

FINAL  
City of Antioch  
2010 UWMP

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Prepared for  
City of Antioch  
Antioch, CA  
June 27, 2011



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City of Antioch  
2010 UWMP

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Prepared for  
City of Antioch, Antioch, CA  
June 27, 2011

Project No. 140259



201 North Civic Drive, Suite 115  
Walnut Creek, California 94596



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## List of Abbreviations

ABAG	Association of Bay Area Governments	gpm	gallons per minute
Act	Urban Water Management Planning Act		
ADWF	average dry weather flow	HAA	haloacetic acids
AF	acre-feet	HET	high efficiency toilet
AFY	acre-feet per year		
		In	inches
BDCP	Bay-Delta Conservation Plan		
BMP	best management practice	LMEC	Los Medanos Energy Center
BPS	booster pump station		
Bureau	United States Bureau of Reclamation	MG	million gallons
		mg/L	milligrams per liter
Canal	Contra Costa Canal	mgd	million gallons per day
CBDA	California Bay-Delta Authority	MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
CCWD	Contra Costa Water District		
CDPH	California Department of Public Health		
CIMIS	California Irrigation Management Information System	NPDES	National Pollutant Discharge Elimination System
CIP	Capital Improvement Plan		
City	City of Antioch	Plan	Urban Water Management Plan
CUWCC	California Urban Water Conservation Council	PRV	pressure reducing valve
		psig	pounds per square inch gage
		PWSS	Public Water System Statistics
DDSD	Delta Diablo Sanitation District		
DEC	Delta Energy Center		
DOF	Department of Finance	RBP	Randall-Bold Plant
DMM	demand management measure	RWF	Recycled Water Facility
DSC	Delta Stewardship Council		
DWD	Diablo Water District	SB7	Senate Bill SBx7-7
DWR	California Department of Water Resources	SCVWD	Santa Clara Valley Water District
		SFPUC	San Francisco Public Utilities Commission
EBMUD	East Bay Municipal Utilities District	SFR	single family residential
EPA	United States Environmental Protection Agency	SWRCB	State Water Resources Control Board
ET <sub>o</sub>	reference evapotranspiration		
		TDH	total dynamic head
		TDS	total dissolved solids
°F	degrees Fahrenheit	THM	trihalomethane
ft	feet		
		ULFT	ultra low flow toilet
gpcd	gallons per capita per day	UWMP	Urban Water Management Plan
gpd	gallons per day		

WELO	water efficient landscape ordinance
WPCF	Water Pollution Control Facility
WTP	water treatment plant
yr	year

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# Professional Engineer's Certification

This is to certify that this 2010 Urban Water Management Plan by Brown and Caldwell for the City of Antioch, California has been prepared under my direction and supervision.

*William K Faist*

June 27, 2011

William Faist, P.E.

Date

California Civil Engineer, C29146

Expires 03/31/2013



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## Section 1

# Plan Preparation

This Urban Water Management Plan (Plan) addresses the City of Antioch's (City's) water system, which currently serves about 103,000 people within a 28.8 square mile area located in eastern Contra Costa County. In 2009, the City provided approximately 5,700 million gallons of water to 30,668 connections. The City currently relies entirely on surface water. Its primary sources are the Sacramento/San Joaquin Rivers Delta through water purchased from Contra Costa Water District (CCWD).

This Plan fulfills several purposes:

1. It is the year 2010 Urban Water Management Plan Update as required by the Urban Water Management Planning Act (Act).
2. It provides the analysis of water conservation measures in accordance with the guidelines of the California Urban Water Conservation Council (CUWCC).
3. It serves as the long-term water supply plan for the City of Antioch Water System.

This Plan serves as a long-range planning document for the City's water supply. Details regarding the wholesaler's, Contra Costa Water District's (CCWD), water supplies are included in the CCWD UWMP.

### 1.1 Urban Water Management Planning Act

This Plan has been prepared in accordance with the Act (Assembly Bill-AB797 as amended). The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit UWMPs every five years to the California Department of Water Resources (DWR). In November 2009, the State most recently amended the Act with the adoption of Senate Bill (SB) x7-7 (SB7). The most significant revision is the requirement for establishing per capita water use targets and an option to delay Plan adoption to July 1, 2011.

Appendix A includes the DWR checklist of components required for UWMPs with cross-referencing to indicate where this UWMP addresses each requirement.

### 1.2 Resource Maximization and Import Minimization

The City has used water management tools to maximize local water resources and minimize imports. The City has and continues to participate with CCWD to implement some water conservation measures as part of CCWD's wholesaler water conservation program in order to maximize the use of local water resources. The City is responsible for water conservation marketing and outreach to the City's customers.

### 1.3 California Urban Water Conservation Council

Addressing the efficient use of water supplies in accordance with CUWCC guidelines is another purpose of this Plan. The CUWCC is a voluntary organization comprised of water utilities, environmental organizations, and other interested groups that are responsible for administering the implementation of water conservation measures in California. The Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) (CUWCC, 2008) defines the water conservation measures or demand management measures (DMMs). The signatories of the CUWCC submit a semi-annual report regarding

their implementation of DMMs. The City is not currently a MOU signatory. However, the City implements the water conservation program collaboratively with CCWD and CCWD is a signatory. This Plan provides a description of the City's water conservation program.

## 1.4 Previous Reports

Several reports have been prepared in the past decade, which address water supply and demand for the City of Antioch water system and for the Contra Costa Water District which supplies a portion of Antioch's water supply. An understanding of these previous studies' results provides a broader context for preparing an updated water supply plan for the future. This section provides a summary of these recent planning reports.

Five east county public agencies jointly sponsored an investigation of groundwater resources in the East Contra Costa Area (Luhdorff, March 1999). The purpose of the study was to define the aerial and vertical extent of the aquifer system better, characterize the water quantity and quality, define how groundwater is recharged and discharged out of the area, and define the reliable supply and whether conjunctive use plans should be developed.

A Water System Master Plan Update was prepared in September 1999 (Brown and Caldwell, 1999). This document included long-term demand forecasts and water supply capital improvement recommendations to meet future water supply needs for the City of Antioch.

A Water System Master Plan: Updated Executive Summary was prepared in October 2001 (Brown and Caldwell, 2001). This document summarizes changes in water use characteristics and study area demographics and presents significant findings, conclusions and recommendations for existing and future facilities through the year 2028.

The Antioch/DDSD Recycled Water Project Facilities Plan was prepared in December 2007 to describe the project currently being pursued by Delta Diablo Sanitation District (DDSD) and the City to expand recycled water use within the City (RMC, 2007).

The Urban Water Management Plan 2005 Update was prepared in January 2006 (Brown and Caldwell, 2006). This document provided a comprehensive summary of the existing water system, historical and projected water use, water supply (sources), water conservation best management practices, water supply versus demand comparison, and recommendations.

The CCWD 2010 UWMP includes a forecast of supplies and demands and describes the District's water demand management and recycled water opportunities to the year 2035. It also presents a water shortage contingency analysis and a description of the plan adoption, public coordination and planning coordination activities.

## 1.5 Public Agency Coordination

This Plan has been prepared with the cooperation and assistance of the City of Antioch, CCWD, and DDSD. Table 1-1 summarizes the efforts the City has taken to include additional agencies and citizens in its planning and preparation process.

