conserve Water. Ensure that water resources are used efficiently (pages IV. 1-2 and IV. 1-6)

POLICY 4.1—Water Conservation: Promote the conservation of water.

4.1.1—New Development: Require new development to incorporate water-efficient fixtures into design and construction.

4.1.2—Decrease Use: Provide incentives for water users to decrease consumption.

4.1.3—Landscape Ordinance: Implement a water-conserving landscape and irrigation ordinance.

4.1.4—Public Education: Educate the public regarding ways to reduce water consumption and advantages of water-conserving landscaping.

POLICY 4.2—Reclaimed Water: Promote the use of reclaimed water and other raw water sources.

4.2.1—Dual Water Systems: Encourage large-scale developments and golf course developments to incorporate dual water systems.

4.2.2—Incentives: Provide incentives to developers and individuals who use reclaimed water and other raw water for landscaping.

4.2.3—Agency Coordination: Work with other public agencies.

Chapter 2
Plan Preparation

Coordination

Coordination efforts are conducted to (1) inform other agencies of the activities of the City, (2) gather high-quality data for use in developing this UWMP, and (3) coordinate planning activities with other related regional plans and initiatives. The City coordinated with several stakeholders in the preparation of this UWMP. Legal public notices for city council adoption hearings were published in local newspapers and posted at City facilities. Copies of the public hearing notices are included in Appendix B. Table 2-1 summarizes the efforts the City has taken to include additional agencies and citizens in its planning and preparation process.

Table 2-1 (DWR Table 1). Coordination with Appropriate Agencies

Table 1 Coordination with Appropriate Agencies							
Coordinating Agencies	**Participated in Developing the Plan**	**Commented on the Draft**	**Attended Public Meetings**	**Was Contacted for Assistance**	**Was Sent a Copy of the Draft Plan**	**Was Sent a Notice of Intention to Adopt**	**Not Involved/ No Information**
CCWD					X		
ECCID					X		
Brentwood WWTP	X	X		X	X		
General Public			X	X			
Other						X	
Notes: CCWD = Contra Costa Water District. ECCID = East Contra Costa Irrigation District. WWTP = wastewater treatment plant.							

Public Participation

The public participation process provides an opportunity for City residents and employees to learn about the City's water supply, conservation goals, and plans for providing a reliable, safe, high-quality water supply for the future. The following public outreach activities will occur as part of the City's 2010 UWMP development process:

- **2010 UWMP Pre-Adoption Hearing:** Prior to the adoption hearing, the City will hold a pre-adoption hearing to discuss the 2010 UWMP, present and future measures, and programs and policies to help achieve the water use reductions. In addition, the City will maintain the draft UWMP on its web site and a hard copy at its offices.

- **Public Release of Final 2010 UWMP:** The City will respond to public comments on the 2010 UWMP and release a draft to be adopted at the adoption hearing.
- **2010 UWMP Adoption Hearing:** At this public hearing, the City will officially adopt the City's 2010 UWMP (Deadline: July 1, 2011).
- **Submit UWMP to DWR, the California State Library, and City/County that Receives Water from Supplier:** Within 30 days of adoption of the UWMP, the water supplier must submit the plan, as well as copies of changes or amendments, to DWR, the California State Library, and any city or county within which it supplies water (Deadline: July 30, 2011).
- **Provide Copy of UWMP for Public Review:** The water supplier must provide a copy of the adopted UWMP for public review during normal business hours for the 30 days that follow its submission to DWR (Deadline: August 31, 2011).
- **Provide Copies of UWMP to Supplied Entities:** The water supplier must provide the reliability section and supply-and-demand section of the adopted UWMP to any city or county within which the supplier provides water within 60 days after submitting the adopted UWMP to DWR (Deadline: September 30, 2011).

This UWMP was subsequently revised based on comments from DWR, and adopted by the City of Brentwood City Council.

Plan Adoption, Submittal, and Implementation

The UWMP will be adopted, submitted, and implemented according to UWMP Act requirements. The deadline for adoption of a water supplier's 2010 UWMP is July 1, 2011 (CWC Section 10608.20). This date is extended from the normal requirement of December 31 in years ending in five or zero (CWC Section 10621(a)) to allow additional time for water suppliers to address UWMP requirements of the Water Conservation Act of 2009.

The 2010 UWMP submission deadline to DWR is July 31, 2011. The 2010 UWMPs may (but are not required to) be submitted to DWR by uploading them on the Internet. DWR's online submittal tool (DOST) is still in development and not yet available to the public. Data used to generate the 2010 UWMP tables can also be submitted to DWR through DOST.

The UWMP Act requires submittal of applicable supporting documents. Documents that may be considered a part of a UWMP include:

- A copy of the resolution adopting the UWMP.
- A copy of the draft water shortage contingency resolution or ordinance. The California Urban Water Conservation Council (CUWCC) best management practice (BMP) reports, which may be submitted as DMM documentation.
- A copy of the order or decree adopted by the court or the State Water Board for adjudicated basins and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. This documentation may be provided separately from the submitted UWMP.

The City plans to use the schedule below for the plan preparation and submittal process (Table 2-2).

The City is included in DWR's North Central Region. The North Central Region office will review the UWMP to determine whether each required element is fully addressed. DWR staff members will complete the review using the 2010 Review of Completeness Form (Appendix C), which will become part of the UWMP record after the review process is complete. Chapter 10 of this UWMP contains a UWMP Checklist.

After the UWMP review is completed, DWR will send a letter to the water supplier, either indicating that the plan is complete or specifying the area or areas in which further information is required. This will be in addition to the electronic notification sent through DOST. If additional information is required, it must be provided before the water supplier can be eligible for grants or loans.

Table 2-2. Key Water Dates for the City of Brentwood 2010 UWMP Preparation and Submittal

	2011					
Action	**Feb**	**March**	**April**	**May**	**June**	**July**
Public Release of Draft UWMP				X		
2010 UWMP Pre-Adoption Hearing				X		
Public Release of Final Draft 2010 UWMP				X		
2010 UWMP Adoption Hearing				X		
Submit UWMP to DWR, California State Library, and City/County that Receives Water from Supplier					X	
Provide Copy of UWMP for Public Review					X	
Provide copies of UWMP to Supplied Entities					X	

RESOLUTION NO. 2011-75

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BRENTWOOD ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN FOR SUBMITTAL TO THE DEPARTMENT OF WATER RESOURCES AS PREPARED BY CITY STAFF AND ICF JONES & STOKES INTERNATIONAL, ENGINEERING CONSULTANTS.

WHEREAS, on August 14, 2001, by Resolution No. 2341, the City Council adopted the 2000 Urban Water Management Plan (UWMP) as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, on January 10, 2006, by Resolution No. 2006-6, City Council adopted the 2005 Urban Water Management Plan as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, Urban Water Management Plans are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands; and

WHEREAS, every urban water supplier that either provides over 3,000 acre-feet of water annually or serves more than 3,000 connections is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years; and

WHEREAS, this assessment is to be included in its UWMP, which is to be prepared every five years and submitted to the Department of Water Resources (DWR). The DWR then reviews the submitted plans to ensure the requirements identified in the Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code §10610 - 10656) are completed; and

WHEREAS, the City of Brentwood is an urban water supplier providing water for municipal purposes to more than 3,000 customers, and has prepared the 2010 UWMP, which provides the analysis of water conservation measures in accordance with the guidelines of the California Urban Water Conservation Council and DWR and it serves as the long-term water supply plan for the City of Brentwood water system, and supports the reduction of 20 percent per capita use by the year 2020; and

WHEREAS, the funds for the preparation of the 2010 UWMP were budgeted in the City Council adopted 2010/11 Operating Budget through the Water Operations Operating Budget; and

WHEREAS, City staff and ICF Jones & Stokes International, Engineering Consultants have prepared the 2010 UWMP, made it available for public review, and has held the appropriate public hearing.

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Brentwood that the 2010 UWMP is hereby adopted.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Brentwood at a regular meeting held on the 24h day of May 2011 by the following vote:

AYES:	Barr, Brockman, Bryant, Stonebarger, Taylor
NOES:	None
ABSENT:	None
ABSTAIN:	None

Robert Taylor
Mayor

ATTEST:

Margaret Wimberly, CMC
City Clerk

Chapter 3
System Description

This chapter discusses the City's water system as well as its climate, population, and demographics. It also describes the physical system (transmission, treatment, and distribution facilities) to support Water Conservation Act of 2009 requirements. Changes to the water system, the water supplier's organizational structure, and issues that affect the water system are also discussed.

Service Area Physical Description

The City currently supplies water to approximately 16,000 water connections in a service area of 14.83 square miles (Contra Costa Local Area Formation Committee 2008). Brentwood is bounded to the north by the City of Oakley, to the west by the City of Antioch, and to the south and east by unincorporated Contra Costa County. The City's service area is shown in Figure 3-1.

All water deliveries are metered. The service area is primarily residential, with small areas of commercial, office, and light industrial land uses. The City provides water treatment and distribution services as well as wastewater collection, treatment, and treated waste disposal services for its residents and businesses. The City has no agriculture deliveries; deliveries to agricultural users are made by the East Contra Costa Irrigation District. The City land use plan includes numerous parks, large areas of agriculture conservation, and special planning areas that are undeveloped.

Environmental Setting

A description of the City's environmental setting follows and includes a discussion of land use, geography, climate, and hydrology.

Land Use

Settled in 1874, the area that would eventually become the City of Brentwood began as a farming community in the late 19th century and still is known throughout the Bay Area for its agricultural products, primarily its cherries, corn, and peaches. Since 1990, many of the old farms and orchards have been replaced by suburban developments. The predominant land use is now residential, with the majority of residential development being single family. The City currently has several small to mid-sized office buildings, as well as larger business park sites, that house financial, consulting, telecommunications, computer, and bio-tech companies.

Geography

The area extends from steep, hilly terrain in the southern and western portions of the service area to flat terrain with a gentle slope in the northeastern portion of the service area. Elevations range from approximately 30 feet to almost 500 feet.

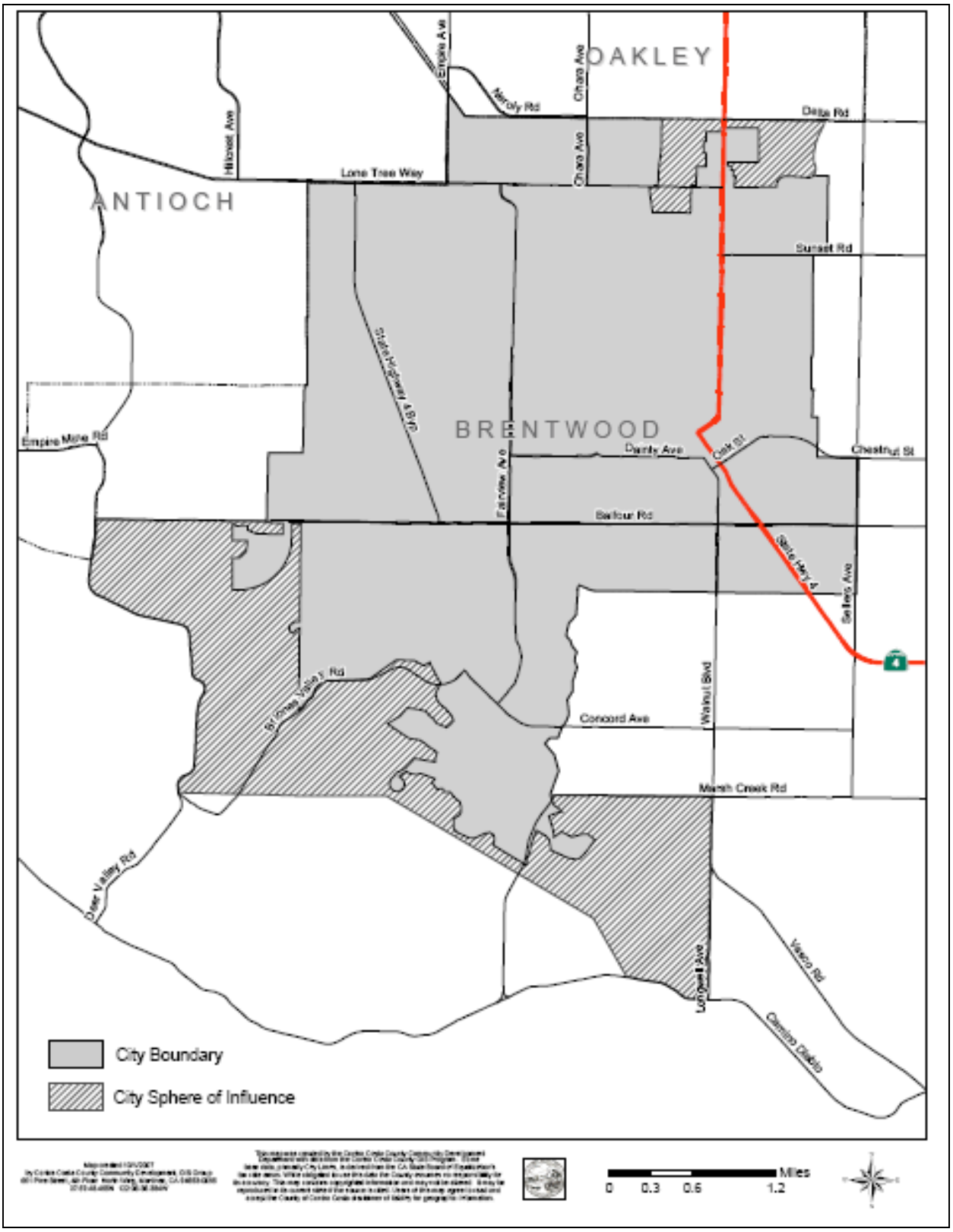

Figure 3-1. City of Brentwood Location Map (Contra Costa County Community Development Department 2007)

Climate

The City's weather is similar to that of the City of Antioch because the two cities are adjacent, and a significantly longer data set was available for the City of Antioch than for the City of Brentwood. Therefore, the climate data for the City of Antioch was utilized in this report as it serves as a suitable climate reference to the City of Brentwood. In general, winters are cool and humid and summers are hot and dry. Historical climate data for the City of Antioch (1955–2010) obtained from the Western Regional Climate Center (WRCC) web site (Western Regional Climate Center 2011) were used to describe precipitation and temperature patterns.

The City of Antioch's average daily temperature ranges from 35 to 92 degrees Fahrenheit (°F), but the extreme low and high temperatures have been 18°F and 117°F, respectively. The historical (1961–1990) monthly average precipitation and minimum and maximum air temperatures are shown in Table 3-1, and the annual average is shown in Figure 3-2. The rainy season begins in November and ends in March. Average monthly precipitation during the winter months is about 2 to 3 inches, but records show that the monthly winter precipitation has been as high as 8 inches (February 1998) and as low as 0 inches. Water demands during the winter are relatively low. Low humidity usually occurs in the summer months, from May to September. The combination of hot and dry weather during the summer results in high water demand during these periods. Landscape irrigation, including lawn irrigation in the summer, significantly contributes to higher summer water demand.

Hydrology

Brentwood is located in eastern Contra Costa County, on the eastern perimeter of the San Francisco Bay Area metropolitan area. The City lies in the Marsh Creek watershed and is surrounded by the foothills of Mt. Diablo and the rich farmlands of the famous Sacramento-San Joaquin Delta, which drains to San Francisco Bay.

The Marsh Creek watershed drains the east side of Mt. Diablo. It covers about 128 square miles of rangeland, farmland, protected parkland, and urban land. The creek flows approximately 30 river miles from its headwaters in the Morgan Territory Preserve through Brentwood and Oakley to empty into the Delta at Big Break near the confluence of the Sacramento and San Joaquin Rivers. Several creeks that run through the City, such as Sand Creek, Deer Creek, and Dry Creek, are all tributaries of Marsh Creek.

Geology

The geologic setting of Contra Costa County is composed of surficial (Quaternary) deposits that overlie fault-bounded bedrock assemblages. East Contra Costa County has four groundwater regions. The City occupies the largest region, an area where groundwater occurs in material that was deposited by streams that originate in the Coast Ranges to the west. Aquifer materials capable of yielding quantities of water suitable for municipal and/or agricultural purposes extend to depths of 600 feet below the ground surface.

Water Distribution System

The City's distribution system consists of three pressure zones, one wastewater treatment plant (WWTP), one potable water treatment plant, nine active groundwater wells, six water reservoirs,

seven water booster pump stations, and 172 miles of water mains within the city limits (cite). Figure 3-3 shows the locations of these features within the water service area.

Table 3-1. Average Monthly Precipitation and Air Temperature in Antioch, CA, near Brentwood, CA (1961–1990)

Month	Average Precipitation (inches)	Average Minimum Temperature (°F)	Average Maximum Temperature (°F)
January	2.41	36.2	53.4
February	2.27	40.0	60.2
March	1.80	42.8	65.4
April	0.87	45.7	71.6
May	0.31	50.5	78.8
June	0.01	55.2	85.4
July	0.03	56.8	90.6
August	0.06	56.2	89.6
September	0.23	54.3	85.6
October	0.89	49.2	77.3
November	1.80	41.4	61.9
December	1.86	36.6	54.0
Annual	12.63	47.2	73.0
Source: Western Regional Climate Center 2011.			