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

	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
Contra Costa Water District				X		X	
Delta Diablo Sanitation District						X	
City of Antioch	X			X	X	X	
Relevant public agencies						X	
Public Library					X		
General Public (via the City's website and bill inserts)						X	

## 1.6 Public Participation

The DWR Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (DWR March 2011) includes a description of the requirements for public participation and Plan adoption. The requirements include the following:

- At least 60 days prior to the public hearing, water suppliers must notify any city or county within which the supplier provides water supplies that the supplier is in process of updating their Plan.
- Water suppliers must encourage the involvement of diverse social, cultural, and economic elements of the population within the service area.
- Water suppliers must make the UWMP available for public inspection prior to adoption. Prior to the public hearing, the water supplier must provide public notification of the time and place for the hearing. The water supplier must provide such notification in two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates.
- If a water supplier makes changes to the UWMP after plan adoption, the supplier must hold another public hearing and have the UWMP readopted.
- A copy of the UWMP adoption resolution must be included in the UWMP.
- The water supplier must provide information on how it will implement the UWMP.
- No later than 30 days after submitting a UWMP to DWR, water suppliers must provide a copy of the UWMP to the California State Library and any city or county within which the supplier provides water supplies and must make the UWMP available for public review during normal business hours

For this update to the UWMP, the City Council noticed the public hearing on May 26, 2011 and June 2, 2011 and then held a formal public hearing on June 14, 2011, to receive public comment on the draft Plan. The annotated agenda for the meeting is included in Appendix B. During the public hearing, the City described the general plan for compliance with the Water Conservation Bill of 2009.

The City posted notice of the public hearing on the City's homepage on the internet. The City arranged to publish legal public notices for the hearing in the local newspaper and posted them at City facilities. Copies of the draft Plan were available at City offices, libraries, and City Hall.

The hearing provided an opportunity for the City's water service customers and all residents, employers, and employees in the service area to learn about the water supply system and the plans incorporated to provide a reliable, safe, high-quality water supply into the future. The hearing also allowed people to ask questions regarding the current system and the viability of future plans. Upon City Council's approval at the conclusion of the public hearing, the City adopted this Plan.

Appendix B includes the resolution to adopt the UWMP.

## 1.7 Plan Organization

This section provides a summary of the sections in the Plan.

- Section 1 describes how the City prepared the Plan.
- Section 2 provides a description of the service area, climate, water supply facilities, and distribution system.
- Section 3 presents historical and projected water use.
- Section 4 describes water supplies.
- Section 5 provides a summary of water supply reliability and water shortage contingency planning.
- Section 6 addresses water conservation.
- Section 7 provides recommendations.
- Appendices provide relevant supporting documents.

## Section 2

# System Description

This section describes the City's existing water system. This section includes a description of the service area and its climate, existing and proposed water system facilities, including the surface water supply and treatment, the booster pump stations, the reservoirs, and the piping system. Also included in this section is a description of the population, employment, and housing within the service area.

## 2.1 Description of Service Area

The Antioch water system serves about 30,688 connections within Contra Costa County (as of 2009). Figure 2-1 shows the service area and its surroundings. The existing service area covers 28.8 square miles and includes the area within the City limits and some adjacent land to the northeast and the west, as shown on Figure 2-1. This Plan also addresses the land which may be developed through build-out and for which the City is likely to be relied on for water service.

The service area is primarily residential, with small areas of commercial and industrial land use.

Figure 2-2 provides an overview of existing land use planning, based on the current Antioch General Plan and Use Element Map (LSA, 2003). For this Plan, it is assumed that marginal agricultural lands in the southern portion of the planning area will be converted to residential or commercial use by the year 2030.

## 2.2 Topography

The service area extends from steep hilly terrain in the south and west portions of the service area to flat with a gentle slope in the northeast portion of the service area. Elevations in the service area range from sea level to over 700 feet. Generally, the service area is limited to elevations less than 560 feet. Four pressure zones are currently required to distribute water, and eventually six to seven may be necessary depending on future land development.

## 2.3 Climate

Antioch has cool and humid winters, and hot and dry summers. Based on the historical data obtained from the California Irrigation Management Information System (CIMIS), Antioch's average monthly temperature ranges from 47 to 73 degrees Fahrenheit (Table 2-1). Also shown in Table 2-1, the historical annual average precipitation is approximately 13 inches. 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 precipitation has been as high as 8 inches and as low as 0 inches. 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 demands. Landscape irrigation, including lawn watering, in the summer is a major contributor to the higher summer demands.

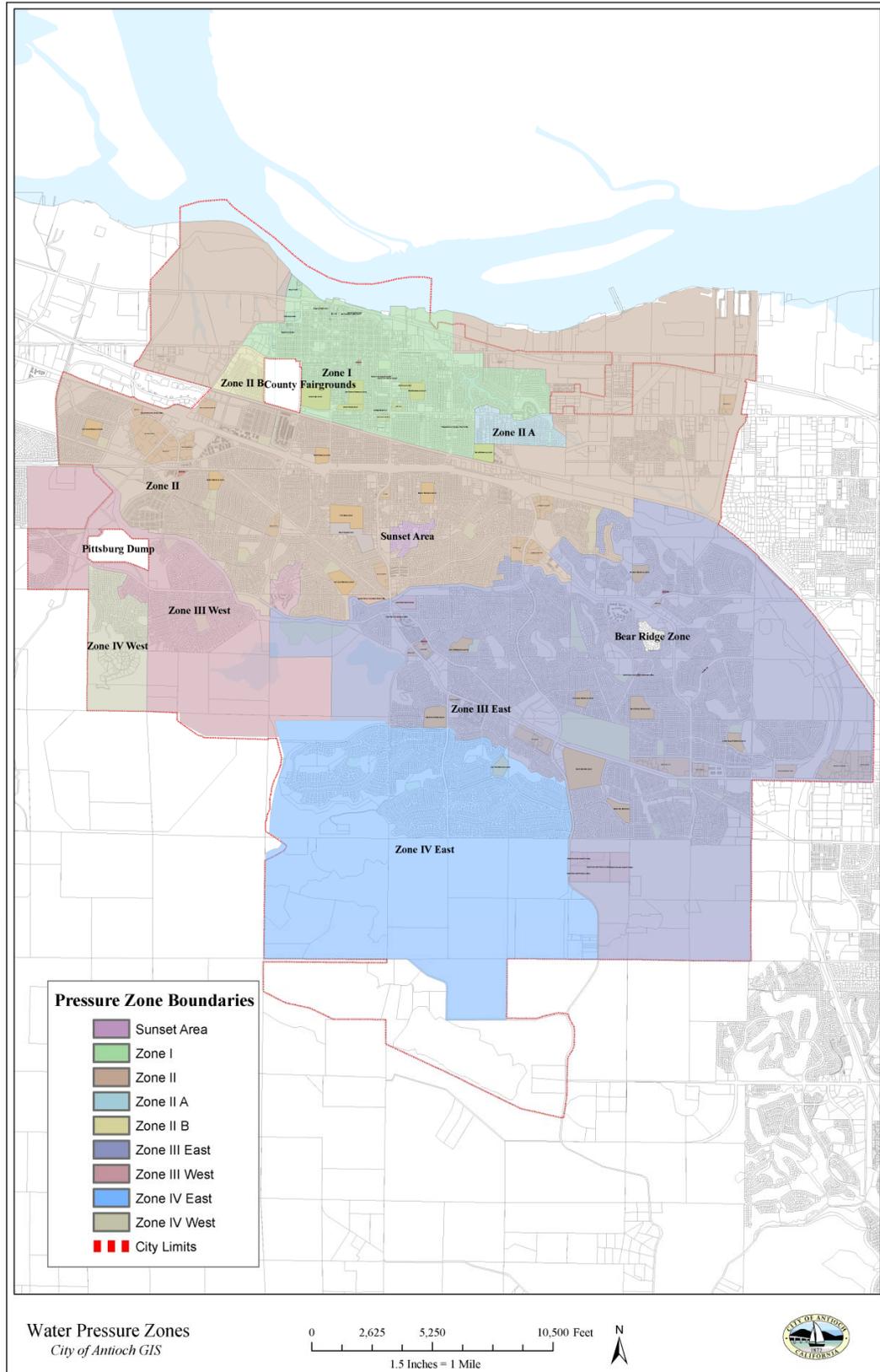


Figure 2-1. Service Area and Pressure Zone Boundaries

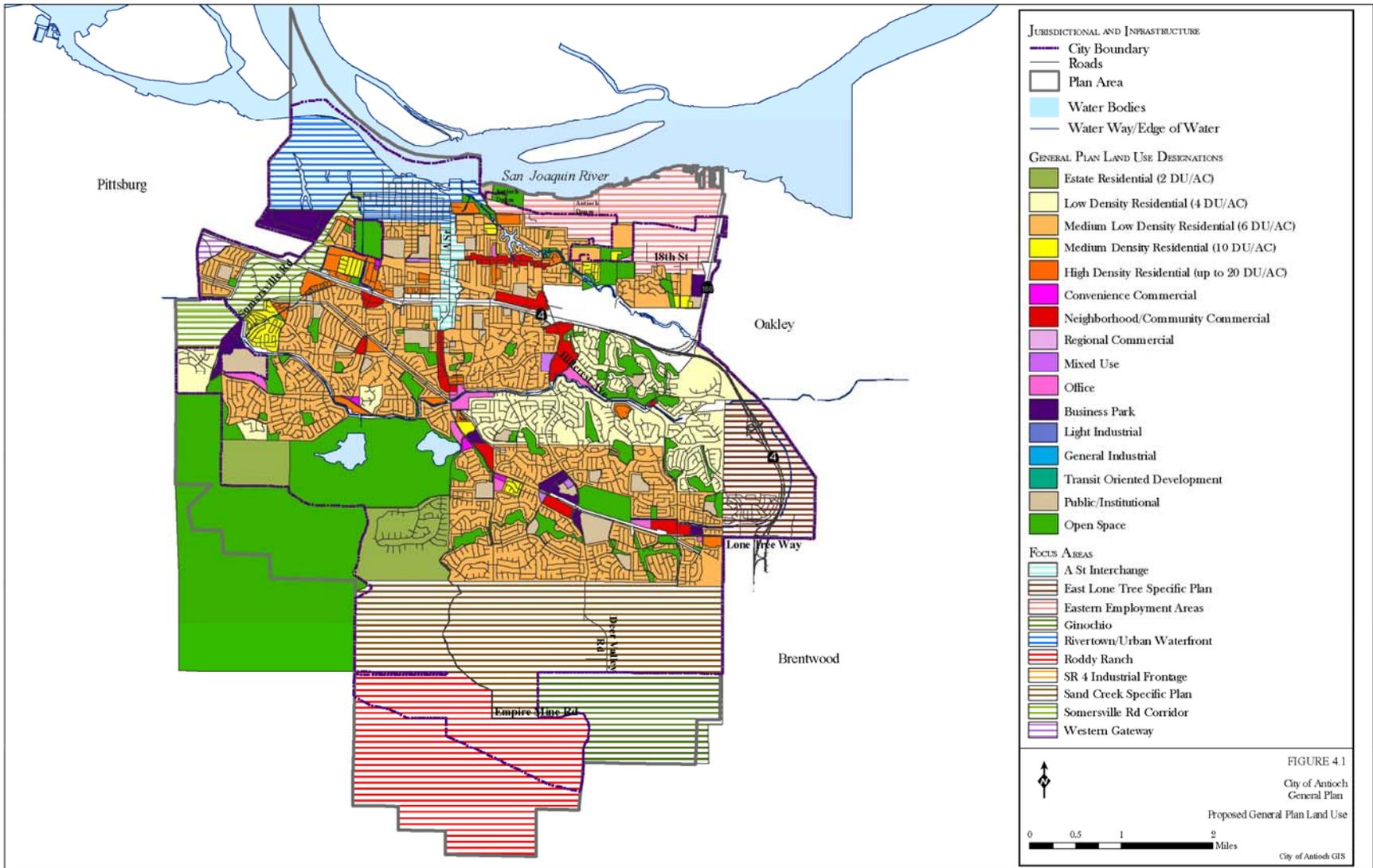


Figure 2-2. Zoning Map

<b>Table 2-1. Climate</b>			
<b>Month</b>	<b>Standard Average ET<sub>o</sub> (in)<sup>a</sup></b>	<b>Average Rainfall (in)<sup>a</sup></b>	<b>Average Temperature (F)<sup>a</sup></b>
January	1.39	2.54	47.1
February	2.10	2.52	51.5
March	3.75	1.35	56.8
April	5.37	0.69	60.4
May	6.80	0.71	64.9
June	7.51	0.23	68.8
July	8.07	0.14	72.4
August	7.20	0.21	71.5
September	5.47	0.31	68.6
October	3.85	0.66	62.1
November	1.97	1.22	52.7
December	1.31	2.27	45.3
<b>Annual</b>	<b>54.8</b>	<b>12.9</b>	<b>60.1</b>

<sup>(a)</sup> Source: California Irrigation Management Information System (CIMIS) website <http://www.cimis.water.ca.gov/cimis/data.jsp>, Brentwood Station (Station 47). Period of record: 1985-2010.

## 2.4 Water Supply Facilities

The principal sources of raw water supply are the Sacramento/San Joaquin Rivers Delta and the Contra Costa Canal (Canal), which can be stored in the Antioch Municipal Reservoir. Canal water, purchased from CCWD is pumped from Victoria Canal, Rock Slough and Old River in the western Delta. The pipelines from the Contra Costa Canal to the water treatment plant (WTP) have a capacity over 60 million gallons per day (mgd), well above the maximum predicted future water demand. Water from the Canal can be pumped into the municipal reservoir or directly to the WTP. The California Department of Public Health (CDPH) requires that river water must be first pumped to the municipal reservoir before going to the WTP. The WTP has a maximum capacity of about 38 mgd. Treated water flows into two 1.0 million-gallon (MG) clearwells before entering the distribution system. Figure 2-3 is a schematic diagram of the existing and proposed water system. Table 2-2 summarizes existing storage facilities and booster pumping stations (BPSs) by zone.

In addition to expansion, the City improved water source reliability by purchasing treated water from CCWD produced at the Randall-Bold Plant (RBP), using a connection to the CCWD multipurpose pipeline at Hillcrest Avenue, the Diablo Water District (DWD) conveyance system, a new BPS at the RBP and a new pipeline.