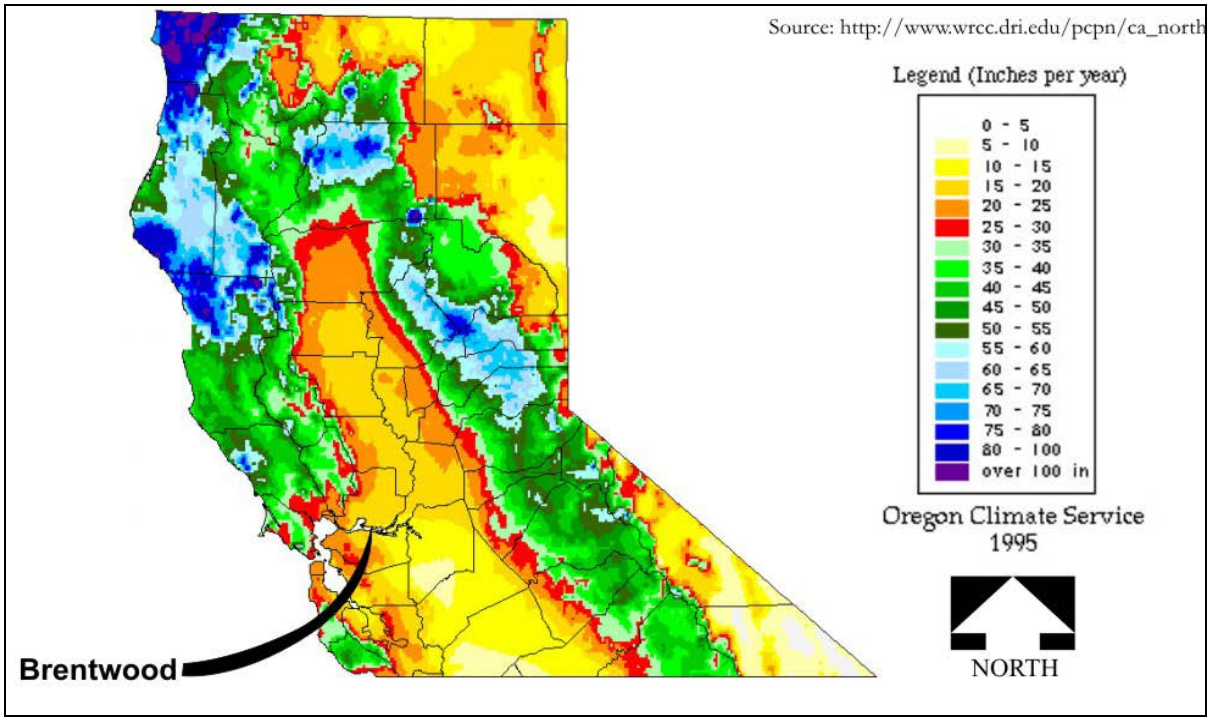

Figure 3-2. Northern California Annual Average Precipitation (in.), 1961

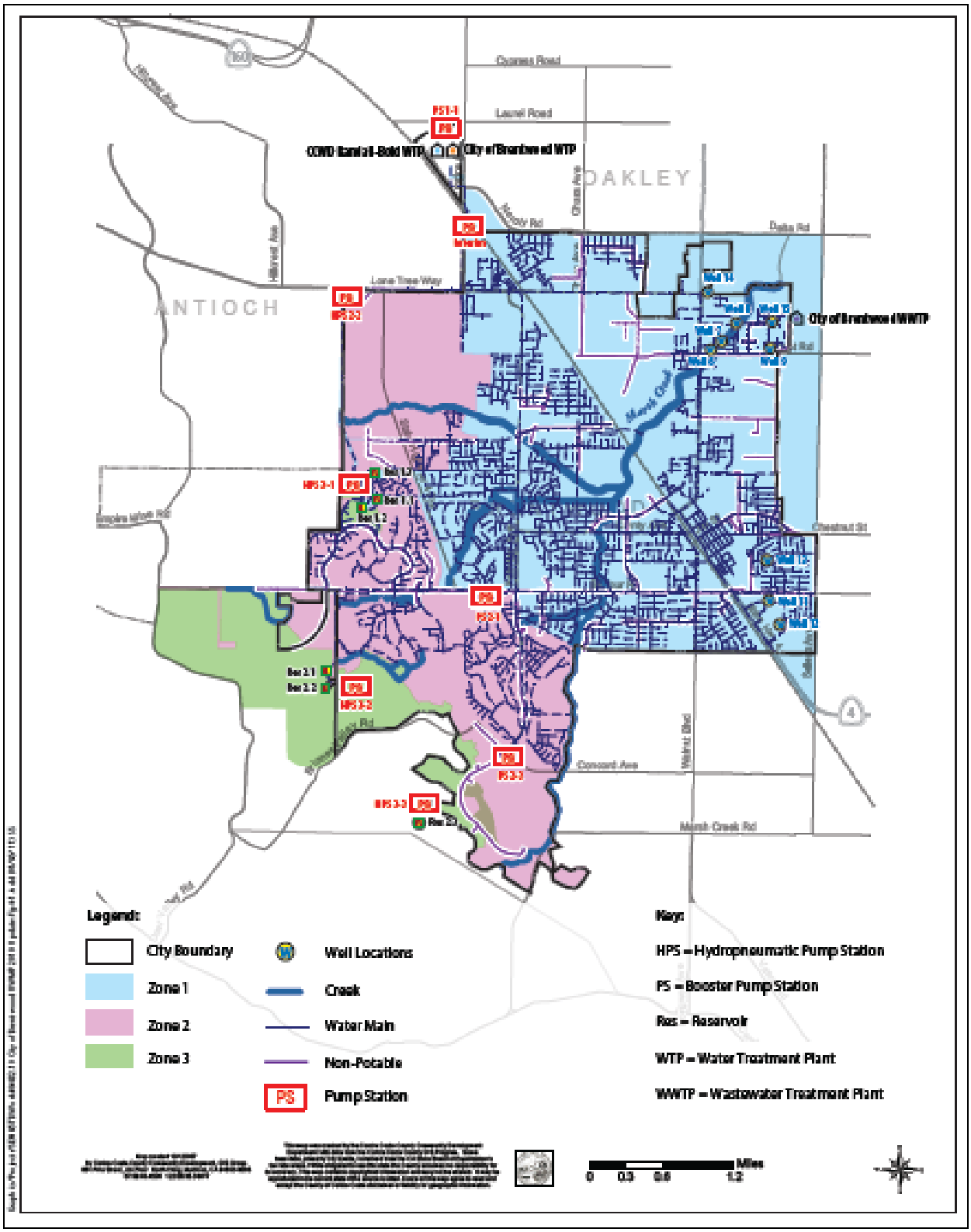

Figure 4-1
The City of Brentwood Water Service Area

Figure 3-3. The City of Brentwood Water Service Area

Pressure Zones

The City's distribution system consists of three primary pressure zones. Water pressure is maintained between 40 and 100 pounds per square inch. Pressure Zone 1 is both the largest and lowest (in elevation) zone and covers the east side of the City. The Zone 1 distribution system serves all developments with an elevation of less than 110 feet. All water supplied to the City goes through Zone 1 and is then pumped up to the other zones. Zone 1 has in-zone reservoir storage. Pressure Zone 2 is located primarily on the west and south side of the City at higher elevations. Zone 2 also has in-zone reservoir storage. Zone 2 is confined to areas with elevations greater than 110 feet but less than or equal to 220 feet. Pressure Zone 3 is composed of three isolated islands that operate as independent subzones to serve the higher elevations in the City. It is limited to areas with elevations greater than 220 feet but less than or equal to 330 feet. The three Zone 3 subzones are located generally in the northern, central, and southern parts of the west side of the City. All Zone 3 subzones are currently hydropneumatic zones, with no reservoir storage. In the future, the central subzone (Zone 3 Central) is expected to have in-zone reservoir storage. The north and south subzones (Zone 3 North and Zone 3 South) will remain hydropneumatic zones.

Treatment Facilities

The City receives water from three primary treatment plants: COBWTP, RBWTP, and the City WWTP. More information on these treatment facilities is provided in Chapter 5, System Supplies.

The COBWTP was built in 2008 to serve the City. It was part of a joint venture between the City and the Contra Costa Water District (CCWD) in which the City owns the facility and is responsible for operational and capital costs yet contracts with the CCWD for operation and maintenance of the facility. The first phase of the COBWTP, which has been constructed and is in operation, can treat up to 16.5 million gallons per day (mgd) of surface water. However, the plant is designed so that it can be expanded to an ultimate capacity of 30 mgd to serve the City's projected water demands through 2040.

The COBWTP treats raw water that the City purchases and diverts from Old River, Middle River, and Rock Slough, all of which have intakes connected by the CCWD's 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir (CCWD 2011). The COBWTP facilities are used for raw water pumping, flash mixing, flocculation, sedimentation, ozonation, filtration, and water storage. Treated surface water is pumped into the City's Zone 1 via a treated water pump station located at the COBWTP and a large diameter transmission pipeline.

The RBWTP is owned and operated by CCWD. The RBWTP treats Delta water that is blended in the Contra Costa Canal (Old River, Middle River, and Rock Slough), and Los Vaqueros Reservoir (City of Brentwood 2005, p. 2-4). Prior to operation of the COBWTP, the City received up to 14,800 acre-feet (4,823 million gallons) of water per year from the East Contra Costa Irrigation District (ECCID), which was withdrawn at Old River, Middle River, and Rock Slough and treated by the CCWD at the RBWTP to provide interim treatment for the City (as part of the City's 1999 agreement with the CCWD and the ECCID). This 14,800 acre-feet per year from Old River, Middle River, and Rock Slough is now treated by the COBWTP.

Located adjacent to one another, the COBWTP and the RBWTP share certain facilities and operational staff. These facilities are either independently owned by the CCWD or owned by the

RBWTP under a Joint Powers Agreement.[1] These facilities include solids lagoons (owned by the CCWD), a standby electrical power system (owned by the CCWD), and 21-kilovolt electrical service feeds (owned under the Joint Powers Agreement). The COBWTP has interim use of the RBWTP's service roads until a separate, independent access road on Empire Avenue can be constructed by the City. The communication and control systems of the two water treatment plants are connected. The plants share common control rooms and several buildings and can be interconnected to provide two-way backup during planned maintenance and emergencies.

Along with treatment and disposal, or reuse, of wastewater generated in the City, the City WWTP supplies recycled water via tertiary treatment for landscape irrigation and concrete batch production at the City's only industrial site. The City plans to expand its recycled water deliveries to several golf courses and parkways in the future.

Groundwater Wells

Seven out of nine permitted groundwater wells located within the City's water service area are active. Groundwater is treated at the wellhead prior to delivery to the drinking water distribution system. The City has two main well fields: Wells 6, 7, 8, 14, and 15, located in the northeast part of the City, and Wells 12 and 13 to the south. Of the two wells that are not in use, Well 9 currently does not have a disinfection system, and Well 11 is not used because of high nitrate concentrations. The wells are not typically drawn to capacity as the average annual production of all the active wells (2000-2010) is 4.13 mgd and the total well capacity is 6.50 mgd.

Table 3-2 summarizes the characteristics of the existing wells.

Table 3-2. Permitted Wells for the City of Brentwood

Well Number	Start-Up Year	Well Design Capacity (mgd)	Average Annual Production (2000–2010) (mgd)
6	1987	1.15	0.72
7	1987	1.01	0.74
8	1994	1.44	0.77
9	2000	NA	Not Currently Active
11	1995	NA	Not Currently Active
12	1997	0.58	0.27
13	1997	0.36	0.27
14	2001	1.44	1.09
15	2006	0.65	0.27
Total		**6.50**	**4.13**
Source: City of Brentwood 2006a and subsequent updates from the City.			

Reservoirs

The six existing reservoirs in the City have a combined capacity of 18.8 million gallons. Water is pumped through the reservoirs and used continually rather than for storage purposes. Therefore,

[1] The Joint Powers Agreement includes the cities of Antioch, Brentwood, and Oakley as well as Contra Costa County.

available reservoir water volumes fluctuate daily but are kept relatively consistent throughout the year. Therefore, it is assumed that the City has no annual net change in storage. These reservoirs provide equalization, emergency supply, and fire supply.

Table 3-3 lists the storage reservoirs and their capacities.

Table 3-3. Brentwood Reservoir Storage Tanks

Name	Type	Volume (MG)
Zone 1		
Reservoir No. 1.1	Gravity	2.5
Reservoir No. 1.2	Gravity	4.3
Reservoir No. 1.3	Gravity	4.0
Reservoir No. 1.4 - future	Pump	
Reservoir No. 1.5- future	Pump	
Zone 2		
Reservoir No. 2.1	Gravity	2.0
Reservoir No. 2.2	Gravity	2.0
Reservoir No. 2.3	Gravity	4.0
Reservoir No. 2.4- future	Gravity	
Zone 3		
Reservoir No. 3.1- future	Gravity	
Total Capacity		**18.8**
Source: City of Brentwood 2006a and subsequent updates from the City.		

Pump Stations

The City's pump stations provide a redundancy in the City's water system. Of the seven pump stations, one of them, the Roddy Ranch Pump Station, which is located on the ECCID canal, delivers raw water. The City's maximum pumping capacity is 53.8 mgd, which includes treated water from the pump station located adjacent to the COBWTP (City of Brentwood 2010c). This exceeds the highest level of demand. The City has two types of pump stations: booster and hydropneumatic. Booster pump stations are sized for maximum-day demand (average flow on the "maximum day") for the area they serve. Hydropneumatic pump stations must provide capacity to meet domestic peak-hour flows and typically include a standby pump, a large fire pump, and a standby fire pump. Hydropneumatic stations require backup power to ensure that the pumps will be operational at all times. Booster pump stations that pump into zones with reservoir storage do not need fire pumps or backup power.

Zone 1 is the largest zone and thus requires the most storage. All water supplied to the City goes through Zone 1 and is then pumped up to the other zones. Pump stations in Zone 1 pump stored water out of the non-gravity reservoirs and into the system. Zone 2 has in-zone reservoirs and pump stations that pump water to two of the three Zone 3 subzones (north and south) because they currently are hydropneumatic zones with no reservoir storage. Table 3-4 summarizes the design capacities of each pump station.

Table 3-4. Brentwood Booster Pump Stations

Name	Type	Purpose	Capacity (mgd)
Zone 1			
PS 1.1	Booster	Supplies treated surface water from the COBWTP	36
Zone 2			
PS 2.1	Booster	Zone 2 pumping capacity to refill Zone 2 reservoirs and pass water via Zone 3	3.6
PS 2.2	Hydropneumatic	Serves Zone 2	2.3
PS 2.3	Booster	Additional Zone 2 pumping capacity and refill capacity for Reservoir 2.3	3.9
Zone 3			
HPS 3.1	Hydropneumatic	North subzone	2.0
HPS 3.2	Hydropneumatic	Central subzone	2.0
HPS 3.3	Hydropneumatic	South subzone	4.0
Total Pump Capacity			**53.8**
Source: City of Brentwood 2006a and subsequent updates from the City.			

Piping System

The City's distribution system consists of pipelines of various sizes, all of which are adequately sized to meet build out demands. The City currently maintains 172 miles of distribution mains (City of Brentwood 2007a). The original water mains were constructed in 1940 and range in size from 4 to 10 inches in diameter. Larger-diameter water mains have been constructed more recently. A 42-inch-diameter transmission main transports treated water from the RBWTP along Empire Road to the inter-tie and pump station, and then smaller distribution lines connect to the system at Lone Tree Way.

Water is transported via the piping system from the Zone 1 reservoirs to the downtown system by a 24-inch-diameter water main west of Fairview Avenue, which connects to a 20-inch-diameter water main along Dainty Avenue. A 16-inch-diameter transmission main transports water from the northern wells southward along Highway 4 to the downtown pipe grid system. The City currently has an ongoing program to replace sections of the original water mains that are in need of repair.

Service Area Population

The City had a January 2010 of population of 51,394 (California Department of Finance 2011) in an area of approximately 15 square miles (Contra Costa Local Area Formation Committee 2008). According to DWR's methodology for estimating service area population (California Department of Water Resources 2011a), the City is considered to be a Category 1 water supplier because its actual distribution area overlaps substantially (≥ 95%) with the boundaries of the City during baseline and compliance years.

The City was incorporated in 1948 with a population of 1,700. The City's population has increased dramatically since 1990, when, according to U.S. census data, the population was approximately 7,500. In addition to the increase in population, demographics have changed as the area evolved from an agricultural community to a predominantly residential community. However, the

population boom of the late 1990s and early 2000s, a time when annual double-digit percentage increases were common, has tapered substantially.

The City underwent a dramatic economic boom from 2000 through 2008. However, economic growth stalled in 2009, paralleling changes in the U.S. economy and the real estate market collapse in California. As a result, the City experienced a one percent decrease in population from 2009 to 2010 (City of Brentwood, 2010a). The population growth rate, which is expected to remain below 1% until 2013, is expected to peak at 2% in 2016 before beginning to decline slightly, according to the City of Brentwood 2009/10 Fiscal Model (City of Brentwood 2010a). The City's population is projected to reach 69,826 by 2030, with an annual growth rate of 1.5% from 2010 through 2030 (City of Brentwood 2010a). At build out, the City is estimated to have a total population of approximately 76,226 citizens, which is expected to be reached sometime after 2050 (City of Brentwood 2010a). A total maximum-day build out water demand of 41 mgd of water must be supplied to the City from all sources (City of Brentwood 2006a, p. 1).

Historical and current population data for the City come from the California Department of Finance Demographic Research Unit (DRU) as control totals for each jurisdiction. Historical population estimates for evaluating historical growth are used in the City's annual fiscal model reports. Population projections are also estimated by using Department of Finance DRU data. The population projections are driven by economic and demographic mathematical models and constrained by examining local governments' plans, policies, and regulations that affect land development.

Population projections are used by the annual Fiscal Model developed by the City's Finance Department. The department uses the City's growth model, which is based on projected residential and commercial growth. Projections consider historical and present trends, taking into account available vacant land, redevelopment activities, and current land use policies and plans. Residential and commercial projections indicate that the worst of the development slowdown is over. The total number of new single family houses is planned to increase by at least 100 units per year, and the number of multi-family units is projected to be initially slow, but reach 50 units per year by 2013 (City of Brentwood 2010a). Commercial growth (in square feet), which has recently declined substantially, is forecast to remain sluggish for the next few years, followed by an increase in 2013. This pattern of little development followed by a return to modest growth is consistent with the residential development forecast (City of Brentwood 2010a).

A summary of the historic and projected population within the area served by the City water system is presented in 5-year increments in Table 3-5.

Table 3-5 (DWR Table 2). City of Brentwood Population (Current and Projected)

Table 2 City of Brentwood Population (Current and Projected)							
	2010	2015	2020	2025	2030	2035 (optional)	Data Source
Service area population[1]	51,394	55,159	60,290	66,561	69,826	72,696	City of Brentwood 2010a and City of Brentwood 2011a
[1] Service area population is defined as the population served by the distribution system.							

Other Demographic Factors Affecting Water Supply and Demand

Many people choose to reside in Brentwood because of the affordability of housing. Despite the growing population and increased employment rates in the City, almost 90% of Brentwood residents commute to jobs outside of the City, primarily to employment opportunities in San Francisco, Oakland, Concord, Walnut Creek, Antioch, and Pittsburg (City of Brentwood 2001).

Within the City, the largest employers are community-serving retail and government employers (e.g. school districts). Agriculture remains important to the local economy but has declined in relative importance as the City has become more suburban. There is no heavy industry and only a small light industry area in the northeastern part of the City. The Police Department is the fastest growing City Department. Police are the only department that is projected to hire additional staff over the next ten years (City of Brentwood 2010a).

Chapter 4
System Demands

Water Demands

This chapter presents an analysis of available water use data, customer connections, historical groundwater and surface water production, unit water use, and the resulting projections for future water needs for the City.

Baseline and Targets

The Water Conservation Act of 2009 states that an urban retail water supplier shall include baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use estimates in its UWMP, along with the basis for determining these estimates, including references to supporting data.

Baseline and Compliance Water Use Determination Methodologies

DWR has developed nine methodologies for determining baseline water use and associated compliance with the 2020 water use target (California Department of Water Resources 2011a). Water suppliers must define a 10- or 15-year base (or baseline) period for water use, which will be used to develop target levels of per capita water use. The longer baseline period applies to a water supplier that meets at least 10% of its 2008 measured retail water demand through recycled water. Water suppliers must also calculate water use for a 5-year baseline period and use that value to determine the minimum required reduction in water use by 2020. The City has chosen the 10-year baseline period because recycled water demand in 2008 was less than 10%. Baseline water use targets were determined using *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (California Department of Water Resources 2011a). Table 4-1 summarizes the base-period ranges and indicates how they were determined.

Table 4-1 (DWR Table 13). Base-Period Ranges

Table 13 Base-Period Ranges			
Base	**Parameter**	**Value**	**Units**
10- to 15-year base period	2008 total water deliveries	4,595	million gallons
	2008 total volume of delivered recycled water[1]	25	million gallons
	2008 recycled water as a percent of total deliveries	0.57	percent
	Number of years in base period[2]	10	years
	Year-beginning base-period range	2001	
	Year-ending base-period range[3]	2010	
5-year base period	Number of years in base period	5	years
	Year-beginning base-period range	2005	
	Year-ending base-period range[3]	2009	

[1] Delivered recycled water for 2008 was calculated as the total produced recycled water (51 million gallons) minus what was used for wastewater treatment plant operations (28 million gallons).
[2] If the percentage of 2008 recycled water is less than 10%, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10% or greater, the first base period is a continuous 10- to 15-year period.
[3] The ending year must be between December 31, 2007, and December 31, 2010.

Table 4-2 summarizes the annual population, daily gross water use, and annual per capita water use totals during a 10-year period (2001–2010). These were used to determine the City's 2015 and 2020 water use targets. Gross water use was calculated using the methodology described in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (California Department of Water Resources 2011a).

Table 4-2 (DWR Table 14). Base Daily per Capita Water Use (10-year range)

Table 14 Base Daily per Capita Water Use (10-year range)				
Base-Period Year				
Sequence Year	Calendar Year	Distribution System Population[1]	Daily System Gross Water Use (mgd)[2]	Annual Daily per Capita Water Use (GPCD)
Year 1	2001	26,181	5.7	220
Year 2	2002	29,956	7.8	261
Year 3	2003	34,055	8.3	243
Year 4	2004	38,325	9.1	238
Year 5	2005	41,954	10.6[3]	253
Year 6	2006	45,752	10.6	231
Year 7	2007	48,667	12.0	246
Year 8	2008	50,618	12.0	238
Year 9	2009	51,908	11.2	216
Year 10	2010	51,394	10.5	203
Base Daily per Capita Water Use				**235**

GPCD = gallons per capita per day.
[1]Source: California Department of Finance 2010.
[2] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.
[3] A 6% increase in the total water produced volume was applied to the year 2005 to eliminate discrepancies between water produced and water delivered. Discrepancies are likely attributed to errors in the data record that occurred during the transition process when improvements were made in data collection and billing practices in 2005.

The City's 2020 water use target was calculated as 80% of the 10-year baseline water use, and the 2015 water use target was calculated as 90% of the 10-year baseline water use. Table 4-3 summarizes these water use and target GPCD values.

Table 4-3. Summary of 10-year Baseline Water Use and Target GPCD Values

10-year Baseline GPCD	235
2015 10-year Baseline Interim Target GPCD	211
2020 10-year Baseline Target GPCD	188
GPCD = gallons per capita per day.	

Table 4-4 summarizes the population, daily gross water use, and annual daily per capita water use totals during a 5-year period (2004–2009). These were used to determine the City's minimum water use reduction requirement.

Table 4-4 (DWR Table 15). Base Daily per Capita Water Use (5-year range)

Table 15 Base Daily per Capita Water Use (5-year range)				
Base-Period Year		Distribution System Population[1]	Daily System Gross Water Use (mgd)[2]	Annual Daily per Capita Water Use (GPCD)
Sequence Year	Calendar Year			
Year 1	2005	41,954	10.6	253
Year 2	2006	45,752	10.6	231
Year 3	2007	48,667	12.0	246
Year 4	2008	50,618	12.0	238
Year 5	2009	51,908	11.2	216
Base Daily per Capita Water Use				237

GPCD = gallons per capita per day.
[1]Source: California Department of Finance 2010.
[2] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.

The City's 2020 minimum water use reduction target was calculated as 80% of the 5-year baseline water use, and the 2015 minimum water use reduction target was calculated as 90% of the 5-year baseline water use. Table 4-5 summarizes these water use and target GPCD values.

Table 4-5. Summary of 5-year Baseline GPCD and Targets

5-year Minimum Baseline GPCD	237
2015 Minimum Baseline Interim Target GPCD	213
2020 Minimum Target GPCD	189
GPCD = gallons per capita per day.	

Water Demand by Water Use Sector

Table 4-6 describes past and current water deliveries, the number of units (per 1,000 gallons), and the number of metered connections by water sector. Several assumptions were used in calculating actual water use and water use projections. The industrial and institutional/government water sector volumes are blank in the DWR tables because the City includes them in the commercial water sector when tracking and reporting. Unlike water production data, water delivery data includes recycled water and does not include meter adjustments. The City provides water treatment and distribution services as well as wastewater collection, treatment, and treated water disposal services to the following water sectors:

- **Single-Family Residential**—This sector refers to single-family residences in an identifiable suburban residential neighborhood or cluster-style development designed with open space and other amenities (City of Brentwood 2001).
- **Multi-Family Residential**—This sector refers to families living in apartments and condominiums in structures of two or three stories with off-street parking and other requirements for higher density living (City of Brentwood 2001).

- **Commercial/Institutional**—This sector includes commercial, government (city accounts), and industrial uses. It includes primarily uses associated with commercial buildings (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.). This sector includes recycled water provided to a concrete batch plant.
- **Landscape**—This sector includes primarily raw water use for irrigation at parks, schools, cemeteries, churches, residences, or public facilities (including city accounts). This sector includes recycled water at various parkways and landscaped medians throughout the City.
- **Other**— This sector includes metered water and unmetered water. Metered water includes hydrant meter water use from which meters are read quarterly. The unmetered water volume includes water use from activities such as firefighting, construction, street sweeping, system flushing, and meter discrepancies. This also includes system losses and other unaccounted-for water use. This sector includes a water volume that accounts for the difference in water production and delivery data.

Historical Water Deliveries

Records of historical water deliveries were obtained from the City's annual reports sent to DWR and California Department of Public Health (CDPH). The records serve as the basis for developing unit water demands and peaking ratios for the City's system. These data are reported as water delivered, but the total volume was estimated to equal total annual water production volume by adding the remaining unaccounted-for water into the "other" category. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial/industrial, and institutional/government connections as well as unaccounted-for water.

2005 Water Deliveries

Recycled water began to be produced and distributed by the City WWTP in 2005. However, recycled water is not included in historical water deliveries because it is considered to be water reuse as opposed to water production. Table 4-6 shows 2005 water deliveries per water sector, as well as the annual GPCD.

Table 4-6 (DWR Table 3). Water Deliveries (actual), 2005

Table 3 Water Deliveries (actual), 2005[1]						
	2005					
	Metered		Not Metered			
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	Total Volume	
		mgy		mgy	mgd	mgy
Single-Family Residential	13,731	2,762			7.6	2,762
Multi-Family Residential	39	76			0.2	76
Commercial[2,3]	561	821			2.2	821
Industrial	0	0			0	0
Institutional/government	0	0			0	0
Landscape[3]	190	174			0.5	174
Agriculture	0	0			0	0
Other	36	36		12	0.13	48
Total	**14,521**	**3,869**	**0**	**12**	**10.6**	**3,881**
				GPCD	**253**	

Units: million gallons per day (mgd); million gallons per year (mgy); gallon per capita per day (GPCD).
[1] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.
[2] Commercial and Industrial data are combined.
[3] Recycled water is included.

2010 Water Deliveries

According to 2010 water delivery data for the City, the single-family residential sector has the highest demand for water (65%). Landscape water use has the second highest demand for water (27%). The multi-family residential and commercial water sectors have the lowest total water volume demand (3% to 5%). Figure 4-1 shows water demand by water use sector.

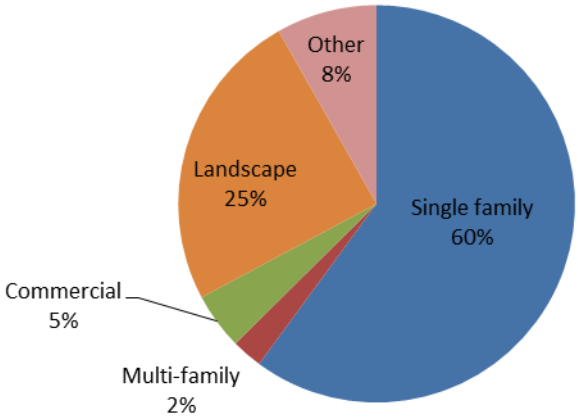

Figure 4-1. 2010 City of Brentwood Water Demand by Water Use Sector

Table 4-7 summarizes water delivery volumes by water sector. Compared with 2005 water deliveries, single-family residential and commercial water use decreased dramatically, whereas landscape water use increased. Single-family residential and commercial water use reductions are attributed primarily to the City's water conservation program efforts as well as the downturn in the economy. Increases in the landscape sector are attributed primarily to increases in the number of landscaped areas, such as golf courses and parkways.

As shown in Table 4-2, annual per capita water delivery use in 2010 was significantly less than the 2005 annual per capita water delivery use. This is likely most attributed to the City's conservation efforts. The reduction may also be due to the difference in total volumes of unaccounted-for water losses.

Table 4-7 (DWR Table 4). Water Deliveries (actual), 2010

Table 4 Water Deliveries (actual), 2010[1]						
	2010					
	Metered		Not Metered		Total Volume	
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume		
		mgy		mgy	mgd	mgy
Single-Family Residential	14,913	2,294			6.3	2,294
Multi-Family Residential	56	96			0.3	96
Commercial[2,3]	492	176			0.5	176
Industrial						
Institutional/government						
Landscape[3]	503	938			2.6	938
Agriculture						
Other	36	16		297	0.9	314
Total	**16,000**	**3,520**		**297**	**10.6**	**3,817**
				GPCD	**203**	

Units: million gallons per day (mgd); million gallons per year (mgy)); gallon per capita per day (GPCD)..
[1] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.[2] Commercial and Industrial data are combined.
[3] Recycled water is included.

Changes in water deliveries from 2005 to 2010 vary depending on the sector. Single family water use volumes decrease, which this is primarily because of the economic downturn that occurred between 2005 and 2010, whereas landscape irrigation water use volumes increase, which is primarily due to increases in golf courses and parks within the City. Figure 4-2 shows changes in annual water deliveries per sector from 2005 to 2010.

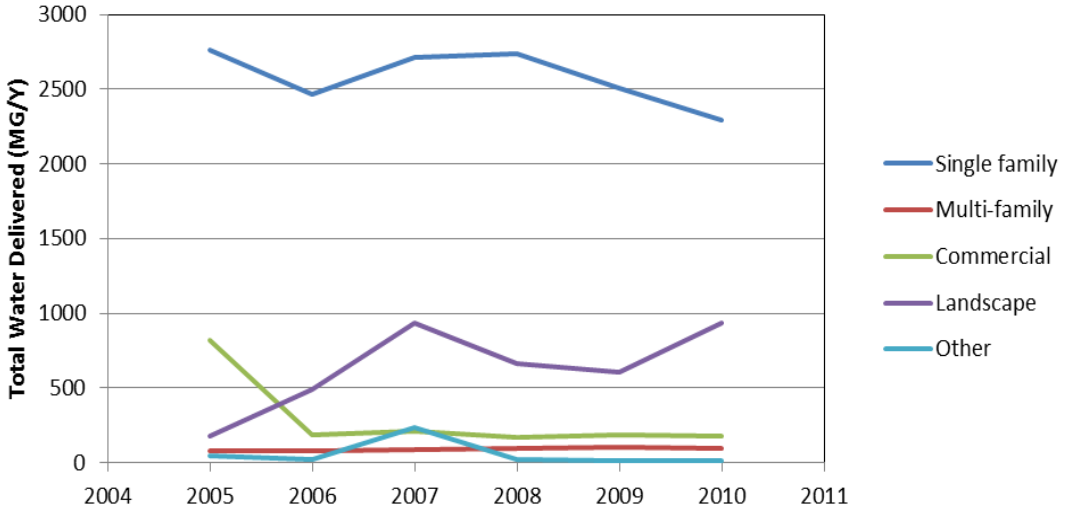

Figure 4-2. Changes in Annual City Water Deliveries per Sector from 2005 to 2010

Maximum-Day Demand

Water use varies continuously throughout a given day as well as seasonally. Daily demand fluctuates throughout the year based primarily on seasonal climate changes. Water use during a typical summer day is approximately four times that of a winter day. Maximum demands for water normally occur in June, July, August, and September. Increased landscape irrigation during the hot, dry weather is largely responsible for these higher demands. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. The ratio between average and maximum-day demands provides a maximum-day peaking factor that can be used to scale future demand projections to maximum-day levels. The City uses a maximum-day peaking factor of 2.1 (City of Brentwood 2006a).

Maximum daily water demand projections provide the basis for sizing and staging future water facilities. The City's preliminary design report for the COBWTP (2005) includes the City's 2001 master plan water demand projections, which will aid in determining when COBWTP capacity will need to be expanded to 30 mgd. The City has projected total annual water demand up to 2040 based on a maximum build out water demand of 41 mgd, with water supplied from all sources of supply (surface and groundwater).

Two maximum daily water demand growth-rate projection scenarios were evaluated: (1) a high growth rate curve and (2) a straight-line growth rate. The high growth rate curve provides a scenario in which water demands are high until 2020 and then slow from 2020 to 2040. This is consistent with the *Brentwood Treatment Options Study* (City of Brentwood 2003). Under the straight-line growth rate scenario, water demands are expected to increase at a constant rate until 2040. Actual water demands are expected to be between these two projections. Table 4-8 summarizes the projected maximum daily demands used to determine COBWTP expansion. According to the projections, the capacity of the COBWTP will be expanded between 2012 and 2018 (City of Brentwood 2005). In this UWMP, we assume this expansion will occur by 2020.

Table 4-8. Current and Projected Maximum Daily Water Demands (2005–2040) for the City of Brentwood

Year	Total Maximum Daily Demand—High Growth Rate Scenario (mgd)	Total Maximum Daily Demand—Straight-Line Growth Rate Scenario (mgd)	Well Supply (mgd)	RBWTP and COBWTP (mgd)
2005	17	15	5	6
2010	23	18.5	5	10–12
2015	29	22	5	13.5–18
2020	35	26	5	17–24
2025	36.5	30	5	21–24
2030	38	33.5	5	28.5–31.5
2035	39.5	37	5	32–34.5
2040	41	41	5	36
Source: City of Brentwood 2005.				

Water Demand Projections

The following tables define the projected reductions in water deliveries from 2015 through 2035. The percent increase in population for each year was used to project total water use per sector (see Table 3-5 for population projections).

For 2015 sector water use, there is an approximate 7% projected increase in population from 2010 to 2015. This 7% was applied to the number of metered accounts for each sector from 2010. As a result of this increase in population, the projected 2015 total water delivery volume and GPCD are greater than those of 2010. Using the baseline data and the methodologies described in previous chapters, the City is already meeting the required 2015 water use target (with 10-year base period) of 211 GPCD.

Table 4-9 summarizes total project water delivery volumes for 2015.

Table 4-9 (DWR Table 5). Water Deliveries (projected), 2015

Table 5 Water Deliveries (projected), 2015					
	2015				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	16,856	2,456			2,456
Multi-Family Residential	57	102			102
Commercial	527	188			188
Industrial					0
Institutional/government					0
Landscape	539	1,004			1,004
Agriculture					0
Other	39	17		418[1]	436
Total	**18,016**	**3,768**		**418**	**4,186**
				GPCD	**208**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other"(or unaccounted-for) water use is calculated as the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). More information is provided in the section, *Unaccounted-for water use*.

For 2020 sector water use, there is an approximate 9% projected increase in population from 2015 to 2020. This 9% was applied to the number of metered accounts for each sector from 2015. Water deliveries from 2015 to 2020 will require reduction measures to meet a 20% overall reduction by 2020. The greatest water use reductions will come from the conversion of raw or potable water to recycled water for landscape watering. The projected landscape water use per account was reduced by 18% between 2015 and 2020. Water reductions could also come from the conversion of fire hydrant water lines to recycled water lines, which are covered under the "other" water use sector. The projected "other" water use per account was reduced by 15% between 2015 and 2020. Incremental water use reductions will occur within the multi-family and commercial water use sectors through increased use of water-efficient practices and technologies. Single-family use was

reduced by 5% between 2015 and 2020. It was already dramatically reduced between 2005 and 2010 for 2010 projections.

Table 4-10 (DWR Table 6). Water Deliveries (projected), 2020

Table 6 Water Deliveries (projected), 2020					
	2020				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	18,354	2,540			2,540
Multi-Family Residential	62	106			106
Commercial	574	195			195
Industrial					
Institutional/government					
Landscape	586	897			897
Agriculture					
Other	42	16		376	393
Total	**19,618**	**3,754**			**4,130**
				GPCD	**188**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other"(or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 4-11 summarizes total project water delivery volumes for 2025, 2030, and 2035. For 2025 sector water use, there is an approximate 10% projected increase in population from 2020 to 2025. This 10% was applied to the number of metered accounts for each sector from 2020. Although overall water volumes per sector do not decrease greatly, because of the increase in population, water deliveries from 2020 to 2025 will require reduction measures to maintain the 2020 water use target. The increase in population between 2025 and 2030 is projected to be approximately 5%; between 2030 and 2035, it is projected to be approximately 4%. Population projections decrease in 2030 and 2035. Water delivery reductions will be greatest in the landscape sector (due to the increased use of recycled water) to maintain the 2020 water use target through 2030 and 2035. Some reductions in the "other" water use sector will need to be made as well to maintain the 2020 water use target in 2035. Incremental reductions in the single-family, multi-family, and commercial water use sectors through water conservation measures will also be made to maintain the 2020 water use target in 2030 and 2035. Annual GPCD projections for 2025, 2030, and 2035 are 185, 185, and 186, respectively. All of these GPCDs will meet the 2020 Water Use Target of 188 GPCD.