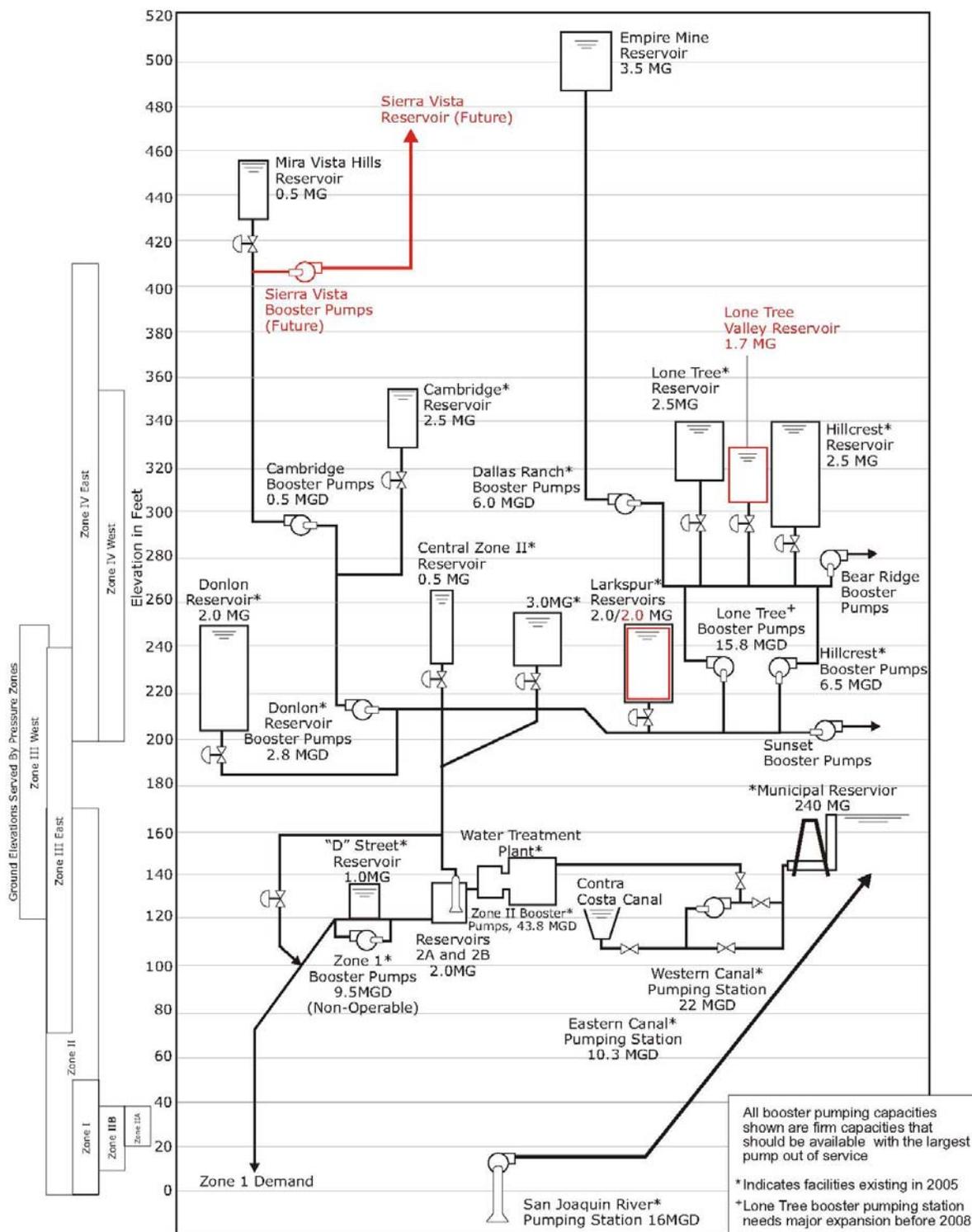


Figure 2-3. Existing and Proposed Water System Schematic

Table 2-2. Existing Reservoir Storage and Booster Pumping Station Capacity <sup>(a)</sup>								
Zone	Booster Pumping Station				Reservoir			
	Name	Configuration, number and gpm	Total Dynamic Head (TDH), ft	Firm Capacity, mgd	Name	Configuration, number and volume in MG	Key Elevations overflow/base, ft	Service Elevation Range, ft
I	Zone I <sup>(b)</sup>	3 @ 3,300 1 extra slot	120	9.5	“D” Street Plant A Clearwell Plant B Clearwell	1.0 1.0 1.0	133.5/120 133.5/118.5 133.5/118.5	0 to 50
II	Zone II	5 @ 2,400 2 @ 4,800 1 @ 1,200 2 extra slots	125	24.2	Central 3 MG Donlon Larkspur	0.5 3.0 2.0 2.0	264/229 256/230 248/200 248/216	0 to 170
III East	Hillcrest Lone Tree	3 @ 1,500 1 extra slot 3 @ 1,800 1 extra slot	94 105	4.3 5.2	Hillcrest Lone Tree	2.5 2.5	340/292 340/308	70 to 240
III West	Donlon	2 @ 1,200 1 @ 600 + 1 slot @ 1,200	160	2.6	Cambridge	2.5	355/320	130 to 255
IV East	Dallas Ranch	3 @ 1,400 + 1 extra slot	220	4.0	Empire Mine	3.5	510/485	175 to 410
IV West	Cambridge	2 @ 340 1 extra slot	131	0.5	Mira Vista Hills	0.5	455/420	200 to 355

<sup>(a)</sup> These facilities are existing in 2010. The City has designed but not yet constructed the Sierra Vista BPS (three pumps at 200 gpm each) and Sierra Vista Reservoir (0.3 MG). In the future the City may construct other BPSs and reservoirs to serve Zone II (estimated volume of 2.0 MG) and Lone Tree Valley and Roddy Ranch (estimated volume of 1.7 MG).

<sup>(b)</sup> The Zone 1 booster pumping station is currently inoperable.

<sup>(c)</sup> Total existing storage is 22.0 MG, of which 1.0 MG is reserved for operational needs at the WTP.

## 2.5 Distribution System

The Antioch distribution system consists of four primary pressure zones. Water pressure typically is maintained between 40 and 100 pounds per square inch gage (psig).

### 2.5.1 Pressure Zone I

Pressure Zone I distribution system serves the older residential sections of the City, the original central business district and some major industrial users. Ground elevations range from sea level to 50 feet. Zone I is served by gravity principally through a 24 inch-diameter main from the WTP. The BPS to serve Zone I is out of service and is no longer needed because pressure reducing valves (PRVs) installation between Zones I and II allows water to flow down to Zone I from Zone II. Three of these exist, and five more PRVs are recommended.

### 2.5.2 Pressure Zone II

Pressure Zone II serves primarily residential and commercial users and has ground elevations ranging from sea level to 170 feet. One area above 170 feet in elevation is supplied by the small Sunset BPS. The principal water mains in Zone II are 10, 12, 16, 20, 24 and 30 inches in diameter. The system is supplied by two Zone II BPSs – one built in 1967 and one built in 1988, which take suction from the WTP clearwells. There is emergency WTP generator capacity available to operate all Zone II booster pumps should there be a power outage. Four water storage reservoirs are located in Zone II.

### 2.5.3 Pressure Zone III East

Pressure Zone III East encompasses much of the newer residential and commercial growth in the City. Zone III East generally extends south from the Canal, with some development north of the canal in the eastern portion of the City. It is bounded on the west by Contra Loma Regional Park and on the east by a Southern Pacific Railroad right-of-way. The zone border extends south to the city limits but excludes most of the area south of Lone Tree Way and west of Deer Valley Road. Three BPSs, Hillcrest and Lone Tree 1 and 2, and two reservoirs, Hillcrest and Lone Tree, serve Zone III East. Zone III East is served with 12, 16, 20 and 24 inches in diameter water mains. Future development in the southeast in Lone Tree Valley will eventually require additional Zone III East reservoir storage, probably located on the south side of Lone Tree Valley. The Dallas Ranch BPS possibly will need expansion or the City will construct a new BPS in Lone Tree Valley. The Bear Ridge BPS serves as an isolated high area west of Hillcrest Avenue. Isolated higher lots may require individual booster pumps.

### 2.5.4 Zone III West

Zone III West is a developed residential area on the west side of the City. Most existing development is residential but some commercial development will occur in the western portion of this zone. After the completion of the planned developments at Meadowlands and Black Diamond Ranch, this zone will encompass about 1.25 square miles. It is bound by the Canal, Black Diamond Mines, Contra Loma Regional Park, and the City limits. Zone III West is served by the Donlon BPS which fills the Cambridge Reservoir. Water mains of 8, 10, 12 and 16 inches in diameters serve the Zone III West development. Additional transmission facilities will be needed to accommodate planned development within this zone.