Table 4-11 (DWR Table 7). Water Deliveries (projected), 2025, 2030, and 2035

Table 7a Water Deliveries (projected), 2025					
	2025				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	20,168	2,791			2,791
Multi-Family Residential	68	116			116
Commercial	630	214			214
Industrial					
Institutional/government					
Landscape	644	985			985
Agriculture					
Other	46	18		376	394
Total	**21,557**	**4,125**		**376**	**4,501**
				GPCD	**185**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other"(or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 7b Water Deliveries (projected), 2030					
	2030				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	22,163	3,006			3,006
Multi-Family Residential	75	125			125
Commercial	693	231			231
Industrial					
Institutional/government					
Landscape	708	964			964
Agriculture					
Other	51	19		376	395
Total	**23,689**	**4,345**			**4,721**
				GPCD	**185**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other"(or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 7c Water Deliveries (projected), 2035					
	2035				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	24,354	3,204			3,204
Multi-Family Residential	82	134			134
Commercial	761	246			246
Industrial					
Institutional/government					
Landscape	778	953			953
Agriculture					
Other	56	19		376	395
Total	**26,031**	**4,556**			**4,721**
				GPCD	**186**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other"(or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Low-Income Residential Water Use

The City has also projected water use for single-family and multi-family residential housing of lower income households. Low-income water use projections are based on the assumption that low-income residents are 10% of the single-family residents and 20% of the multi-family residents. Low-income units include 20 single-family dwelling units within the California Orchard subdivision, which was constructed during 2001 and 2002. These units have recorded affordability controls for 30 years. It also includes 30 low-income dwelling units that were constructed in 2007. Very low-income units include a two-unit duplex constructed by Habitat for Humanity in 2000. This development has a 30-year affordability agreement that expires in 2049. Additional very low-income units include 20 single-family units within the Arroyo Seco Estates subdivision, which includes 30-year resale restrictions that expire in 2029. The very low-income sector also includes 282 very low-income dwelling units and 54 low-income units (City of Brentwood 2001, p. 2-11).

Table 4-12 (DWR Table 8). Low-Income Projected Water Demands

Table 8 Low-Income Projected Water Demands					
Low-Income Water Demands[1]	2015	2020	2025	2030	2035 (optional)
Single-Family Residential	246	254	279	301	320
Multi-Family Residential	20	21	23	25	27
Total	**266**	**275**	**302**	**326**	**347**

Units: million gallons per year.
[1]Low-income water use is assumed to be 10% of single-family residential water use and 20% of multi-family residential water use.

Sales to Other Water Agencies

The City does not have any sales accounts with other water agencies. Therefore, projections on water sales to other water agencies were not determined.

Unaccounted-for Water Use

Unaccounted-for water use is unmetered water use, including water used for fire protection and training, system and street flushing, sewer cleaning, system leaks, system losses, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies and discrepancies in water use tracking systems. To account for these uses, unaccounted-for water use is included in the "Non metered" section of the "Other" category in the calculation of gross water use. For this UWMP, unaccounted-for losses are calculated as the differences between water production and water delivery volumes. Table 4-8 shows unaccounted-for water use only for historical years.

Table 4-8. Calculated Unaccounted-for Historical Water Use

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Water Produced	2,098	2,849	3,020	3,335	3,881	3,854	4,364	4,395	4,090	3,817
Water Delivered	1,749	2,302	2,520	3,046	3,869	3,238	4,174	3,689	3,413	3,520
Non Metered Other Sector Water	349	546	500	289	12	616	190	705	677	297
Units: million gallons per year (mgy).										

An unaccounted-for water use volume is included in water use projections as an average of unaccounted-for water use volumes from 2001-2010. The average of this 10-year period, 418 million gallons per year, was added to each projection to account for potential unaccounted-for losses. This additional volume results in conservative projections due to the assumption that unaccounted-for water use volumes are assumed to remain relatively unchanged from the average in the future. However, in order to meet the 2020 target of 188 GPCD, unaccounted-for water use volumes will need to be reduced by 10% to reach 375 million gallons per year by 2020. The City is currently, and plans to continue, implementing several measures to reduce unaccounted-for water use volumes and meet their reduction targets by year 2020 and beyond. These reduction measures include:

- Pipe infrastructure repairs where needed to prevent system leaks (physical losses due to leakage from pipes).
- Increased inspections and research to identify unauthorized connections.
- Replacing old meters with new ones to reduce the potential for meter inaccuracies.
- Installing new meters to improve tracking of water used for fire protection and training, system and street flushing, and sewer cleaning that are typically not metered.

Beyond the year 2020, unaccounted-for water use reductions are not necessary in order for the City to meet its reduction obligations beyond year 2020. However, in efforts to conserve and be stewards of the local water supply, the City will continue to identify and implement reduction measures to address unaccounted-for water consumption. This continued focus will ultimately improve the City's overall water supply efficiency and help them to meet their targeted reductions in the years following 2020.

Additional Water Uses and Losses

Additional water uses and losses are shown in Table 4-13. This table contains only metered recycled water delivery volumes. Projected recycled water use was calculated for all the landscape, commercial (includes industrial) and "Other" water use sectors since these are the areas where recycled water use can be applied due to existing and planned recycled water pipe infrastructure. Projected recycled water use was calculated per sector based on the projected increase in water delivery accounts due to population projections and the water use volume per account from previous year. There is some unmetered recycled water use for landscaping and other purposes at the City WWTP that is not accounted for in these projections. System losses are accounted for in the unaccounted-for water use volumes described above. The City has no saline barriers, groundwater recharge, or conjunctive use operations. Therefore, water uses and losses were not projected for those sectors.

Table 4-13 (DWR Table 10). Additional Water Uses and Losses

Table 10 Additional Water Uses and Losses							
Water Use[1]	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Saline Barriers							
Groundwater Recharge							
Conjunctive Use							
Raw Water							
Metered Recycled Water	39	18	18	45	133	224	311
System Losses[2]							
Total	**39**	**18**	**18**	**45**	**133**	**224**	**311**

Units: million gallons per year.
[1]Any water accounted for in DWR Tables 3 through 7 is not included in this table.
[2]System losses are included in the unaccounted-for water use volumes in Table 4-8.

Total Water Use

Total water demand projections are shown in Table 4-14. Between 2005 and 2035, total water demands are expected to increase by 22%, from 3,098 million gallons in 2005 to 5,346 million gallons in 2035, with a projected 54% increase in population. Despite the large projected increase in population, overall per capita water use is projected to decrease 32%, from 244 GPCD in 2005 to 184 GPCD in 2035. Overall, a 22% reduction from the 10-year baseline water use volume would be achieved in 2035.

Table 4-14 (DWR Table 11). Total Water Use

Table 11 Total Water Use							
Water Use	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Total Water Deliveries (from DWR Tables 3 to 7)	3,881	3,817	4,186	4,130	4,501	4,721	4,932
Sales to Other Water Agencies (from DWR Table 9)	0	0	0	0	0	0	0
Additional Water Uses and Losses (from DWR Table 10)	39	18	18	45	133	224	311
Total	**3,920**	**3,835**	**4,204**	**4,175**	**4,634**	**4,945**	**5,243**
Units: million gallons per year.							

Water Use Reduction Plan

The City is not an urban wholesale water supplier. Therefore, it does not need to include an assessment of present and proposed future measures, programs, and policies to help achieve wholesale water use reductions. See Chapter 8 for information on related items for the City as a retail water supplier.

Chapter 5
System Supplies

Water Sources

This chapter describes the sources of water available to the City for distribution and services. It includes a description of each water source, source limitations, water quality, and other water opportunities.

The City's current supply consists of both surface water from the Delta and groundwater from existing groundwater wells located in the San Joaquin Groundwater Basin. There are five sources of water supply for the City:

- **RBWTP:** Treated surface water purchased from Contra Costa Water District originally from diverted water from the Old River, Middle River and Rock Slough delivered via the Contra Costa Canal.
- **Raw water:** Surface water purchased from ECCID delivered via the East Contra Costa Irrigation Canal.
- **Groundwater:** Groundwater from 7 active groundwater wells within the City.
- **COBWTP:** Supplier-produced surface water originally from diverted water from the Old River, Middle River and Rock Slough delivered via the Contra Costa Canal.
- **Recycled Water:** Tertiary treated wastewater from the City's wastewater treatment plant (BWWTP**).**

Figure 5-1 depicts the water supply percentages based on 2010 water production volumes.

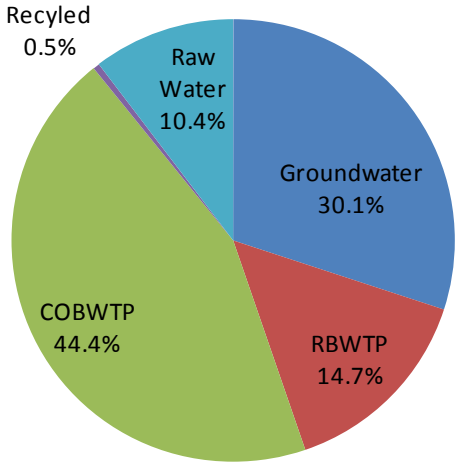

Figure 5-1. 2010 City of Brentwood Water Supply Allocations

With respect to potable water sources only, the City obtains approximately 58% of its water supply from treated surface water (COBWTP and RBWTP) and approximately 30% from groundwater wells. City water customers receive a blend of surface and groundwater from these sources. Of raw

water sources, approximately 0.5% is recycled water from the City WWTP and approximately 10% is raw water.

The City's current and projected water supply uses are summarized in Table 5-1. These values represent the actual and projected use (or purchases) based on percentages of total water deliveries (not water production volumes as shown in Figure 5-1). The rationale and assumptions used in determining current and projected water supplies is as follows:

- **Contra Costa Water District (RBWTP):** The City has purchased a permanent capacity right of 6 mgd at the RBWTP and may use additional capacity on an as-need basis (Contra Costa Local Area Formation Committee 2007, p. 3-9).
- **Supplier-Produced Surface Water (COBWTP):** This water comes from the City's entitlement to purchase up to 14,800 acre-feet per year (4,823 million gallons per year) from ECCID, according to a 1999 agreement between ECCID and the City (Contra Costa Local Area Formation Committee 2007, pg. 3-7). The current capacity of the COBWTP is 16.5 mgd. Plant expansion to 30 mgd is expected to occur according to demand; capacity is projected to be reached by 2025. Projected use of COBWTP was calculated based on 48% of the City of total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010.
- **Raw Water:** Raw water is delivered via the Roddy Ranch Pump Station on the ECCID Canal that supplies water to the City's raw distribution system. Projected use of raw water was calculated based on 11% of the City of total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010.
- **Supplier-Produced Groundwater:** Total groundwater well supply is assumed to have a firm capacity of 5 mgd (1,825 million gallons per year) (City of Brentwood 2005, pg. 2-8). Projected use of groundwater was calculated based on 33% of the City of total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010.
- **Recycled Water (WWTP): The total volume of recycled water in 2010** with use potential was equal to 93% of the total volume of treated water. Therefore, total recycled water supply is assumed to be 93% of the total WWTP capacity. The capacity of the WWTP is expected to expand to 7.5 mgd by 2020; and the plant will need to expand to 25 mgd by 2025 to meet projected wastewater treatment needs based on population growth.

Table 5-1 (DWR Table 16). Water Supplies (current and projected)

Table 16 Water Supplies (current and projected)							
Water Supply Sources		**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Water Purchased From[1]:	Wholesaler Supplied Volume (yes/no)						
Contra Costa Water District (RBWTP)		563	618	610	664	697	728
Supplier-Produced Surface Water (COBWTP)		1,704	1,869	1,844	2,010	2,108	2,202
Raw Water (ECCID)		397	436	430	469	492	513
Supplier-Produced Groundwater		1,152	1,264	1,247	1,359	1,425	1,489
Transfers In							
Exchanges In							
Recycled Water (WWTP)		18	18	45	133	224	311
Desalinated Water							
Total		**3,835**	**4,205**	**4,176**	**4,634**	**4,945**	**5,243**

Source: Public Water Statistic Reports and Well Production Data provided by the City.
Units: million gallons per year.
[1] Volumes shown here should be what was purchased in 2010 and what is anticipated to be purchased in the future. If these numbers differ from what is contracted, show the contracted quantities in DWR Table 17.

Surface Water

Surface water supplies for the City originate from Old River, Middle River and Rock Slough and are transported through the Contra Costa Canal for treatment at the COBWTP and the RBWTP. The City also provides raw water to customers in some portions of the water service area.

City of Brentwood Water Treatment Plant

The COBWTP treats raw surface water from Old River, Middle River, and Rock Slough that was purchased by the City from the ECCID, as described in Table 5-1. The COBWTP was constructed in 2008 adjacent to the RBWTP and employs many of the same treatment technologies because the raw water supply originates from the same source. The COBWTP has the capacity to provide 16.5 mgd but is expandable to 30 mgd when needed to meet increased demands in the future.

Randall-Bold Water Treatment Plant

The RBWTP has been in operation since 1992 and is designed to treat up to 40 mgd. The City has purchased a permanent capacity right of 6 mgd from the RBWTP. However, the contract between CCWD and the City allows the City to purchase additional treated water from CCWD. It also permits CCWD to use surplus treatment capacity at the COBWTP, if needed.

Raw water is pumped to the RBWTP from Old River, Middle River, and Rock Slough via the Contra Costa Canal, which is operated by CCWD, for treatment prior to distribution as a public water supply. Water can also be stored in the off-stream Los Vaqueros Reservoir from the Old River intake.

During periods of low salinity, raw water is stored in Los Vaqueros Reservoir. This stored water is supplied to the Contra Costa Canal and blended with raw water from the Delta intakes as needed.

Raw Water

The City obtains raw water via the Roddy Ranch Pump Station on the ECCID Canal to the raw distribution system. It is used primarily for irrigation purposes. Current users include golf courses, parks and parkways, schools, and commercial landscaped areas.

Table 5-2 describes the amount of raw water purchased from ECCID in 2010 and the volumes projected to be supplied by ECCID in the future.

Table 5-2 (DWR Table 17). Wholesale Supplies (existing and planned sources of water)

Table 17 Wholesale Supplies (existing and planned sources of water)						
Wholesale Sources[1,2]	Volume[3]	2015	2020	2025	2030	2035 (optional)
East Contra Costa Irrigation District	4,823	436	430	469	492	513

Source: Public Water Statistic Reports and Well Production Data provided by the City.
Units: million gallons per year
[1] Water volumes presented here should be accounted for in DWR Table 16.
[2] If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale supplier, if more than one.
[3] Indicate the full amount of water.

Groundwater

Area groundwater is extracted from the San Joaquin Basin. The City is permitted for nine groundwater production wells, but only seven are currently active (Table 3-2). Of the two wells not in use, Well 9 does not currently have a disinfection system, and Well 11 is not used because of high nitrate concentrations. The seven active wells have a combined capacity of 5 mgd and provide approximately 33% of the City's annual water production.

The groundwater quality constituents and respective issues for the City wells can be differentiated into normally occurring constituents and man-made constituents. Historical monitoring of water from the wells has indicated some shallow groundwater impacts from man-made constituents, including nitrates, chloride, and total dissolved solids (TDS). Natural-occurring constituents, however, have required the system to take steps to minimize taste and odor effects prior to the water being delivered to system customers. Table 5-3 summarizes annual pumped groundwater volumes from 2006 to 2010. The percentage of groundwater supply versus total water supply has decreased over the years because of increases in the use of surface water supplies from the COBWTP and recycled water supplies from the BWWTP.

Table 5-3 (DWR Table 18). Groundwater (volume pumped)

Table 18 Groundwater (volume pumped)						
Basin Name(s)	**Metered or Unmetered[1]**	**2006**	**2007**	**2008**	**2009**	**2010**
San Joaquin Basin	Metered	1,886	1,331	1,474	1,235	1,152
Total groundwater pumped		1,886	1,331	1,474	1,235	1,152
Groundwater as a percent of total water supply		48%	30%	33%	29%	29%
Source: Public Water Statistic Reports and Well Production Data provided by the City. Units: million gallons per year. [1] Volume is based on volumetric meter data.						

Table 5-4 describes the volume of groundwater projected to be pumped from 2015 to 2035. Projected percentages of total water supply remain consistent with those in the recent past (i.e., 2009 and 2010).

Table 5-4 (DWR Table 19). Groundwater (volume projected to be pumped)

Table 19 Groundwater (volume projected to be pumped)					
Basin Name(s)	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
San Joaquin Basin	1,264	1,247	1,359	1,425	1,489
Total groundwater pumped	1,264	1,247	1,359	1,425	1,489
Percent of total water supply	30%	30%	29%	29%	28%
Units: million gallons per year.					

Desalinated Water Opportunities

The City is not planning to build a desalination plant. There are no opportunities for the development of desalinated water as a future supply source within the City's service area because the distance to the Pacific Ocean or the saline waters of San Francisco Bay is a limiting factor.

Transfer Opportunities

The City does not participate in any transfer or exchange programs and does not have any transfer or exchange programs planned for the future.

Recycled Water Opportunities

Recycled water is an important part of the City's water resources. Recycled water allows the City to conserve potable water, thereby ensuring a reliable water supply for current and future demand. The City WWTP is used for treatment and disposal, or reuse, of wastewater generated in the City's service area. Wastewater is collected by gravity in a series of mains, trunks, and interceptors. Collected wastewater is then transported to the WWTP, which currently has a treatment capacity of

5 mgd but is capable of expanding to 10 mgd in 2.5 mgd increments during peak wet-weather flows. In 2010, the average influent to the WWTP was 3.16 mgd. The WWTP's tertiary treatment provides recycled water for landscaping as well as processes at the Antioch Building Materials concrete batch plant. According to the City's 2010 billing records, the WWTP supplied 1.1 million gallons of recycled water to the concrete batch plant and 17 million gallons to five landscape users (e.g., commercial enterprises and parkways) in 2010.

Table 5-5 summarizes the historic and projected volumes of collected and treated wastewater that could be delivered for recycled water uses. In addition, the City's recycled water distribution system is shown in Figure 5-2.

Table 5-5 (DWR Table 21). Recycled Water (wastewater collection and treatment)

Table 21 Recycled Water (wastewater collection and treatment)							
Type of Wastewater	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Wastewater Collected and Treated in Service Area	1,168	1,176	2,575	3,974	5,662	7,433	9,276
Volume that Meets Recycled Water Standard[1]	1,087	1,166	2,475	3,819	5,441	7,143	8,915
Source: City of Brentwood 2011b. Units: million gallons per year. [1] Projected values for 2015 and beyond are based on average volumes that met the recycled water standard in 2005 and 2010.							