### 2.5.5 Zone IV West

The Zone IV West facilities serve to the higher elevations of the Mira Vista Hills Subdivision and the higher elevations in Black Diamond Ranch. The Cambridge BPS has emergency power facilities to convey water into Zone IV West and the Mira Vista Hills Reservoir. In the future, Zone IV West will be used to

convey water to the south to the proposed higher elevation Sierra Vista Development. New 8, 10 and 12 inches in diameter mains serve the Zone IV West development.

### 2.5.6 Zone IV East

Zone IV East includes all of the Higgins Ranch and parts of the Dallas Ranch, Black Diamond Knolls, and Diablo West developments. Zone IV East is bound by Contra Loma Regional Park on the west, Zone III East on the north and east, and the proposed new Urban Limit Line on the south. The Dallas Ranch BPS serves Zone IV East. It initially included three 1,400-gpm pumps (a firm capacity of 4.0 mgd), supported with emergency power facilities. There is space for a fourth pump to raise the future firm capacity to 6.0 mgd. The BPS conveys water to Zone IV East and to the Empire Mine Reservoir. The reservoir has a capacity of 3.5 MG and an overflow elevation of 510 feet.

## 2.6 Population, Employment, and Housing

Water use is closely related to population. Data from the California Department of Finance (DOF) serve as the basis for estimating the City's past and current population (Table 2-3). When compared to the Association of Bay Area Governments (ABAG) Projections 2009, DOF data are lower. The difference can be attributed to occupancy rates being considered in DOF data but not in ABAG's data.

ABAG data provide a basis for future demand projections. Population projection for 2015, 2020, 2025, and 2030 are based on ABAG data and assume that the occupancy rate rises one percent per year (i.e., 96 percent in 2015, 97 percent in 2020, 98 percent in 2025, and 99 percent in 2030). ABAG data also serve as the basis for household and total job projections, as summarized in Table 2-3

Future industrial development probably will occur in Zones I and II along the major transportation routes. Zone III East also has small areas zoned as industrial. The remainder of the General Plan study area is likely to develop to residential and commercial uses. Residential water requirements vary on a per-acre basis, depending on the density of dwelling units and the number of persons per dwelling unit. Based on data from California Department of Finance, the average number of people per household is approximately 3.0.

Table 2-3 presents and Figure 2-4 illustrates a summary of the historic and projected population, housing, and employment within the Antioch water system.

Service Area Population	2000	2005	2010	2015	2020	2025	2030
<b>Total Population <sup>(a)</sup></b>	90,532	100,035	102,330	106,228	109,841	113,083	116,592
<b>Households <sup>(b)</sup></b>	29,656	33,089	35,130	36,079	37,030	37,969	38,878
<b>Total Jobs <sup>(b)</sup></b>	22,220	22,865	22,874	25,985	29,435	32,444	35,844

<sup>(a)</sup> Total population for the years 2000, 2005, and 2010 are based on Department of Finance (DOF) data from Table 2: E-5 City/County Population and Housing Estimates (2010). Compared to ABAG Projections 2009: Forecasts for the San Francisco Bay Area for the City of Antioch's sphere of influence, DOF population estimates are lower because they account for occupancy rates. Future population projections for 2015, 2020, 2025, and 2030 are based on ABAG projections and assume that the occupancy rate rises one percent per year (i.e., 96 percent in 2015, 97 percent in 2020, 98 percent in 2025, and 99 percent in 2030).

<sup>(b)</sup> Based on ABAG Projections 2009: Forecasts for the San Francisco Bay Area for the City of Antioch's sphere of influence.

As shown in Table 2-3, the City expects an increase in the number of employees over the next 20 years, with the highest job growth in service employment.

In summary, from 2000 to 2010, the Antioch population increased 13 percent, which is a growth rate of approximately 1.3 percent per year. By 2030, population is expected to increase by an additional 14 percent, from 102,330 in 2010 to 116,592 in 2030, which is an average of 0.4 percent growth rate per year (ABAG, 2009). Employment within the City is expected to grow 36 percent between 2010 and 2030, which equates to an annual employment growth rate of 1.8 percent (ABAG, 2009).

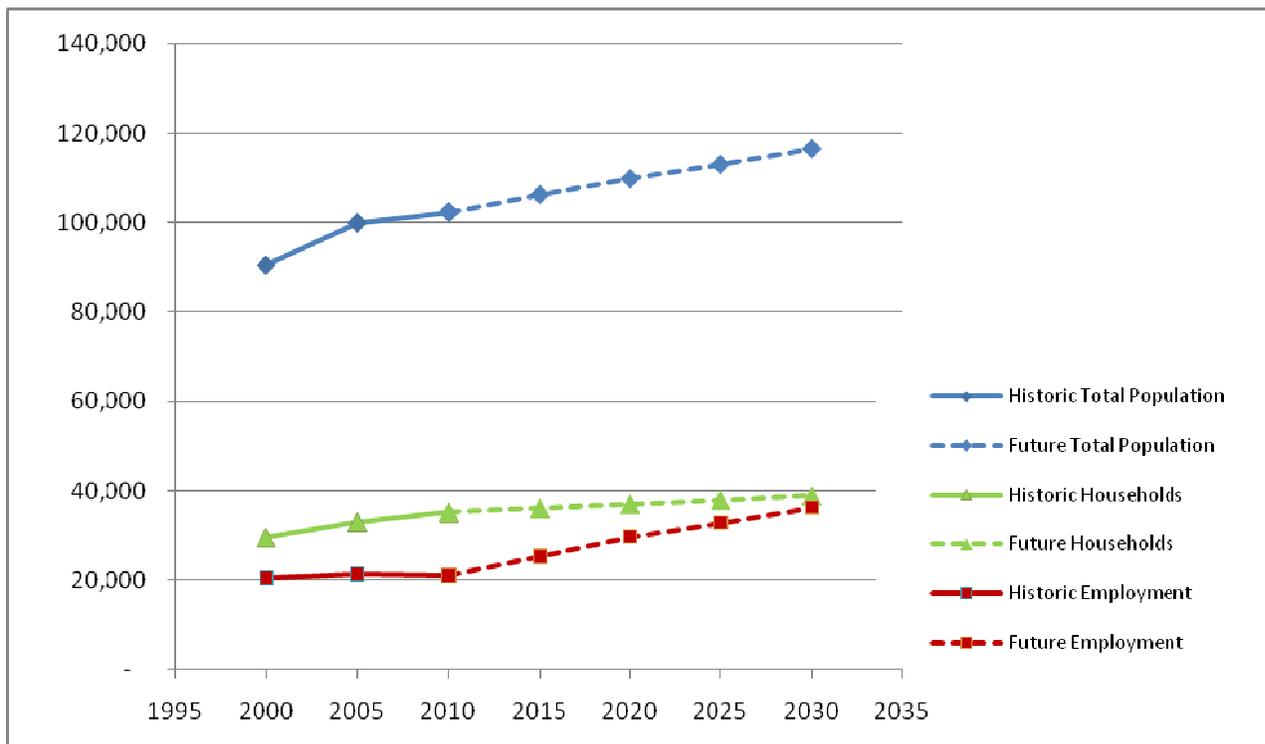


Figure 2-4. Historical and Projected Population, Housing, and Employment



## Section 3

# System Demands

Water demand projections provide the basis for sizing and staging future water facilities. Water use and production records, combined with projections of population, employment, and urban development, provide the information necessary for estimating future water requirements. This section presents an analysis of available water use data and the resulting projections for future water needs in the Antioch water system.

### 3.1 Per Capita Water Use Targets

With the goal of reducing California's urban water use by twenty percent by year 2020, recently passed SB7 requires water providers to establish per capita water use targets using one of four methods:

- **Method 1:** Eighty percent of the urban retail water supplier's baseline per capita daily water use using a 10-year average;
- **Method 2:** The per capita daily water use that is estimated using the sum of several defined performance standards. This method requires quantifying the landscaped area and the baseline commercial, industrial, and institutional use;
- **Method 3:** Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (DWR, 2010). The City is in DWR's Hydrologic Region 6 (San Joaquin River) as shown on Figure 3-1. The interim 2015 target is 200 gallons per capita per day (gpcd) (i.e., 95 percent of 211 gpcd), while the 2020 target for the City is 165 gpcd (i.e., 95 percent of 174 gpcd); and
- **Method 4:** While Methods 1 through 3 are included in the SB7 law, the law required that DWR develop Method 4 through a public process. DWR released the result of the Method 4 development as the Provisional Method 4 for Calculating Urban Water Use Targets dated February 16, 2011. Method 4 involved calculating water savings based on indoor residential water savings, metering savings, CII savings, and landscape and water loss savings. Water savings can be estimated using a calculation tool called the BMP Calculator.

The City performed a detailed analysis to determine the City's baseline water use and future water use targets (Appendix C). The analysis is summarized briefly within this section.

Table 3-1 provides information related to the base period ranges for calculations related to SB7 baseline water use and future water use targets. Tables 3-2 and 3-3, respectively, present data used to calculate the City's 10 to 15-year and 5-year baseline water use.

Table 3-4 summarizes the City's baseline water use, the interim 2015 water use target, and the 2020 water use target for SB7 Methods 1, 3 and 4. The City chose not to pursue SB7 Method 2 in this evaluation. The City has selected Method 3 as the preferred method for determining the City's gpcd target. The City's interim 2015 water use target is 200 gpcd, and the 2020 target is 165 gpcd.

The City is also included in a regional SB7 alliance under its wholesaler, CCWD.

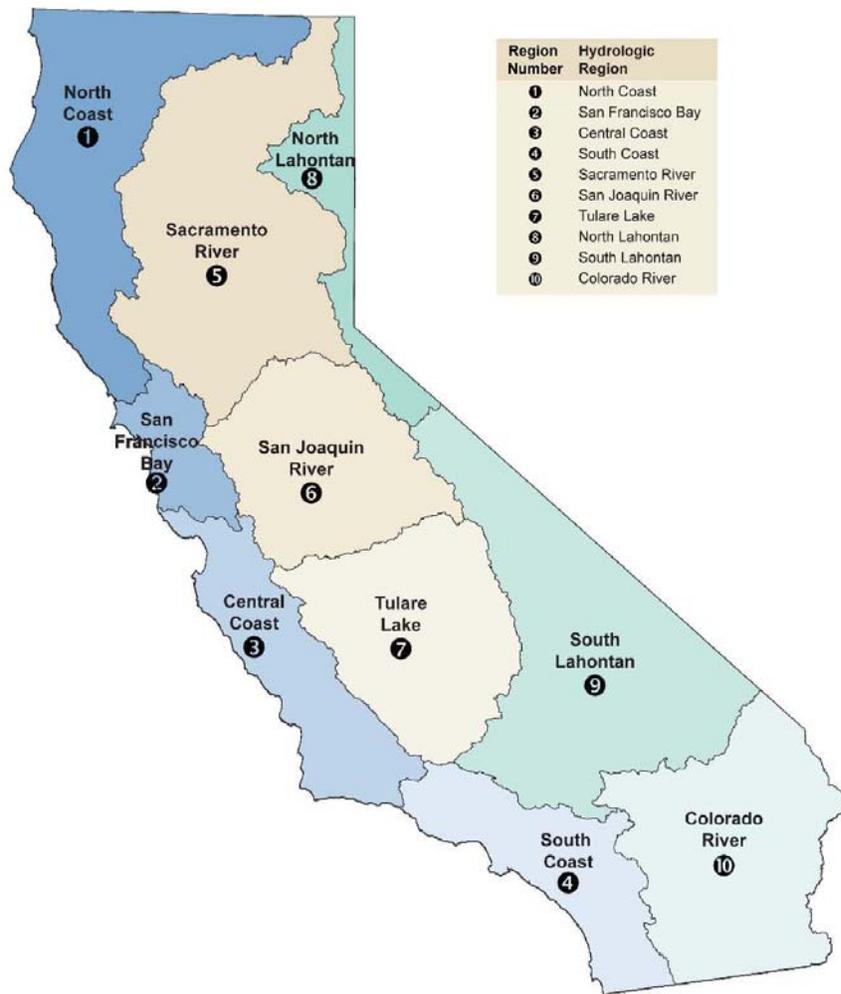


Figure 3-1. California Hydrologic Regions for SB7 Analysis

<b>Table 3-1. Base Period Ranges (DWR Table 13)</b>			
<b>Base</b>	<b>Base Period Ranges</b>		
	<b>Parameter</b>	<b>Value</b>	<b>Units</b>
<b>10- to 15-year Base Period</b>	2008 total water deliveries	6,838	million gallons
	2008 total volume of delivered recycled water	0	gallons
	2008 recycled water as a percent of total deliveries	0	Percent
	Number of years in base period	10	Years
	Year beginning base period range	January 1999	
	Year ending base period range	December 2008	
<b>5-year Base Period</b>	Number of years in base period	5	Years
	Year beginning base period range	January 2004	
	Year ending base period range	December 2008	

<b>Table 3-2. Base Daily per Capita Water Use - 10- to 15-year Range (DWR Table 14)</b>				
<b>Base Period Year</b>		<b>Distribution System Population</b>	<b>Daily System Gross Water Use (mgd)</b>	<b>Annual Daily Per Capita Water Use (gpcd)</b>
<b>Sequence Year</b>	<b>Calendar Year Ending</b>			
Year 1	December - 99	86,408	16.2	187
Year 2	December - 00	90,532	16.5	182
Year 3	December - 01	93,150	17.8	191
Year 4	December - 02	96,602	18.2	188
Year 5	December - 03	98,734	17.9	181
Year 6	December - 04	100,278	18.9	189
Year 7	December - 05	100,035	18.6	186
Year 8	December - 06	99,368	17.8	180
Year 9	December - 07	99,334	19.5	196
Year 10	December - 08	99,988	18.5	185
Year 11	--	--	--	--
Year 12	--	--	--	--
Year 13	--	--	--	--
Year 14	--	--	--	--
Year 15	--	--	--	--
<b>Base Daily Per Capita Water Use</b>				<b>186</b>

**Table 3-3. Base Daily per Capita Water Use 5-year Range (DWR Table 15)**

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year Ending			
Year 1	December - 04	100,278	18.9	189
Year 2	December - 05	100,035	18.6	186
Year 3	December - 06	99,368	17.8	180
Year 4	December - 07	99,334	19.5	196
Year 5	December - 08	99,988	18.5	185
Base Daily Per Capita Water Use				187

**Table 3-4. Baseline Water Use and SB7 Targets**

Parameter or Method	Baseline	Year 2015 Interim Target (gpcd)	Year 2020 Target (gpcd)	Notes/Comments
10-year Average (1999-2008)	186	--	--	1999-2008 baseline
95% of 5-year Average (2004-2008)	178	--	--	2004-2008 baseline
Method 1 - 80% of 10-yr Baseline	--	168	149	1999-2008 baseline
Method 3 - Hydrologic Region Target, 95%	--	200	165	
Method 4 - Method 4 (GPCD calculator by DWR)	--	168	149	

*Method 2 was not evaluated in the level of detail required by DWR in the "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use" (DWR Methodology) that DWR issued on October 1, 2010. Thus, the Method 2 result is not shown in this table. Note that DWR does not require that the City carry out a Method 2 analysis.*

## 3.2 Water Use

This section discusses the past, current and projected water use. Water demand projections are based on the selected SB7 water use targets combined with the ABAP projected population for the service area. Demand projections provide the basis for sizing and staging future water facilities to ensure adequate supply. This section identifies the usage among water use sectors including single-family residential, multifamily residential, commercial, industrial, institutional/governmental, irrigation use, and others.