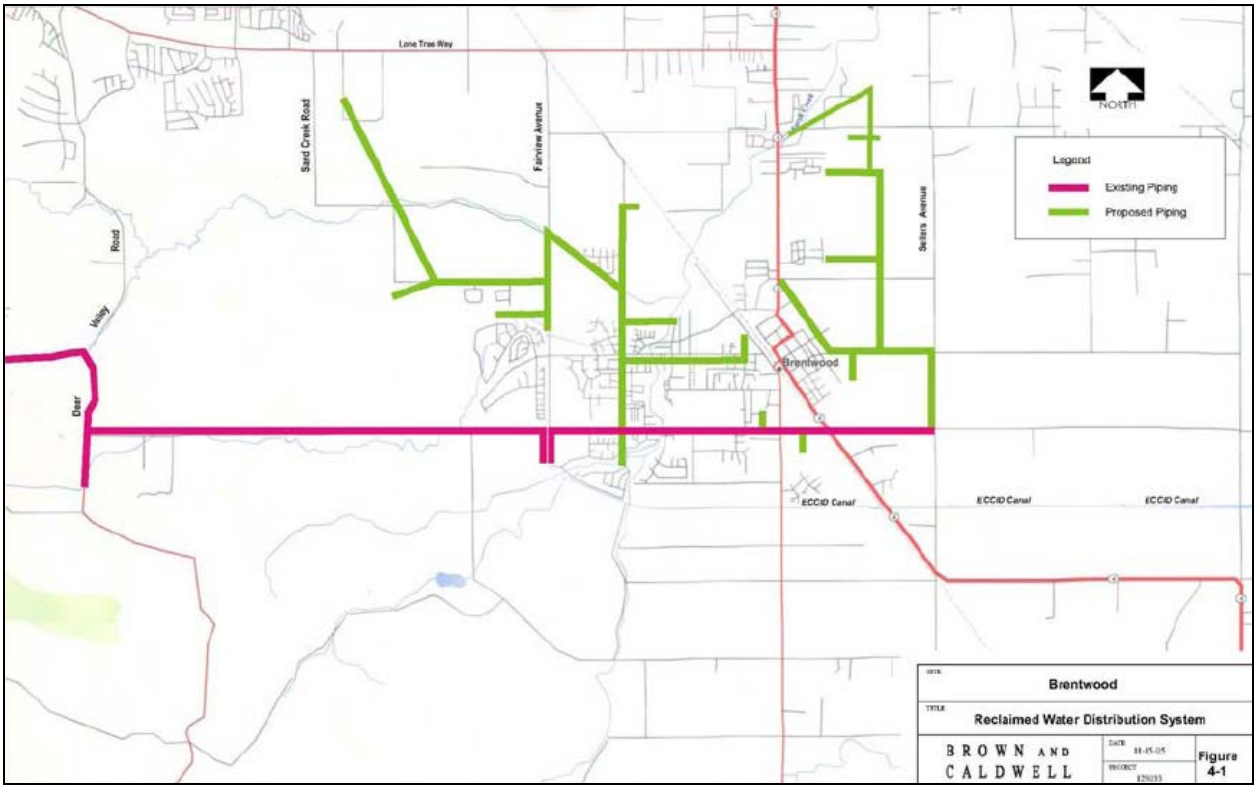

Figure 5-2. City's Existing and Proposed Recycled Water System (City of Brentwood 2006b)

Wastewater from the City that is not reused is treated and discharged to Marsh Creek, which drains to Big Break in the Delta. Annual average and future effluent flows to Marsh Creek are listed in Table 5-6. To minimize discharges to Marsh Creek, the City implements off-site wastewater reclamation under a master reclamation permit that allows for the distribution and use of recycled water within its service area.

Table 5-6 (DWR Table 22). Recycled water (non-recycled wastewater disposal)

Table 22 Recycled water (non-recycled wastewater disposal)							
Method of Disposal	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Discharge to Marsh Creek	Tertiary	1,115	2,428	3,730	5,241	6,837	8,501
Retention Ponds	Secondary	10	76	117	166	219	273
Total		**1,125**	**2,504**	**3,847**	**5,408**	**7,056**	**8,774**
Source: City of Brentwood 2011b. Units: million gallons per year							

The City has developed preliminary planning documents to identify uses for reclaimed wastewater at both existing and future sites. The reclaimed wastewater will be used for the irrigation of parks, golf courses, and landscape amenities. The City has already constructed a portion of the distribution system for the reclaimed water and will continue to expand the system as the City grows.

Existing landscaping that has the potential to be serviced by reclaimed water includes about 288 acres of parks and golf courses. However, before the City can use recycled water at the several golf courses located within the city limits, on-site groundwater studies will need to be conducted if the golf courses plan to have storage ponds, a requirement of the City's water reclamation permit (Order No. R5-2004-0132) from the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Quality Control Board 2004). The golf courses that may use storage ponds for recycled water include Roddy Ranch, the Brentwood Country Club, the SunCal Company, Deer Ridge, and the Shadow Lakes/Brookfield Homes golf courses.

Other uses for recycled water can include playground irrigation, commercial landscaping, residential irrigation, wetlands maintenance, street sweeping, construction (dust control, soil compaction, and general use), concrete production, log deck irrigation, and industrial process water. Some reclamation uses, such as dust control, have lesser standards, as prescribed in California Code of Regulations Title 22, Recycled Water Criteria, compared with uses such as playground irrigation.

The evapotranspiration data indicate that 4.7 feet of water per acre is required in the City's area. Therefore, the parks and golf courses will require about 5,260 acre-feet (1,714 million gallons) of reclaimed water per year at build out. The current demand for landscape irrigation is estimated at approximately 2,500 acre-feet per year (815 million gallons per year) (City of Brentwood 2006b). Table 5-7 summarizes potential future use of recycled water by use type. The potential for future increases in recycled water use is greatest in the landscape sector, including several golf courses and future parkways, as well as the "other" sector (e.g., fire hydrants can be converted to recycled water sources and raw water customers can convert to recycled water).

Table 5-7 (DWR Table 23). Recycled Water (potential future use)

Table 23 Recycled Water (potential future use)							
User Type	**Description**	**Feasibility[1]**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Agricultural Irrigation							
Landscape Irrigation[2]	X	Currently being used and has potential for increased use	17.2	42.8	128.1	211.4	293.8
Commercial Irrigation[3]	X	Is currently being used where available	N/A	N/A	N/A	N/A	N/A
Golf Course Irrigation	X	Requires groundwater study					
Wildlife Habitat							
Wetlands							
Industrial Reuse	X	Is currently being used at a concrete batch plant	1.1	1.1	1.1	1.1	1.1
Groundwater Recharge							
Seawater Barrier							
Geothermal/Energy							
Indirect Potable Reuse							
Other[4]	X	Planned for future use.	0	32.6	114.6	114.6	156.6
Total		**0**	**18**	**77**	**244**	**327**	**452**

Units: million gallons per year.
[1] Technical and economic feasibility.
[2] Includes commercial and golf course irrigation. Landscape irrigation includes parks, schools, cemeteries, churches, residences, or public facilities.
[3] Includes commercial building uses (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.). Potential future use could not be quantified because the recycled water volumes used for commercial irrigation are included in landscape irrigation use volumes.
[4] Includes metered water used for construction, emergency response involving fire hydrants, and other activities. The hydrant meters are read quarterly.

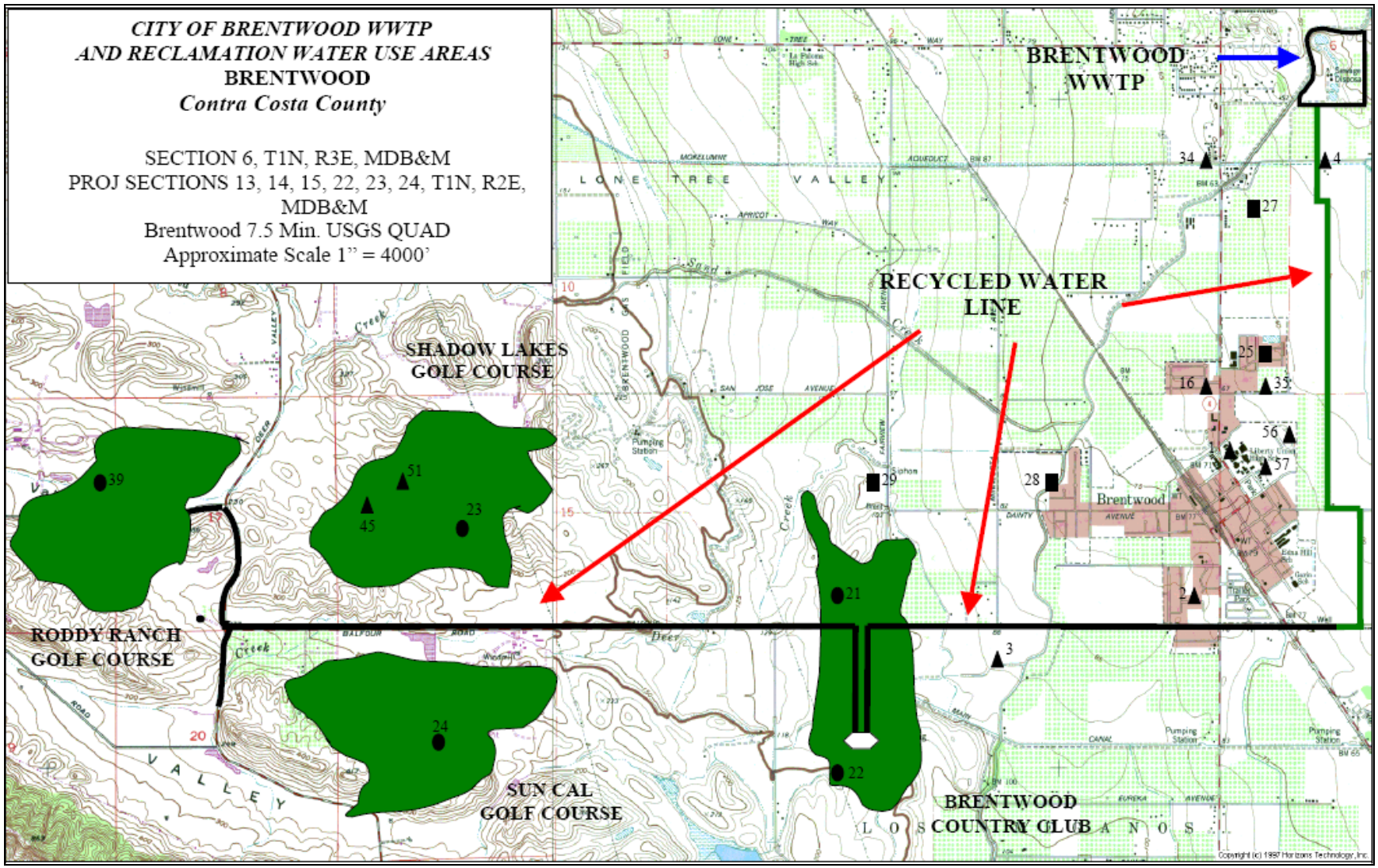

Figure 5-3. City Wastewater Treatment Plant and Reclamation Water Use Areas (Central Valley Regional Water Quality Control Board 2004)

Table 5-8 compares 2010 recycled water use, as projected in the 2005 UWMP (City of Brentwood 2006b), to actual 2010 water use by type. Actual recycled water use in 2010 was much less than that projected in the 2005 UWMP. Agricultural and wildlife projections were not met because the City does not deliver water to agricultural users, nor does it quantify wildlife habitat water use. Recycled water use in the industrial sector is limited because only one industrial facility is located in the City. Landscape water use was much less than projected primarily because of the conversion of Sunset Parks from recycled to potable water. However, the numbers for this use type are expected to increase significantly in future projections.

Table 5-8 (DWR Table 24). Recycled Water (2005 UWMP use projection compared with 2010 actual)

Table 24 Recycled Water (2005 UWMP use projection compared with 2010 actual)		
Use Type	**2010 Actual Use**	**2005 Projection for 2010[1]**
Agricultural Irrigation		8
Landscape Irrigation[2]	17	261
Commercial Irrigation[3]		
Golf Course Irrigation		
Wildlife Habitat		2
Wetlands		
Industrial Reuse	1	8
Groundwater Recharge		
Seawater Barrier		
Geothermal/Energy		
Indirect Potable Reuse		
Total	**18**	**279**

Units: million gallons per year
[1] From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing categories or modified to the new categories at the discretion of the water supplier.
[2] Includes parks, schools, cemeteries, churches, residences, or public facilities.
[3] Includes commercial building uses (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.).

Methods to Encourage Recycled Water Use

The City wants to expand the use of recycled water by offering financial incentives. The City currently offers potable water at $2.87 per 1,000 gallons. This rate is almost three times that of recycled water, which is $0.97 per 1,000 gallons. In addition, the City will maintain the cost of recycled water proportionally lower than of potable water in the future. City hopes to increase recycled use amongst the number of large-volume customers in the future as they realize that operating costs can be reduced from the use of recycled water. This includes customers who are responsible for golf courses, roadway irrigation, and parks.

There are currently two projects which are aimed at increasing the use of recycled water. The first is a Capital Improvement Project (CIP), Raw Water Distribution System project, which will convert a large part off potable water to recycled water and improve the access to recycle water supplies. The

second is pursuing providing recycled water to the golf courses. The Central Valley Regional Water Quality Control Board requires a groundwater study be conducted at each golf course site before the City can supply the recycled water to the golf courses. The City is currently pursuing alternatives to this requirement.

The City is also exploring the opportunity to expand the use of recycled water during construction by banning local contractors from using potable water for dust control and earth compaction. This would require the adoption of a City ordinance and some fire hydrants systems to be converted to recycled water piping systems.

Table 5-9 describes the methods the City currently implements and plans to implement in the future to encourage recycled water use among its customers.

Table 5-9 (DWR Table 25). Methods to Encourage Recycled Water Use

Table 25 Methods to Encourage Recycled Water Use						
Actions	Projected Results					
	2010	2015	2020	2025	2030	2035 (optional)
Financial incentives - Low Recycled Water Cost	Recycled water at a decreased rate reduces potable and raw water use.					
Increase Recycled Water Access Opportunities	NA	Conversion of potable water lines to recycled water lines will Improve access to recycled water will reduce the volume of potable and raw water use.				
Regulatory Incentives	NA	City ordinance on banning potable water use for dust control and earth compaction for construction projects.				

Future Water Projects

The City's primary future water supply projects are described in the City's 2010/11–2014/15 Capital Improvement Program (City of Brentwood 2010b). The following projects are those in the Water Improvements section of the City's capital improvement program. Water improvements include items such as major transmission mains, new water sources, booster stations, water wells, reservoirs, and treatment facilities.

- **Brentwood Boulevard Sewer and Water Main:** This project involves the installation of a 12-inch sewer main and a 12-inch water main, approximately 2,300 feet, along Brentwood Boulevard from Lone Tree Way to the northerly city limits as well as lateral stubs for Sims Road and service laterals for existing properties along Brentwood Boulevard. This project will provide sewer and water service for existing residents as well as for future development along Brentwood Boulevard north of Lone Tree Way.
    - **Timeline:** This project is contingent upon future development along Brentwood Boulevard. Currently scheduled to begin 2014/15.
    - **Funding:** The funded portion of this project will be split between two facility fees, water and wastewater.
- **Chlorine Generator Upgrade:** This project involves the upgrade of power supplies and components for the on-site sodium hypochlorite generators at Wells 6, 7, 8, 11, 12, 13, 14, and

15. The existing power supplies that are in use, which are obsolete and have proven themselves unreliable, are being replaced with new, more robust power supplies. This will relocate the power supplies away from the Programmable Logic Controller, thereby reducing failures. Replacing the power supplies as needed at Wells 8 and 15 will help to ensure a safe, reliable disinfection system for the City's water supply. This project is systematically replacing the power supplies so that not all wells are out of service at the same time. Thus far, Wells 6, 7, 11, 12, 13, and 14 have been upgraded.

  - **Timeline:** Complete.

- **Downtown Infrastructure:** This project includes the installation of new water and sewer facilities, the rehabilitation of existing facilities, and either the removal or replacement of existing infrastructure to accommodate future redevelopment and correct existing operations and maintenance constraints due to the age of the facilities.
  - **Timeline:** Complete.
  - **Funding:** The funds for this project will come from the redevelopment agency's 2001 bond proceeds in agency cash, the Water Enterprise Fund, and the Wastewater Enterprise Fund.
- **RBWTP Maintenance and Capital Upgrades:** This project involves the upgrade or replacement of existing plant facilities, including the installation of new facilities, due to wear and tear or new treatment standards. The City purchased 6 mgd of treatment capacity from the RBWTP in 2003. Therefore, the City has a fair share responsibility for capital as well as replacements and upgrades for operations based on the capacity right and total plant capacity.
  - **Timeline:** This project is currently under way and ongoing.
  - **Funding:** Funding from facility fees is generally for capital upgrades where the operational replacements are being funded through the enterprise. Per the agreement with CCWD, these replacement and upgrade project costs and priorities are reviewed in conjunction with CCWD on an annual basis.
- **Sensus Automated Meter Reading System Upgrade:** This project involves the installation of a fixed-base Sensus meter reading system to provide hourly meter readings. This will require the installation of a centrally located antenna and the replacement of the multiplexer units on the water meters. Upgrading the current Sensus automated meter reading system to an automated meter reading/advanced metering infrastructure fixed-base system will eliminate the need to drive routes to obtain meter readings. With the new system, meter readings will be available on an hourly basis and downloaded four times a day. Fixed base is a proactive metering solution with the ability to notify the staff of leaks, high consumption, and water theft when they occur. This will reduce water loss within the City. Upgrading the current system will reduce staff time spent reading meters and allow for proactive customer service. Utility billing will have access to the meter readings on an hourly basis, thus eliminating the need to contact public works staff to provide reads for occupant changes.
  - **Timeline:** This is a multi-phase project. The first phase will evaluate the system and communication requirements. The second phase will consist of upgrading the water meters (citywide) one zone at a time. This project is scheduled to begin 2013/14 and be completed 2017/18.
  - **Funding:** Overall costs for the project will come from water enterprise fees.