### 3.2.1 Historical Water Use by Customer Type

Metered customers are classified as single-family residential, multifamily residential, commercial/institutional, industrial, landscape irrigation, and other. Tables 3-5 and 3-6 list the historical water use and customer account profile percentages for each water use sector. These classifications were used to analyze current consumption patterns among various types of customers.

Table 3-5. Water Deliveries, Actual 2005 (DWR Table 3)					
Water Use Sector	2005				
	Metered <sup>(a)</sup>		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	27,644	15,135	0	0	15,135
Multi-family	695	1,459	0	0	1,459
Commercial <sup>(b)</sup>	719	1,389	0	0	1,389
Industrial	19	962	0	0	962
Institutional/ governmental <sup>(b)</sup>	0	0	0	0	0
Landscape Irrigation	1,143	1,022	0	0	1,022
Agriculture	0	0	0	0	0
Other	216	143	0	0	143
<b>Total</b>	<b>30,436</b>	<b>20,110</b>	<b>0</b>	<b>0</b>	<b>20,110</b>

<sup>(a)</sup> Source: PWSS Report.

<sup>(b)</sup> Institutional/governmental accounts are aggregated in the Commercial customer category.

Table 3-6. Water Deliveries, Actual 2010 (DWR Table 4)					
Water Use Sector	2010				
	Metered <sup>(a)</sup>		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	28,380	11,262	0	0	11,262
Multi-family	693	1,246	0	0	1,246
Commercial	792	1,294	0	0	1,294
Industrial	18	736	0	0	736
Institutional/ governmental	0	0	0	0	0
Landscape Irrigation	1,091	1,871	0	0	1,871
Agriculture	0	0	0	0	0
Other	306	572	0	0	572
<b>Total</b>	<b>31,280</b>	<b>16,981</b>	<b>0</b>	<b>0</b>	<b>16,981</b>

<sup>(a)</sup> City of Antioch, INCODE report

<sup>(b)</sup> Institutional/governmental accounts are aggregated in the Commercial customer category.

### 3.2.2 Projected Water Use by Customer Type

Water demand projections in this report are based on population and employment projections and the SB7 targets for Antioch. The population projections were calculated based on ABAG 2009 projections for the City's sphere of influence (Section 2.6). The water use projections for 2015 assume that the City will use its 10-year baseline (i.e. 186 gpcd), since its less than the interim Method 3 target of 200 gpcd, and the projections for 2020, 2025, and 2030 assume that the City will use its 2020 water use target (165 gpcd). Tables 3-7, 3-8, and 3-9 summarize projected water use by water use sector for 2015, 2020, 2025 and 2030, respectively. Note that the water use projections decrease between 2015 and 2020

even though the number of accounts increases. This drop occurs because the per capita use factor decreases between these years.

**Table 3-7. Water Deliveries, Projected 2015 (DWR Table 5)**

Water Use Sector	2015				Total Volume (AFY)
	Metered <sup>(a)</sup>		Unmetered		
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	29,461	14,669	0	0	14,669
Multi-family	719	1,450	0	0	1,450
Commercial	954	1,816	0	0	1,816
Industrial	18	795	0	0	795
Institutional/governmental	0	0	0	0	0
Landscape Irrigation	1,134	1,969	0	0	1,969
Agriculture	0	0	0	0	0
Other	369	826			826
<b>Total</b>	<b>32,655</b>	<b>21,525</b>	<b>0</b>	<b>0</b>	<b>21,525</b>

<sup>(a)</sup> Basis: Total water demands are based on ABAG population projection for 2015 multiplied by the City's 10-year per capita water demand, as shown in Table 3-2 (since it is lower than the City's interim 2015 gpcd target). Demands by water use sector are based on multiplying the average percent of water use from 1994-2010 by customer category to the total water demand projection.

**Table 3-8. Water Deliveries, Projected 2020 (DWR Table 6)**

Water Use Sector	2020				Total Volume (AFY)
	Metered <sup>(a)</sup>		Unmetered		
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	30,463	12,813	0	0	12,813
Multi-family	744	1,333	0	0	1,333
Commercial	1,118	1,878	0	0	1,878
Industrial	18	752	0	0	752
Institutional/governmental	0	0	0	0	0
Landscape Irrigation	1,160	1,948	0	0	1,948
Agriculture	0	0	0	0	0
Other	432	967			967
<b>Total</b>	<b>33,935</b>	<b>19,692</b>	<b>0</b>	<b>0</b>	<b>19,692</b>

<sup>(a)</sup> Basis: Total water demands are based on ABAG population projection for 2020 multiplied by the City's 2020 gpcd target, as shown in Table 3-4 for Method 3 (i.e., the City's selected method). Demands by water use sector are based on multiplying the average percent of water use from 1994-2010 by customer category to the total water demand projection.

Table 3-9. Water Deliveries, Projected 2025, and 2030 (DWR Table 7)				
Water Use Sector	2025		2030	
	Metered <sup>(a)</sup>		Metered <sup>(a)</sup>	
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)
Single family	31,362	13,189	32,335	13,459
Multi-family	766	1,330	790	1,327
Commercial	1,236	2,008	1,366	2,295
Industrial	19	760	19	777
Institutional/governmental	0	0	0	0
Landscape Irrigation	1,180	1,916	1,188	1,863
Agriculture	0	0	0	0
Other	478	1,070	528	1,182
<b>Total</b>	<b>35,040</b>	<b>20,273</b>	<b>36,226</b>	<b>20,902</b>

<sup>(a)</sup> Basis: Total water demands are based on ABAG population projections for 2025 and 2030 multiplied by the City's 2020 gpcd target, as shown in Table 3-4 for Method 3 (i.e., the City's selected method). Demands by water use sector are based on multiplying the average percent of water use from 1994-2010 by customer category to the total water demand projection.

### 3.2.3 Low Income Projected Water Demands

Projected water demands for low-income single-family and multi-family residential water uses are included in the total water demands described in this section. The City's Housing Element includes a description of planned development within the City (City of Antioch, 2010). Part of the planned development includes lower income housing related to single family and multi-family accounts. To determine lower income housing water demands related to future development, the number of planned lower income housing units was multiplied by the average number of people per household (3.07) and by the SB7 gpcd targets.

Table 3-10 summarizes the water demand projections related to planned low-income developments.

Table 3-10. Low Income Projected Water Demands (DWR Table 8)				
Water Use Sector	Low Income Water Demands (AFY) <sup>a</sup>			
	2015	2020	2025	2030
Single family	6	11	17	23
Multi-family	90	136	193	250
<b>Total</b>	<b>96</b>	<b>148</b>	<b>210</b>	<b>272</b>

<sup>a</sup> Based on City of Antioch Housing Element (2010), 2000 Census average people per household of 3.07, and SB7 water use targets. The lower income water demands are included in the total water demand projections in Table 3-7, 3-8, and 3-9

### 3.2.4 Water Sales to Other Agencies

There are no existing or projected sales of water from the City to other agencies (Table 3-11).