- **Surface Water Treatment Facility Phases I and II:** Phase I consists of preparing all necessary environmental documents to jointly expand or construct a new facility adjacent to the RBWTP, including the necessary pumping and distribution facilities. Phase I will also consist of design and construction of the ultimate pumping facilities and main trunk line to the City's distribution system and all related appurtenances. Phase II will consist of the design and construction of a new facility, with CCWD to treat the City's surface water supply to potable drinking water standards to accommodate the ultimate water consumption demands of the City. This is required to provide a safe, reliable source of potable water to the potable water customers of the City. Phase I of the project has been constructed and has been in service since spring 2006. Phase II began construction in fall 2006 and was substantially completed in fall 2008, with project administration and closeout remaining.
    - **Timeline:** This project is currently under way and pending closeout. Phase 1 is complete. Phase II will be scheduled based upon need at a later date.
    - **Funding:** The overall costs for this facility will be split by the water enterprise (60%) and water facility fees (40%).
- **Underground Water System Corrosion Mitigation:** This project will install cathodic protection systems on metallic water lines, valves, and fittings on fire hydrants, as required. Cathodic protection is an efficient and cost-effective method of protecting the buried metallic structure from either costly repairs or future replacement due to corrosive soils. This project will reduce and prevent the amount of emergency work on the water facilities due to ruptures caused by corrosion. This project will also minimize the amount of water lost each year due to leakage from corrosion.
    - **Timeline:** This project is currently in the design phase and projected to begin construction in 2013/14.
    - **Funding:** The overall costs for this facility will be split by the water enterprise and water facility fees.
- **Water Distribution Supervisory Control and Data Acquisition (SCADA) System Upgrade:** This project involves the addition of a SCADA monitoring station and an upgrade of the SCADA Alarm and iFIX operating system from version 3.5 to version 5.0. This will include the iFIX Plus SCADA Pak Unlimited Developer version 5.0 for two SCADA monitoring stations. Update programming on Programmable Logic Controller's to allow data to be efficiently stored in the SCADA system's data concentrator. The SCADA software currently used by the City, iFIX version 3.5, is out of date and no longer supported by the manufacturer. Upgrading to SCADA Alarm and iFIX 5.0 is necessary to ensure that SCADA continues to operate correctly and efficiently. Programmable Logic Controller data will be used to produce auto-generated production reports. Upgrading the software will bring the SCADA system up to date and provide needed technical support for the SCADA Alarm and the iFIX operating system. Adding the additional SCADA workstation will provide the needed redundancy in the event the current SCADA workstation fails or needs repair.
    - **Timeline:** Complete.
    - **Funding:** The overall costs for this project will come from water enterprise fees.
- **Water Distribution System Rehabilitation:** This project involves the replacement of leaking or non-operable valves, the installation and construction of tie-ins and loops, and the

installation and repair of fire hydrants, air reducing valves and sample stations, as well as other distribution system components. Improvements to the distribution system are required to ensure delivery of water in compliance with state and federal water quality regulations. This project allows the City to be proactive in water distribution system maintenance and repair, thereby reducing water loss within the City. Project improvements will reduce service requests and customer complaints and improve flushing and shutdown capabilities. Efforts will focus on older valves that may be broken or damaged.

  - **Timeline:** This project is currently in the construction phase and ongoing.
  - **Funding:** The overall costs for this project will come from water enterprise fees.

- **Water System Connections/Regulating:** This project involves the installation of additional connections throughout the City, including across the Union Pacific Railroad, Marsh Creek, and the State Route 4 Bypass, to ensure an adequate flow of water throughout the City. It also involves the installation of pressure regulating stations, zone cross connections, and flow monitoring stations to stabilize water pressure and volumes in specific water zones during peak demand. This project is necessary to ensure adequate flow between the City's potable water wells, reservoirs, and end users. This project will also minimize pressure drops during peak demands, ensure that adequate fire flow is maintained, and provide a “looped” system to safeguard water quality. This project is intended to improve water flow throughout the City and stabilize volumes and pressure during peak demands by increasing the number and diameter of transmission mains throughout the City, including across the railroad, Marsh Creek, and the State Route 4 Bypass, as well as installing pressure-regulating stations and zone cross connections.
  - **Timeline:** This project is currently under way and projected for completion in 2014.
  - **Funding:** This project is funded by facility fees because of the potential impact new development can have on the potable water system.

- **Zone I Equalization Storage Reservoirs:** A series of buried equalization basins, totaling 10 million gallons of storage, will be constructed in multiple phases. Each phase will consist of a buried, reinforced concrete reservoir; piping; pumps and related equipment; electrical services; and control systems. System storage capacity, among other things, provides the equalization volume required to accommodate maximum water consumption periods throughout the day. All of the City’s existing storage capacity is located on the western edge of the City because of the hilly terrain (typically, water reservoirs are elevated above the service area and rely upon gravity for flow). Adequate locations for additional Zone I reservoirs are currently not available within the city limits; therefore, buried equalization basins are proposed on the eastern edge of the City.
  - **Timeline:** It is proposed that these basins be constructed in phases, as water demands dictate, and re-evaluated on an annual basis to determine when it is most advantageous to construct each reservoir. This project is currently under way and projected to be constructed by 2015.
  - **Funding:** The overall costs for this project will come from water facility fees.

The following projects from the Wastewater Improvements section of the City’s capital improvement program are relevant to this UWMP. The most relevant items involve existing and proposed reclaimed water pipes and the City WWTP expansion and capacity improvements.

- **Neroly Road Recycled (Reclaimed) Water Conversion:** Construct 3,500 feet of 10-inch raw water line along Neroly Road and 2,400 feet of 8-inch raw water line along the Union Pacific Railroad, with the necessary appurtenant structures. The landscape along this stretch of roadway is currently using potable water. By converting to raw water, the City can reduce the cost of landscape irrigation and conserve potable water. This potable water can further be used to meet peak demands in summer and reduce water purchases and treatment costs. It will be beneficial for the City for long-term planning and resources to convert potable water for landscape irrigation whenever possible. O'Hara Avenue has a raw water line that terminates at Neroly Road, and more recycled water will become available from the City WWTP for use.
    - **Timeline:** This project will begin once funds are allocated.
    - **Funding:** This project is currently unfunded.
- **Recycled Water Distribution System—Phase II:** This project involves the installation of a trunk, a reclaimed (raw) water system (12 to 20 inches in diameter), booster pump stations, and storage reservoirs. In addition, irrigation conversions would be made to irrigate golf courses, parks, parkways, and medians citywide. This project is required as a part of the City's urban water conservation plan to minimize the use of potable water for irrigation purposes. The City is exploring and implementing options ranging from increased use of reclaimed water from the WWTP to using raw water from ECCID, where available, for irrigation purposes.
    - **Timeline:** This project is currently underway.
    - **Funding:** This project is funded through wastewater facility fees. However, the City is concurrently looking for state and federal grant funding, development contributions, and possibly zero- or low-interest loans from the state to accelerate the construction of this project as well as the other phases of the raw system.
- **Recycled Water Distribution System—Phase III**: This project involves the installation of a trunk and a reclaimed (raw) water system throughout the City to provide reclaimed water for irrigation at golf courses, parks, parkways, medians, and other applicable uses. This is the third and final phase of the raw water distribution system. Several cost-effective facilities were installed with Phases I and II. This final phase encompasses various improvements and provides distribution facilities to remote areas. However, it may not be cost effective to provide service to all areas.
    - **Timeline:** This project is scheduled to begin in 2014/15.
    - **Funding:** This project represents a placeholder should state or federal funding become available. The City is actively seeking state and federal grant funding and development contributions for the construction of this project as well as the other phases.
- **Wastewater Treatment Plant Expansion—Phase II:** The existing 5 mgd tertiary treatment facility was planned and constructed to accommodate future expansion, up to 10 mgd, by adding oxidation ditches and secondary clarifiers, converting chlorine contact facilities to ultraviolet disinfection, and installing filters and all related appurtenances. The plant is capable of being expanded in 2.5 mgd increments. Therefore, based on the growth rate in the City and the final build out population, the Phase II project could expand to 7.5 mgd, with the ultimate 10 mgd reached under Phase III. This project is necessary to keep the City in compliance with stringent discharge requirements. The expansion will also accommodate planned and approved development within the City.

- **Timeline:** This project is currently underway and is projected to be completed in 2015/16.
- **Funding:** Funding for this project includes wastewater facility fees, the Wastewater Enterprise Fund, and the State Revolving Fund Loan.

Chapter 6

Water Supply Reliability and Water Shortage Contingency Planning

Water Supply Reliability

The surface water supply reliability results from a pre-1914 water right purchased from ECCID, giving the City first rights to 14,800 acre-feet (4,823 million gallons) per year. The City's contract with CCWD to treat its surface water supply at the COBWTP and RBWTP is only limited by the ECCID entitlement of 14,800 acre-feet.

Contra Costa County does not regulate groundwater pumping with water rights. Environmental factors, such as drought conditions, and water quality factors, such as groundwater contamination, can affect the availability of supply, however. Although current groundwater levels and raw water delivery rates are assumed to be constant for this 2010 UWMP, the City is aware that future conditions may vary. It is prepared to adaptively manage any changes that may occur because of extended drought or potential effects of climate change.

Table 6-1 describes legal, water quality, and climatic factors that may affect the reliability of the water supply for the City.

Table 6-1 (DWR Table 29). Factors Resulting in Inconsistency of Supply

Table 29 Factors Resulting in Inconsistency of Supply							
Water Supply Sources[1]	**Specific Source Name (if any)**	**Limitation Quantification**	**Legal**	**Environmental**	**Water Quality**	**Climatic**	**Additional Information**
Purchased from CCWD (RBWTP) (treated surface water)	Raw Water (ECCID)	The City has purchased a permanent capacity of right of 6 mgd at the RBWTP	Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	
Supplier-Produced Surface Water (COBWTP)	Raw Water (ECCID)	Portion of contracted 4,823 million gallons per year (13.2 mgd). Plant capacity = 15 to 30 mgd	Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	
Raw Water	Roddy Ranch Pump Station		Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	East Contra Costa Canal Irrigation shutdowns and water supply will be coordinated between the City and ECCID as required.
Supplier-Produced Groundwater	San Joaquin Groundwater Basin	1,625 million gallons per year (4.5 mgd)	Water Rights		High TDS and nitrate levels could compromise supply.	None	
Recycled Water	City WWTP	5–10 mgd	Master Reclamation Permit Requirements		If tertiary-level water quality requirements are not met, flows are sent to reclamation ponds for analysis.	None	Recycled water irrigation may affect groundwater quality. Groundwater studies are conducted at golf courses prior to recycled water irrigation.
[1] From DWR Table 16.							

Water Quality Effects on Water Supply Reliability

This section describes how water quality may affect the City's water management strategies and discusses supply reliability for surface water, groundwater, and recycled water deliveries.

Surface Water

Water quality fluctuates throughout the year, as well as from year to year, for each of the three surface water sources from the Contra Costa Canal (Old River, Middle River, and Rock Slough). Raw water from the Delta is considered a high-quality source and characterized by low to moderate levels of turbidity, minerals, and natural organic matter. Pathogenic organisms are typically low as well (City of Brentwood 2005). Water from the Contra Costa Canal is routinely monitored for pesticides and other contaminants (e.g., synthetic organic compounds, nitrate, radionuclides, perchlorate, arsenic, etc.); however, these regulated compounds are typically not detected in Delta water supplied via the Contra Costa Canal. Because of weather variations, storm events, and diurnal patterns, water quality in the Contra Costa Canal can vary seasonally, daily, or even hourly. The variation in water quality is partially compensated by changing the flow rates of the various intake sources along the canal.

The RBWTP and the COBWTP are able to treat changing raw water quality with consistent results. For example, the existing facilities can respond to changes in raw water turbidity or other quality changes. All current standards for treated water from the RBWTP and the COBWTP, as stipulated in the waste discharge requirements from the Central Valley Regional Water Quality Control Board (Order No. R5-2007-0048), are being met.

Groundwater

Groundwater is treated with chloramines at the wellheads and pumped to the distribution system directly. Water quality in the City aquifer is adequate, but the water does have relatively high levels of TDS, chlorides, and nitrate. TDS in the groundwater is high, up to 798 milligrams per liter (mg/L) (City of Brentwood 2006b). However, this is below California's maximum contaminant level of 1,000 mg/L. The occurrence of nitrate in groundwater in this area has generally been attributed to agricultural influences. However, the occurrence is limited to the upper sequences of aquifer materials. The nitrate concentrations decline appreciably for wells 200 feet or more below the ground surface. The City's seven active wells are below 20 parts per million; an inactive well (Well 11) is above 20 but still below the limit of 45 parts per million. Chloride and TDS concentrations also decline with depth but less notably than nitrate concentrations. The decline suggests local anthropogenic influences on TDS, chloride, and other constituents in addition to nitrate. As shown in Table 3-2, two of the nine permitted wells are not in use because of issues related to water quality (i.e., one does not currently have a disinfection system [Well 9], and the other has high nitrate concentrations [Well 11]).

After delivery to the City's distribution system, treated surface water is blended with chloraminated groundwater from City wells. The City adjusts pH levels with liquid sodium hydroxide to maintain the pH in the finished water from the COBWTP between 7.7 and 8.0 units. These pH adjustments reduce the corrosive effects of treated surface water from the COBWTP on pipes and plumbing fixtures after blending operations. It is a safe and economical way for the City to maintain good water quality (City of Brentwood 2005).

Recycled Water

The City WWTP is capable of producing high-quality tertiary effluent that complies with California Water Code Title 22 recycling criteria. The WWTP system consists of screening, grit removal, oxidation and nitrification (by extended aeration of activated sludge), denitrification (by anoxic basins), coagulation, tertiary treatment filtration, chlorination, and dechlorination.

Table 6-2 summarizes the potential water quality impacts on water supplies. The only impact resulting in a volume change is groundwater related because of two inactive wells with a combined capacity of approximately 10 million gallons per year.

Table 6-2 (DWR Table 30). Water Quality (current and projected water supply impacts)

Table 30 Water Quality (current and projected water supply impacts)							
Water source	**Description of Condition**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Groundwater	High TDS, chlorides, and nitrates	-10	-10	-10	-10	-10	-10
Surface Water	Salinity/turbidity	0	0	0	0	0	0
Recycled Water	Tertiary-level standards	0	0	0	0	0	0
Units: million gallons per year.							

Water Shortage Contingency Planning

This section describes emergency preparedness plans that would be implemented in the event of a catastrophic reduction in water supplies and the City's mandatory prohibitions against specific water use practices during water shortages. A copy of the City's Draft Water Shortage Contingency Resolution and Water Shortage Contingency Plan are in Appendix E.

Catastrophic Supply Interruption Plan

CWC Section 10632(c) requires certain actions to be undertaken by the water supplier during a catastrophic interruption in water supplies. To that end, the City has a water quality emergency notification plan in place to coordinate the overall response to a disaster. A catastrophic event resulting in a water shortage would be any event, either natural or man-made, with severity equal to or greater than Stage III or Stage IV (severe or critical drought) water supply shortage conditions. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages. Examples of such events are earthquakes, regional power outages, floods, and fires. To ensure preparedness, facilities in the City are inspected annually for earthquake safety. Furthermore, the City has budgeted for or installed auxiliary generators and made improvements to water storage facilities as part of the annual construction process to prevent a loss of these facilities during an earthquake or any disaster that would cause a power outage.

Table 6-3 describes the actions taken to address each catastrophic event.

Table 6-3. Catastrophic Supply Interruption Actions

Potential Catastrophic Event	Summary of Actions
Earthquake/Fault Rupture, Liquefaction	Emergency response plan procedures would be implemented. The City would ensure that any damaged sections of the distribution system would be isolated, customers would be notified of the need to reduce use, backup generators would be used for groundwater pumping, and the water supply would be supplemented by using stored surface water supplies from the City's five reservoirs.
Regional Power Outage	Customers would be notified of the need to reduce use, and backup generators would be used for groundwater pumping.
Flooding/Levee Breach/ Dam Failure	Emergency response plan procedures would be implemented. Depending on the level of flooding, flooded areas would be isolated to minimize the size of the area affected by the event; customers may be evacuated.
Fire	Affected customers would be notified and voluntary and mandatory rationing would be implemented in affected areas, if necessary.

Mandatory Prohibitions during a Water Shortage

CWC Section 10632(d) requires mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. Table 6-4 identifies mandatory prohibitions and the stages during which the prohibitions would be voluntary or mandatory. Where there is no stage number, the action is voluntary. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages.

Table 6-4 (DWR Table 36). Water Shortage Contingency (mandatory prohibitions)

Table 36 Water Shortage Contingency (mandatory prohibitions)	
Examples of Prohibitions	**Stage When Prohibition Becomes Mandatory**
Cleaning sidewalks, streets, walkways, parking areas, patios, porches, or verandas	III, IV
Washing cars	II, III, IV
Watering lawns/landscaping	II, III, IV
Non-permanent agriculture	II, III, IV
Uncorrected plumbing leaks	II, III, IV
Gutter flooding	III, IV
Cleaning/filling/operating/maintaining water levels in non-recycling decorative fountains	II, III, IV

Consumption-Reduction Methods

Each urban water supplier has a choice regarding the types of consumption-reduction methods to use in its water shortage contingency analysis. The methods must be appropriate for the area and capable of reducing water use by up to 50%. CWC Section 10632(e) requires the water supplier to implement consumption-reduction methods during the most restrictive stages of a water shortage.

The City will implement the consumption-reduction methods listed in Table 6-5. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages.

Table 6-5 (DWR Table 37). Water Shortage Contingency (consumption-reduction methods)

Table 37 Water Shortage Contingency (consumption-reduction methods)		
Consumption-Reduction Methods	**Stage When Method Takes Effect[1]**	**Projected Reduction (%)**
Demand-Reduction Program	All	10%–50%
Reduce Pressure in Water Lines	N/A	
Flow Restriction	III, IV	35%–50%
Restrict Building Permits	N/A	
Restrict Use for only Priority Uses	II, III, IV	20%–50%
Use Prohibitions	II, III, IV	20%–50%
Water Shortage Pricing	N/A	
Per Capita Allotment by Customer Type	III, IV	35%–50%
Plumbing Fixture Replacement	All	10%–50%
Voluntary Rationing	II	20%
Mandatory Rationing	III, IV	35%–50%
Incentives to Reduce Water Consumption	N/A	
Excess Use Penalty	III, IV	35%–50%
Water Conservation Kits	All	10%–50%
Education Program	All	10%–50%
Percentage Reduction by Customer Type	III, IV	35%–50%
[1] N/A (not applicable) indicates that this method will not be implemented by the City as a water shortage contingency.		

Penalties or Charges for Excessive Use

CWC Section 10632(f) requires a water supplier to penalize or charge for excessive water use, when applicable. The City, after one written warning, shall install a flow-restricting device on the service line of any customer who is observed by City personnel using water for a non-essential or unauthorized use, as defined by City ordinance.

An excess-use penalty (i.e., per 1,000 gallons] of water used in excess of the applicable allocation during each billing period) shall be charged by the City for all service rendered on or after the effective date of an ordinance. Repeated violations of unauthorized water use will result in a termination of water service. Penalties and charges, as well as the stage during which they take effect, are displayed in Table 6-6.

Table 6-6 (DWR Table 38). Water Shortage Contingency (penalties and charges)

Table 38 Water Shortage Contingency (penalties and charges)	
Penalties or Charges	**Stage When Penalty Takes Effect[1]**
Penalty for Not Reducing Consumption	III, IV
Charge for Excess Use	III, IV
Flat Fine	N/A
Charge per Unit over Allotment	III, IV
Flow Restriction	III, IV
Termination of Service	III, IV
[1] N/A (not applicable) indicates that this penalty or charge will not be implemented by the City as a water shortage contingency.	

Revenue and Expenditure Impacts during Shortages

CWC Section 10632(g) requires an analysis of the impacts of each action taken for conservation and water restriction on the revenues and expenditures of the water supplier. The City will establish record of accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. Currently, the City operates on a no-profit basis; revenue generated from water sales and fixed fees is used to cover the cost of operation including overhead (City of Brentwood 2007b and 2007c). The City imposes fixed fees for each connection it distributes water to, the revenue generated by these fixed fees, or fixed revenue, will not change during drought conditions as these fees will stay in place. However, the amount of revenue generated through water sales will vary during drought conditions, and thus is referred to as variable revenue. To determine the economic impacts of water shortage on the City's budget, average revenue over a four year period was considered (fiscal years 2004/2005 – 2007/2008) as representative of typical conditions; the average annual revenue generated during this time was approximately $14,348,000.

State law requires the City of Brentwood to set rates sufficient to cover operating expenses for the water and wastewater enterprises involving debt service and to provide funds for the replacement of facilities. It does this by examining operational costs, material and supply costs, debt services, normal additions and replacements of the existing system, administrative costs and capital improvement programs and then distributes these costs appropriately among the purchasers of water and wastewater customers. The City reviews its revenue and expenditures related to water on an annual basis and uses annual trends to adjust customer water rates on a periodic basis through the development of a rate study. The City will continue this review and adjustment of revenue with the goal of continuing to meet the needs of its customers and residents.

A reduction in water supply would reduce revenue generated through water sales and add additional financial burden due to the implementation of water use reduction measures. An approximation of the reduction in revenue expected at various reductions in water use is summarized in Table 6-7. The estimated values shown in the table assume that the specified reduction in water consumption occurs for an entire fiscal year. The values shown in Table 6-7 are based on hypothetical situations of year-long water shortages.

Table 6-7. Breakdown of Expected Financial Impact Due to Water Shortage

Expected Financial Impact Type	Percent Water Sales Reduction			
	10%	20%	35%	50%
Estimated Revenue Reduction (Loss) [from reduced variable income]	($997,925)	($1,995,855)	($3,492,740)	($4,989,630)
Estimated Additional Operating Cost (Loss) [from increased demand of staff]	$0	($75,000)	($225,000)	($225,000)
Estimated Cost of Implementing Conservation Measures (Loss)	($165,330)	($165,330)	($325,330)	($325,330)
Total Estimated Revenue Loss (S)	($1,163,255)	($2,236,185)	($4,043,070)	($5,539,960)
Total Estimated Revenue Loss (as % of average annual income)	(8.1%)	(15.6%)	(28.2%)	(38.6%)

The table demonstrates that reduction in water use results in at least a temporary deficit in revenue. To offset the financial impacts of a reduction in water use, the City may impose a surcharge during reduced water consumption. CWC Sections 350-359 allow the governing body of a public water supply to declare a water shortage emergency at times when the governing body determines that water demand cannot be met without depleting the water supply to a detrimental level. The code further specifies that after an emergency condition of water shortage has been established, the governing body can adopt regulations and restrictions regarding the delivery and consumption of water. Therefore, to impose a surcharge on water delivery the City would first have to declare a water shortage emergency. Once the City has declared a water shortage emergency a water surcharge could be imposed to offset reduced revenue. The City is in the process of adopting a new municipal code that allows the City to adopt any necessary rules or regulations in accordance with CWC Sections 350-59 in the event of a water shortage emergency caused by drought or other circumstance.

As Table 6-7 demonstrates, any reduction in water consumption below normal results in a deficit. The reduction in consumption is not directly proportional to the reduction in revenue, as the City imposes both fixed and variable fees. A 10% reduction in consumption for an entire year results in an 8.1% reduction in revenue; the City anticipates that should such a reduction occur, the deficit may be offset through budgetary means, such as delaying improvement projects, delaying salary increases, and reductions in purchase water, without the need to impose surcharges. Reductions in water consumption of 20%, 35% and 50% result in 15.6%, 28.2%, and 38.6% annual budget deficit, which result in large enough impacts on revenue to trigger the need for additional means, such as surcharges, to address revenue shortfalls.

As previously mentioned, the values shown in Table 6-7 are based on hypothetical situations of year-long water shortages. Should an actual water shortage occur, the City will work to address any budget deficit internally first prior to applying a surcharge. If a surcharge is necessary, the City will work diligently to determine the minimum surcharge required that will allow the City to continue to deliver safe, clean water to its customers.

Draft Water Shortage Contingency Ordinance

Should drought conditions warrant mandatory reductions during Stage II of a water supply shortage, the City may adopt and implement an ordinance for mandatory conservation as well as a water restriction plan (see Table 6-10 and the associated discussion below for definitions of the water supply condition stages). This ordinance may require additional tariffs for the City to enforce the plan. The ordinance may address prohibitions on various wasteful water uses, including washing sidewalks and driveways with potable water, cleaning or filling decorative fountains, or allowing plumbing leaks to go uncorrected for more than 72 hours. Any ordinance that is imposed would be established after a water shortage emergency has been declared.

Drought Planning

This section describes the stages pertaining to actions that will be implemented in the event of a water supply shortage.

Water-Year Types

CWC Section 10632(i) requires the reliability of the water supply as well as its vulnerability to seasonal or climatic shortages to be described for each of the following water-year types:

- **Average water year**: A year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.
- **Single dry water year**: Generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.
- **Multiple dry water years**: Generally considered to be the lowest average runoff for a consecutive multiple-year period (i.e., 3 years or more) for a watershed since 1903. For example, 1928–1934 and 1987–1992 were the two multi-year periods of lowest average runoff during the 20th century in the Central Valley. Suppliers should determine this for each watershed from which they receive supplies.

The City has never had a single year or multiple dry years in which it did not pump 100% of its demand, regardless of regional hydrology. No reductions from normal-year supply are expected during single or multiple dry years. Therefore, a calculation to incorporate base years was not performed. However, appropriate base years for the City would be the same as they are for CCWD. These years are 1980 as an average year, 1961 as a single dry year, and 1989 to 1991 as multiple dry years. The basis for water-year data is shown in Table 6-8.

Table 6-8 (DWR Table 27). Basis for Water-Year Data

Table 27 Basis for Water-Year Data	
Water-Year Type	**Base Year(s)**
Average Water Year	1980
Single-Dry Water Year	1961
Multiple-Dry Water Years	1989–1991

Table 6-9 summarizes historic water supply reliability for normal, single, and multiple dry water years. In each case, the total available volume was the sum of the existing capacity of all water supplies.

Table 6-9 (DWR Table 28). Supply Reliability (historic conditions)[1]

Table 28 Supply Reliability (historic conditions)[1]					
	Single Dry Water Year	**Multiple Dry Water Years**			
		Year 1	**Year 2**	**Year 3**	**Year 4**
Average/Normal Water Year	16,010	16,010	16,010	16,010	16,010
Percent of Average/Normal Year	100%	100%	100%	100%	100%
Units: million gallons per year [1] Supply reliability in table includes both surface and groundwater sources.					

Stages of Action for Water Supply Shortages

In accordance with CWC Section 10632(a), the City has developed four stages of action to be taken in response to water supply shortages, including a reduction in water supply by up to 50%. Specific water supply conditions are applicable to each stage. A stage of action will be implemented during water supply shortages according to shortage level, ranging from a 5% shortage (i.e., Stage I) to a 50% shortage (i.e., Stage IV). The stage determination and declaration during a water supply shortage will be made by the public works director. Table 6-10 describes the water supply shortage levels and stages.

Table 6-10 (DWR Table 35). Water Shortage Contingency—Rationing Stages to Address Water Supply Shortages

Table 35 Water Shortage Contingency (rationing stages to address water supply shortages)		
Stage No.	**Water Supply Conditions**	**Shortage**
I	Minor Drought	5%–10%
II	Moderate Drought	10%–20%
III	Severe Drought	20%–35%
IV	Critical Drought	35%–50%

Stage I

During Stage I, water alert conditions are declared and voluntary water conservation is encouraged. The City has an ongoing public information campaign that relies on the distribution of literature, speaking engagements, bill inserts, and conservation messages in local newspapers and on the City's Water Conservation web page. The drought situation is explained to public and government bodies through these information campaigns. In addition, the City explains other stages, forecasts future actions, and requests voluntary water conservation. Educational programs in area schools are ongoing.

Stage II

During Stage II of a water supply shortage, the shortage is moderate (10% to 20%). Conservation may be voluntary, consist of allotments, and/or include mandatory conservation rules. The level of action increases with the level of shortage. The City aggressively continues its public information and educational programs. The City asks for a 10% to 20% water use reduction, either voluntary or mandatory. If necessary, the City also supports the passage of drought ordinances.

Stage III

During Stage III of a water supply shortage, the shortage is considered severe (20% to 35%). Conservation consists of allotments and mandatory conservation rules. This phase becomes effective upon notification by the City that water usage is to be reduced by a mandatory percentage. The City adopts drought ordinances and implements mandatory reductions. Rate changes are implemented to penalize excess usage.

Under Stage III, water use restrictions are put into effect (e.g., restrictions pertaining to the number of daytime hours for watering, excessive watering that results in gutter flooding, hoses without shutoff devices, non-recycling fountains, and washing down sidewalks or patios). The City monitors production weekly for compliance with the necessary reductions. If a customer consistently abuses his or her water use, the City responds by installing a flow restrictor at the water meter.

Stage IV

During Stage IV of a water supply shortage, the shortage is critical (35% to 50%). Conservation consists of allotments and mandatory conservation rules. All steps taken in prior stages are intensified, and water deliveries are monitored daily for compliance with the necessary reductions.

Three-Year Minimum Water Supply

The UWMP Act requires the City to quantify the minimum water supply available for the next 3 years based on the driest 3-year historic sequence for the water supply. Based on historic groundwater and surface water conditions, the City's 3-year minimum supply, as shown in Table 6-11, will equal 100% of the average water-year supply for the next 3 years. The exception is recycled water demand, which can produce approximately 96% of the WWTP capacity, which is 1,630 million gallons per year. Demand and supply for 2011–2013 includes water conservation measures.

Table 6-11 (DWR Table 31). Supply Reliability (current water sources)

Table 31 Supply Reliability (current water sources)				
Water Supply Sources[1]	Average/Normal Water-Year Supply[2]	Multiple Dry Water-Year Supply[2]		
		2011	2012	2013
Purchased Surface Water (RBWTP)	563	563	563	563
Supplier-Produced Surface Water (COBWTP)	1,704	1,704	1,704	1,704
Purchased Raw Water (ECCID)	397	397	397	397
Supplier-Produced Groundwater	1,152	1,152	1,152	1,152
Recycled Water (WWTP)	1,630	1,630	1,630	1,630
Percent of Normal Year	**100%**			

Units: million gallons per year.
[1] From DWR Table 16.
[2] See DWR Table 27 for basis of water-type years.

Mechanisms for Determining Actual Reductions

CWC Section 10632(i) requires the water supplier to develop a mechanism for determining actual reductions in water use in the course of carrying out the urban water supply shortage contingency analysis. Under average water-year supply conditions, water production figures are recorded daily within and monitored by the water production supervisor during normal water supply conditions. Totals are reported monthly and incorporated into water supply reports. The City maintains extensive water use records on individual customer accounts. Exceptionally high usage is identified at meter reading time by the City's electronic meter reading management system. These accounts are investigated for potential water loss or abuse problems. During all stages of water shortages, daily production figures are reported to, and monitored by, the water production supervisor daily.

Water Supplies and Demand Assessment

The comparison of current and projected water supply and demand demonstrates the ability of a supplier to accommodate a City's water demands during an average water year as well as those years with water shortages. Water supply is described in Chapter 5, and water demands are described in Chapter 4.

Tables 6-12 through 6-14 summarize the projected average water supply and projected average water demand. As shown in the tables, the supply is not reduced for the different dry water year types. This is because of the fact that in the past, even in drought years, the City has always maintained sufficient supplies to meet demands due to their ECCID pre-1914 water rights. The City also has additional groundwater supplies as a source of water supply reliability. Should future water supply conditions change, it is possible that demand will also be reduced due to excess water use fees and the City will manage the supply to meet necessary demands. .

Table 6-12 (DWR Table 32). Supply and Demand Comparison (average year)

Table 32 Supply and Demand Comparison (average year)					
	2015	2020	2025	2030	2035 (optional)
Supply Totals (from DWR Table 16)	3,905	4,180	4,192	4,689	5,023
Demand Totals (from DWR Table 11)	3,768	3,754	4,125	4,345	4,125
Difference	137	426	66	344	898
Difference as % of Supply	3.5%	10.2%	1.6%	7.3%	17.9%
Difference as % of Demand	3.6%	11.4%	1.6%	7.9%	21.8%
Units: million gallons per year.					

Table 6-13 (DWR Table 33). Supply and Demand Comparison (single dry year)

Table 33 Supply and Demand Comparison (single dry year)					
	2015	2020	2025	2030	2035 (optional)
Supply Totals[1,2]	3,905	4,180	4,192	4,689	5,023
Demand Totals[2,3,4]	3,768	3,754	4,125	4,345	4,125
Difference	137	426	66	344	898
Difference as % of Supply	3.5%	10.2%	1.6%	7.3%	17.9%
Difference as % of Demand	3.6%	11.4%	1.6%	7.9%	21.8%
Units: million gallons per year. [1] Consider the same sources as in DWR Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water. [2] Provide in the UWMP text that discusses how single-dry-year water supply volumes were determined. [3] Consider the same demands as in DWR Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water. [4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.					

Table 6-14 (DWR Table 34). Supply and Demand Comparison (multiple dry-year events)

Table 34 Supply and Demand Comparison (multiple dry-year events)						
Multiple-Dry Year		**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
First-Year Supply	Supply Totals[1,2]	3,905	4,180	4,192	4,689	5,023
	Demand Totals[2,3,4]	3,768	3,754	4,125	4,345	4,125
	Difference	137	426	66	344	898
	Difference as % of Supply	3.5%	10.2%	1.6%	7.3%	17.9%
	Difference as % of Demand	3.6%	11.4%	1.6%	7.9%	21.8%
Second-Year Supply	Supply Totals[1,2]	3,905	4,180	4,192	4,689	5,023
	Demand Totals[2,3,4]	3,768	3,754	4,125	4,345	4,125
	Difference	137	426	66	344	898
	Difference as % of Supply	3.5%	10.2%	1.6%	7.3%	17.9%
	Difference as % of Demand	3.6%	11.4%	1.6%	7.9%	21.8%
Third-Year Supply	Supply Totals[1,2]	3,905	4,180	4,192	4,689	5,023
	Demand Totals[2,3,4]	3,768	3,754	4,125	4,345	4,125
	Difference	137	426	66	344	898
	Difference as % of Supply	3.5%	10.2%	1.6%	7.3%	17.9%
	Difference as % of Demand	3.6%	11.4%	1.6%	7.9%	21.8%

Units are in acre-feet per year.
[1] Consider the same sources as in DWR Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.
[2] Provide in the UWMP text that discusses how single-dry-year water supply volumes were determined.
[3] Consider the same demands as in DWR Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.
[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Chapter 7
Demand Management Practices

Water conservation is a method available to reduce water demands, thereby reducing water supply needs for the City. This chapter describes the City's water conservation program, including water conservation demand management measures (DMMs). DMMs are specific actions a water supplier takes to support its water conservation efforts.

California Urban Water Conservation Council

The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by DWR, water utilities, environmental organizations, and other interested groups to develop a list of 14 DMMs for conserving water, as identified in the UWMP Act (CWC Section 10631(f)). This consensus-building effort resulted in the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, as amended September 16, 1999, among parties, which formalizes an agreement to implement these DMMs and makes a cooperative effort to reduce the consumption of California's water resources. The MOU is administered by the CUWCC. The City is currently an MOU signatory. The MOU requires a water utility to implement only the DMMs that are economically feasible. If a DMM is not economically feasible, the utility may request an economic exemption for that DMM. The DMMs in the MOU are generally recognized as standard definitions for water conservation measures. The 14 DMMs are as follows:

1. Water survey programs for single-family and multi-family residential connections.
2. Residential plumbing retrofit.
3. System water audits and leak detection and repair.
4. Metering with commodity rates for all new connections and retrofitting of existing connections.
5. Large landscape conservation programs and incentives.
6. High-efficiency washing machine rebate programs.
7. Public information programs.
8. School education programs.
9. Conservation programs for commercial, industrial, and institutional accounts.
10. Wholesale agency programs.
11. Conservation pricing.
12. Water conservation coordinator.
13. Water waste prohibition.
14. Residential ultra low-flow toilet replacement programs.

These 14 DMMs correspond to the 14 BMPs listed and described in the CUWCC MOU, which signatory water suppliers commit to as part of their urban water conservation programs. These 14

DMMs also correspond to the DMMs identified in Assembly Bill 1420, DMM Implementation Compliance. DWR has consulted with the CUWCC and appropriate funding agencies and determined that DMMs will be equated with the BMPs described in the CUWCC MOU for loan and grant funding eligibility purposes. Therefore, for the UWMP process, DMMs and BMPs will be referred to interchangeably as DMMs/BMPs. The CUWCC has reorganized its BMPs to group them according to type. Although BMP names and the overall organization have been modified, they still correlate to the DMMs identified in the UWMP Act.

Water Conservation Program

Water Conservation Program

The City conducts an ongoing water conservation program. A description of each DMM that is currently being implemented or scheduled for implementation, an implementation schedule, and a method to evaluate effectiveness is provided in this section. Several of these DMMs relate to the future water projects described in Chapter 5.

Table 8-1. Demand Management Measures Currently being Implemented or Scheduled for Implementation, Implementation Schedule, and Method to Evaluate Effectiveness

DMM 1	Water survey programs for single-family and multi-family residential connections
Year Implemented	**2005**
Description	The City conducts residential water use surveys as a free service to assist residents of single-family and multi-family units with identifying possible areas of water waste inside and outside their homes and educate them about water conservation techniques. Residential water use surveys consist of annual water audits, water use reviews, and surveys of past program participants. Audits are conducted by trained auditors and may include low-flow device installation. Auditors will identify water use problems, recommend repairs, and offer instruction regarding landscape principles, irrigation timer use, and, when appropriate, meter reading. To provide further program incentives, the City is offering a free 1.5-gallon-per-minute showerhead for scheduling a residential water use survey.
Implementation Steps	• City staff reviews online request forms submitted by residents and schedules a survey. • Survey is conducted by the City. • Survey results are entered into a database and provided to customers via mail.
Implementation Schedule	Ongoing. The City conducts such surveys annually upon request.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by analyzing program penetration and comparing an audited customer's prior water use with future water use.
Conservation Savings and Effects on Future Reductions	A 10% water use reduction per household has been recorded as a result of these surveys. Future surveys will result in a water use reduction in the single-family and multi-family residential sectors.

DMM 2	Residential plumbing retrofit
Year Implemented	**2010**
Description	Plumbing retrofits at existing residential accounts consists of providing low-flow (1.5-gallon-per-minute) showerheads, faucet aerators, and toilet leak-detection tablets to customers. Because more than 75% of construction in the City occurred after 1992, most plumbing fixtures are ultra low-flow units. Remodeling and equipment replacement will upgrade older installations.
Implementation Steps	• As mentioned in DMM 1, the City offers a free 1.5-gallon-per-minute showerhead for scheduling a residential water use survey.
Implementation Schedule	The City provides a free low-flow showerhead to residents during a scheduled residential water use survey.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by taking into consideration the number of customers who install low-flow showerheads and comparing an audited customer's prior water use with future water use.
Conservation Savings and Effects on Future Reductions	This DMM will result in a water use reduction in the single-family and multi-family residential sectors in the future. Savings resulting from this DMM may be linked to savings resulting from DMM 1.

DMM 3	System water audits and leak detection and repair
Year Implemented	**2005**
Description	A system water audit and leak detection and repair program consists of ongoing leak detection and repair within the water distribution system, with a focus on the high-probability leak areas. This program will also include an ongoing meter calibration and replacement program for all production and distribution meters. The existing Downtown Infrastructure project in the Future Water Projects section of Chapter 5 is an example of a project under this DMM.
Implementation Steps	• This DMM involves several different projects. All water audit information is maintained.
Implementation Schedule	The City conducts this program annually.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by tracking leak detection and repair and comparing prior water use with future water use.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM are expected to be 2% to 5% of total water use. Reductions will be reflected in the "other" water use sector volumes because that sector includes system losses.

DMM 4	Metering with commodity rates for all new connections and retrofitting of existing connections
Year Implemented	**2012**
Description	City meters serve both residential and non-residential connections. Currently, data are collected monthly using an automated meter reading system. The City plans to upgrade the existing Sensus automated meter reading system to an automated meter reading/advanced metering infrastructure fixed-base system. The new system will allow meter data to be recorded on an hourly basis. This will reduce water loss within the City because it will notify the staff of leaks, high consumption, and water theft when they occur and improve the effectiveness of the High-Usage Notification Program (DMM 11). See Sensus Automated Meter Reading System Upgrade in Chapter 5 for more detail.
Implementation Steps	• This is a multi-phase project. The first phase will evaluate system and communications requirements. The second phase will consist of upgrading the water meters (citywide) one zone at a time. The project should be completed within 4 years.
Implementation Schedule	To be completed by 2016.

DMM 4	Metering with commodity rates for all new connections and retrofitting of existing connections
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by comparing prior water use with future water use.
Conservation Savings and Effects on Future Reductions	This DMM could result in savings in all water use sectors because it is a programmatic system-wide upgrade.

DMM 5	Large landscape conservation programs and incentives
Year Implemented	**2008**
Description	Weather-Based Irrigation Controller Pilot Study: The irrigation controller assesses weather conditions and automatically adjusts the schedule to irrigate landscaping as needed. In an effort to reduce peak water usage, the City is conducting a pilot study to determine if weather-based irrigation controllers can effectively reduce irrigation water usage. The City is installing weather-based irrigation controllers for eligible residents who commit to participate in the pilot study for a minimum of 1 year. Weather-Based Irrigation Clocks: The City plans to provide financial incentives, such as rebates or replacement programs, to lower irrigation water use by offering rebates or replacement programs for SMART irrigation clocks that water based by management soil evapotranspiration, so fields are watered only when they need it. The City has applied for a regional grant with other water providers that could help fund this program. SMART irrigation clocks promote efficient irrigation water use and thus will reduce overall water use volumes.
Implementation Steps	• Identify all irrigation accounts as well as commercial, industrial, and institutional accounts with 1 acre or more of landscaping and record this information into a database. • Prepare irrigation educational information for all customers. • Review applications for pilot study participants. • Perform surveys with City staff or contractors.
Implementation Schedule	The pilot study is ongoing for those who want to participate.
Evaluation of DMM Effectiveness	Based on the City's study, annual water use was reduced by more than 20% at the homes tested. The effectiveness of this DMM will be evaluated by comparing prior water use with future water use of customers with large areas of landscaping.
Conservation Savings and Effects on Future Reductions	Annual residential landscape water use has already been reduced since the inception of the pilot study, and further reductions are expected as more weather-based irrigation controllers are installed.

DMM 6	High-efficiency washing machine rebate programs
Year Implemented	**2006**
Description	In collaboration with Pacific Gas and Electric, the City committed to a high-efficiency washing machine rebate program to promote this water-saving technology. The City offered washing machine rebates for four years utilizing several grants until the grant funds were depleted.
Implementation Steps	• Joined Pacific Gas and Electric's high-efficiency washing machine rebate program as a participating water agency.
Implementation Schedule	This program ended in January 2010, but the City may implement it again in the future. The City is also coordinating with other local agencies to obtain grant money for this program.
Evaluation of DMM Effectiveness	The effectiveness of this DMM was evaluated by analyzing program penetration and the estimated savings from high-efficiency washing machines. The City supported over 500 high-efficiency washing machine rebates during this four year period.
Conservation Savings and Effects on Future Reductions	This DMM would result in water use reductions primarily in the residential and commercial sectors if implemented in the future.

DMM 7	Public information programs
Year Implemented	**2005**
Description	Public information is an ongoing component of the City's water conservation program. The City currently produces bill inserts and news articles in the City's quarterly newsletter. The City plans to expand its web site to include conservation information. Water-Wise Landscape Information: This is an informational program available on a CCWD web site called Gardening in Contra Costa County (http://www.contracosta.watersavingplants.com/). The web site provides watering tips and information regarding irrigation schedules by soil type, water-saving plants, and other garden resources.
Implementation Steps	• Continually update customers on water conservation program activities and information via the City web site, newsletters, brochures, and other forms of media.
Implementation Schedule	The City's public information program is an ongoing annual program.
Evaluation of DMM Effectiveness	Savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future savings from this program cannot be directly quantified, but it would likely be reflected in total annual water use volumes.

DMM 8	School education programs
Year Implemented	**2005**
Description	School education is an ongoing component of the City's water conservation program. The program targets all grades, and includes offering Project WET workshops for teachers, performing classroom demonstrations, displaying booths at science fairs, providing assemblies. The City also promotes student participation, such as providing bus transportation for 4th graders, in the annual Public Works Open House.
Implementation Steps	• This is part of the City's public information program.
Implementation Schedule	The City's school education program is an ongoing annual program.
Evaluation of DMM Effectiveness	Savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future savings from this program cannot be directly quantified but would most likely be reflected in the commercial water use sector because it includes institutional and government water use.

DMM 9	Conservation programs for commercial, industrial, and institutional accounts
Year Implemented	**Projected 2014**
Description	The City will develop a conservation program for commercial, industrial, and institutional accounts that includes water audits targeted to the top water users. This program will also include surveys of past program participants to determine if audit recommendations were implemented.
Implementation Steps	• This will be an annual program in which the City will evaluate water use among individual commercial, industrial, and institutional accounts and determine which customers to target for water audits.
Implementation Schedule	Within 3 years, the City will commence this annual program.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by analyzing the number of water audits done each year and comparing the prior water use of commercial, industrial, and institutional accounts with future water use.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM will likely result in incremental decreases in water use in the commercial water use sector.

DMM 10	Wholesale agency programs
Year Implemented	
Description	This DMM is not applicable to the City because the City is not a wholesale agency.
Implementation Steps	
Implementation Schedule	
Evaluation of DMM Effectiveness	
Conservation Savings and Effects on Future Reductions	

DMM 11	Conservation pricing
Year Implemented	
Description	The City currently implements conservation pricing for all its metered customers. All of the City's customers are metered. Tiered rates are implemented for residential and commercial customers. High-Usage Notification Program: A notification program has been developed to identify homes that appear to use an above-average amount of water when compared with homes and lots of a similar size. If a resident's water usage is three times greater than the comparative average, a notification is sent to the resident, along with an invitation for a free residential water use survey. New meters (DMM 4) will help the City notify residents sooner about tier exceedances.
Implementation Steps	• The City's Water Conservation staff implements this program each quarter.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	The effectiveness of this DMM is evaluated according to the percentage and type of customers typically presented in the City's annual rate studies in each tier. Nearly half of all residential bills were at the Tier 1 rate of $2.50 per 1,000 gallons, the lowest variable consumption rate. However, non-residential usage figures show that the majority of the water sold is billed at the higher Tier 2 rate.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM are likely to be consistent with the change in tier rates each year. If no rate change occurs, the changes are not anticipated to be notable.

DMM 12	Water conservation coordinator
Year Implemented	**2005**
Description	The City has hired a conservation coordinator as an ongoing component of the City's water conservation program. The conservation coordinator is responsible for implementing and monitoring the City's water conservation activities.
Implementation Steps	• The City water conservation coordinator continually works with other staff and stakeholders to implement activities in the water conservation program.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	Water savings from this DMM cannot be directly quantified. Effectiveness of this DMM will be evaluated by the success of the City's water conservation program.
Conservation Savings and Effects on Future Reductions	Future savings as a result of this DMM will be difficult to quantify, but an overall reduction in annual water use will reflect the success of this program.

DMM 13a	Water waste prohibition
Year Implemented	**2010**
Description	Model Water-Efficient Landscape Ordinance: According to the Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881 [Laird]) the City adopted the State's Model Water-Efficient Landscape Ordinance on January 1, 2010 (Appendix D). This ordinance requires a landscape permit, plan check, or design review for new and rehabilitated landscaped areas of 2,500 square feet or greater. The City has been working to rewrite Municipal Code 17.630 (Landscaping and Screening ordinance adopted in 1992). This rewrite is scheduled to go to Council on June 14, 2011.
Implementation Steps	• The City will review landscape permit applications and grant permits.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	Water savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future water savings from this DMM will likely be reflected in the landscape water use sector.

DMM 14	Residential ultra low-flow toilet replacement programs
Year Implemented	**2008**
Description	The City is currently offering $50 rebates for high-efficiency toilets (HETs), which are even more efficient than ultra low-flow toilets (ULFTs). The rebates apply to customers who fill out a rebate application form and have bought and installed eligible toilets (1.28 gallons per flush or less). Approved toilets must be purchased on or after July 1, 2010. Applications will be processed until funds are depleted. High-Efficiency Toilets (HETs) are defined as fixtures that flush at 20 percent below the 1.6-gallons-per-flush (gpf) The average water savings for HETs is estimated to be 38 gallons per day (gpd) when replacing a non-ULFT. More than 75% of construction in the City occurred after 1992, and the City estimates that more than 90% of toilets are already ULFT units. HETs are even more efficient than ULFTs, and thus can replace ULFTs as well as Non-ULFTs. The average water savings for HETs is estimated to be 7 gpd when replacing a ULFT.
Implementation Steps	• The City produced a HET Rebate Program Terms and Conditions for Participation brochure and rebate application form for customers to apply for a rebate. The City reviews applications and may conduct a HET inspection at the household for verification. Rebates are entered in a database and are limited to one per household.
Implementation Schedule	Not applicable. The City is not currently implementing this DMM.
Evaluation of DMM Effectiveness	The effectiveness of this DMM was evaluated by analyzing program penetration and the estimated savings from HETs.
Conservation Savings and Effects on Future Reductions	This DMM will result in water use reductions primarily in the residential sector if implemented in the future.

Economic Analysis

Methodology and Assumptions

As noted above, the City already has implemented or plans to implement most DMMs. Owing to existing high market penetration for the other DMMs (2 and 14), no economic analyses were completed in the preparation of this plan.

Results

As noted above, no economic analyses were completed for this plan. Hence, this section is not applicable.

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CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

Primary Contact Diana Williford **Telephone** (925) 516-6045 **Email:** dwilliford@ci.brentwood.ca.us

Compliance Option Chosen By Reporting Agency:
(Traditional, Flex Track or GPCD)
GPCD if used:

GPCD in 2010	199
GPCD Target for 2018	189

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	222	100%	231
2012	2	92.8%	214	96%	222
2014	3	89.2%	206	93%	214
2016	4	85.6%	198	89%	206
2018	5	82.0%	189	82%	189

Not on Track if 2010 GPCD is > than target

GPCD in 2010	199
Highest Acceptable GPCD for 2010	231

On Track

Reporting Period: Calendar

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Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.1 Operational Practices

		2009	2010
1.Conservation Coordinator	Name	Diana Williford	Diana Williford
	Title	Water Conservation Specialist	Water Conservation Specialist
	Email		dwilliford@ci.brent\
		On Track	On Track
2. Water waste prevention documentation			
	Descriptive File	0	0
	URL	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.	www.ci.brentwood.ca.us
	Description	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.
		On Track	On Track

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CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

	2009		
Complete a prescreening Audit	yes	On Track	On Track if Yes
Metered Sales	10,398		
Verifiable Other Uses	10,551		
Total Supply	11,453		
(Metered Sales + System uses)/ Total Supply >0.89	1.83	On Track	On Track if =>.89, Not on Track if No
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes	On Track	On Track if Yes
Verify Data with Records on File?	Yes	On Track	On Track if Yes
Operate a system Leak Detection Program?	Yes	On Track	On Track if Yes

	2010		
Compile Standard Water Audit using AWWA Software?	Yes	On Track	On Track if Yes, Not on Track if No
AWWA file provided to CUWCC?	2010CityofBrentwoodWa	On Track	On Track if Yes, Not on Track if No
AWWA Water Audit Validity Score?	80		Info only until 2012
Completed Training in AWWA Audit Method?	yes		Info only until 2012
Completed Training in Component Analysis Process?	No		
Complete Component Analysis?	Off		Info only until 2012
Repaired all leaks and breaks to the extent cost effective?	Yes	On Track	On Track if Yes, Not on Track if No
Locate and repair unreported leaks to the extent cost effective.	Yes	On Track	On Track if Yes, Not on Track if No
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.			Info only until 2012

Provided 7 types of Water Loss Control Info

Leaks Repaired	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost of Interventions	Water Saved
80	$ -	$ 135,700	1.5	Off	$ -	0

Info only until 2012

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Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
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CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

If signed MOU prior to 31 Dec 1997, On Track if all connections metered; If signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.

	2009		2010		
Exemption or 'At least as Effective As' accepted by CUWCC					
Numbered Unmetered Accounts 2008	0	On Track	0	On Track	On Track if no unmetered accounts
Metered Accounts billed by volume of use	Yes	On Track	Yes	On Track	Volumetric billing required for all connections on same schedule as metering
Number of CII accounts with Mixed Use meters	0		0		Info only
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No		No		Info Only
Feasibility Study provided to CUWCC?	Yes	On Track	No	On Track	On Track if Yes, Not on Track if No
Completed a written plan, policy or program to test, repair and replace meters	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

Primary Contact Diana Williford **Email:** dwilliford@ci.brentwood.ca.us

1.4 Retail Conservation Pricing

Metered Water Rate Structure

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes	Multi-Family	Increasing Block	Yes
Commercial	Increasing Block	Yes	Commercial	Increasing Block	Yes
Dedicated Irrigation	Increasing Block	Yes	Dedicated Irrigation	Increasing Block Seasonal	Yes
Other	Uniform	Yes	Other	Increasing Block Seasonal	Yes
	On Track			On Track	

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only

Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1July 2013, or within seven years of signing the MOU,

Agency: City of Brentwood
Retail

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Adequacy of Volumetric Rates) for Agencies with No Unmetered Accounts

Customer Class	2009 Rate Type	2009 Volumetric Revenues $1000s	2010 Rate Type	2010 Volumetric Revenues $1000s
Single-Family	Increasing Block	$ 7,487	Single-Family	$ 7,019
Multi-Family		$ 285		$ 279
Commercial		$ 560		$ 536
Dedicated Irrigation		$ 970		$ 1,035
Other		$ 93		$ 430
Other		$ -		$ -
Other		$ -		$ -
Total Revenue Commodity Charges (V):		$ 9,394		$ 9,300
Total Revenue Fixed Charges (M):		$ 4,418		$ 5,134
Calculate: V / (V + M):		68%		64%
		On Track		On Track
Canadian Water & Wastewater Rate Design Model Used and Provided to CUWCC		No		No

If Canadian Model is used, was 1 year or 3 year period applied?

Agency Choices for rates:

A) Agencies signing MOU prior to 13 June2007, implementation starts 1 July2007: On Track if (V / (V + M) ≥ 70% x .8 = **56% for 2009** and 70%x0.90 = **63% for 2010**; Not on track if (V / (V + M)) < 70%;

B) Use Canadian model.

Agencies signing MOU after 13June2007, implementation starts July 1 of year following signing.

Agency: City of Brentwood
Retail

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CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

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Wastewater Rates

Does Agency Provide Sewer Service? 2009: yes

If 'No', then wastewater rate info not required.

2010: Yes

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Other	Increasing Block	Yes
Multi-Family	Increasing Block	Yes			
Commercial	Increasing Block Seasonal	Yes			
Industrial	Increasing Block Seasonal	Yes			
Other	Increasing Block Seasonal	yes			
	On Track			On Track	

On Track if: 'Increasing Block', 'Uniform', 'based on long term marginal cost' or 'next unit of capacity'

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Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47

Coverage Report Date: May 19, 2011

Primary Contact Diana Williford **Telephone** #N/A **Email:** dwilliford@ci.brentwood.ca.us

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

	2009	2010
1) Contacts with the public (minimum = 4 times per year)	314,894	72,000
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	314,894	72,000
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes	yes
4) Description of materials used to meet minimum requirement.	Website Newsletter articles on conservation Flyers brochures Newsletter articles on conservation	Website Newsletter articles on conservation Newsletter articles on conservation
5) Annual budget for public outreach program.	$ 308,292	$ 453,206
6) Description of all other outreach programs	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	Description is too large for text area. Data will be stored in the BMP Reporting database when online.
	OnTrackfor 6 Actions	OnTrack for 6 Actions

All 6 action types implemented and reported to CUWCC to be 'On Track')

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Coverage Report Date: May 19, 2011

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

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2.2 School Education Programs Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement School Education Programs for this unility's benefit?	No	No	
Name of Wholesale Supplier?	0	0	
1) Curriculum materials developed and/or provided by agency	Project WET	Project WET	Yes/ No
2) Materials meet state education framework requirements and are grade-level appropriate?	Yes	Yes	All 5 actions types implemented and reported to CUWCC to be 'On Track'
3) Materials Distributed to K-6?	yes	Yes	
Describe K-6 Materials	AWWA publication titled "Water Adventures Around the World"		Describe materials to meet minimum requirements
Materials distributed to 7-12 students?	No	No	Info Only
4) Annual budget for school education program.	$ 4,300	$ 10,750	
5) Description of all other water supplier education programs		The City offers annual educational assemblies to grades K-8. EarthCapades Environmental Vaudeville provides information regarding water conservation and recycling.	
	1 On Track	1 On Track	

Chapter 8
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