**Table 3-11. Sales to Other Agencies, AFY (DWR Table 9)**

Water Distributed	2005	2010	2020	2025	2030
N/A	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

### 3.2.5 System Losses and Additional Water Uses

System losses are the difference between the actual volume of water treated and the actual metered consumption. Such apparent losses are always present in a water system due to pipe leaks, unauthorized connections or use; faulty meters; unmetered services such as fire protection and training, and system and street flushing. Table 3-12 summarizes the system losses from 2006 to 2010 as the difference between the annual production (including both treated and untreated water supplies) and annual sales. The average unaccounted-for water comprised about 3 percent of the total water produced. This percentage is very low compared to other California utilities. This lower percentage may be partly due to water meter addition for parks, medians, and school sites, regular meter maintenance, stringent construction standards applied to new facilities, replacement of deteriorated older pipes, and the relatively large portion of the system served by more modern facilities. The City's maintenance staff also actively pursues and corrects leaks. The year-to-year differences including a negative value in 2008 rate may, however, be due in part to a difference in time periods between production data and meter readings. The City measures water production daily, and total water use is measured in arrears. For example, water produced in December is billed as consumption in January.

**Table 3-12. Historical System Losses**

Year	System Losses, percent of annual water production
2006	2%
2007	6%
2008	-1%
2009	5%
2010	0%
<b>Average 2006 to 2010</b>	<b>3%</b>

Sources of additional water uses and losses are list in Table 3-13. There are no existing or projected loses of saline barriers, groundwater recharge, conjunctive use, raw water, or recycled water within the City.

**Table 3-13. Additional Water Uses and Losses, AF/Y (DWR Table 10)**

Water Use	2005	2010	2015	2020	2025	2030
Saline barriers	0	0	0	0	0	0
Groundwater recharge	0	0	0	0	0	0
Conjunctive use	0	0	0	0	0	0
Raw water	375	336	0	0	0	0
Recycled	0	0	487	1,000	1,500	1,500
Other (define)	0	0	0	0	0	0
Unaccounted-for system losses	624 <sup>a</sup>	526 <sup>a</sup>	666	609	627	646
<b>Total</b>	<b>999</b>	<b>862</b>	<b>1,153</b>	<b>1,609</b>	<b>2,127</b>	<b>2,146</b>

<sup>(a)</sup> The City measures water production daily, and total water use is measured in arrears. For example, water produced in December is billed as consumption in January. Thus, the unaccounted for system losses could not be directly calculated and instead were estimated as 3 percent of the annual production value.

### 3.2.6 Annual Water Supplied

Table 3-14 shows historical records of the annual amount of water purchased from CCWD and pumped from the Sacramento/San Joaquin Rivers Delta. Historically, there has been some water loss between the point of water pumping and the flow leaving the WTP including filter backwash water and water in water treatment sludge. Recently, the City brought online new facilities that will significantly reduce such losses at the WTP. Additionally, evaporation from the municipal reservoir results in further minor losses (about 4 acre-feet per year [AFY]).

**Table 3-14. Water Supplied at Antioch's Diversion Points**

Fiscal Year	Purchased from CCWD, AFY	Pumped from Sacramento/San Joaquin Rivers Delta, AFY	Total, AFY
2005/2006	12,198	7,213	19,411
2006/2007	14,222	6,979	21,202
2007/2008	15,037	5,433	20,471
2008/2009	13,762	4,881	18,643
2009/2010	11,064	6,172	17,237
2010/2011	7,668	5,622	13,291

### 3.2.7 Total Water Use

Total water use is the sum of water use by customer categories, sales to other agencies and additional water uses (Table 3-15).

**Table 3-15. Total Water Use, AFY (DWR Table 11)**

Water Use	2005	2010	2015	2020	2025	2030
Total water deliveries (from DWR Tables 3 to 7)	20,110	16,981	21,525	19,692	20,273	20,902
Sales to other water agencies (from DWR Table 9)	0	0	0	0	0	0
Additional water uses and losses (from DWR Table 10)	999	862	1,153	1,609	2,127	2,146
Total of DWR Tables 12, 13, 14	21,109	17,843	22,677	21,301	22,400	23,049

### 3.3 Demand on Wholesale Supply

Table 3-16 provides the projected amount of water that the City expects to purchase from CCWD to meet water demands in the future.

**Table 3-16. City Demand Projections to Wholesale Suppliers (DWR Table 12)**

Water Distributed	Contracted Volume (AFY)	City Demand Projections to Wholesale Suppliers (AFY)				
		2010	2015	2020	2025	2030
CCWD	N/A	17,843	22,677	21,301	22,400	23,049

### 3.4 Water Use Reduction Plan

As described in Section 6, the City has implemented water conservation since 2001. However, the city will need to achieve additional conservation to meet water use reduction goals (refer to Section 3.1).

The City will continue to implement its water conservation program, as described in Section 6. The City receives water from CCWD. CCWD has actively and consistently implemented a variety of water conservation programs since 1988. The overall goal of the City and CCWD water conservation programs is to maximize customer participation in water conservation programs. Since CCWD started its water conservation program in 1988, the program has evolved considerably.

In its early years, the program consisted of single-family surveys and showerhead distribution. Starting in 1994, CCWD provided rebates for Ultra Low Flow Toilets (ULFTs) which flush at 1.6 gallons, and then in 2007, the ULFT program was replaced with a High Efficiency Toilet (HET) Rebate Program for toilets that flush 1.28 gallons. In the year 2000, CCWD initiated a successful High Efficiency Clothes Washer Rebate program. The CCWD conservation program now includes surveys for all customer classes and incentive programs for numerous devices. Both surveys and rebate programs have changed over the years to increase the effectiveness of the program and the sustainability of water savings. The water conservation program is comprised of several key elements, each of which targets a specific customer base and satisfies the requirements of specific BMPs.

The City also expects to reduce water demands through some passive measures. Examples of such passive measures include plumbing code changes (e.g., high efficiency toilets) and regulations requiring retrofit of inefficient plumbing fixtures to efficient models upon resale of real estate.

## Section 4

# System Supplies

Water sources include the Canal water from CCWD, Sacramento/San Joaquin Rivers Delta, and a municipal reservoir located within the City limits. This section describes the water supply sources, quantities, supply constraints, and water quality. In addition, this section describes current and projected water supplies.

### 4.1 Surface Water

This section provides a description of the City's surface water supply as well as the physical and legal constraints of this supply. Currently, the City receives surface water from the Canal, the Sacramento/San Joaquin Rivers Delta, and the municipal reservoir.

#### 4.1.1 Contra Costa Canal

The CCWD supplies water to Antioch from diversions at Rock Slough and Old River in the Sacramento/San Joaquin Rivers Delta through the Contra Costa Canal, operated by CCWD for the United States Bureau of Reclamation (Bureau). The Raw Water Division of CCWD provides wholesale water to the City for about \$1,650 per MG (\$550 per acre-foot). The cost for pumping from the Canal to the municipal reservoir or the WTP is about \$30 per mg. Antioch's current annual agreement is for a peak demand of 25,000 gpm (36.0 mgd). CCWD presently draws only 67 percent of its annual 195,000 acre-feet (63,500 million gallons) allotment from the Delta. Unless constrained by drought conditions, CCWD is prepared to sell to the City all of the City's projected water needs through the year 2028. Based on recent studies, the existing Canal does not have sufficient capacity to carry the City's increased future flow together with those required by other customers, but CCWD has installed a pipeline parallel (multipurpose pipeline) to the Canal to satisfy such demands.

Historically, the quality of the water in the Canal has been beyond the direct control of CCWD. It depends on overall Delta water quality which is, in turn, affected by a multitude of factors including weather, upstream reservoir releases, tidal changes, discharge of nearby agricultural users, export rates of the pumps for the State Water Project and Central Valley Project, and standards and objectives set by the State Water Resources Control Board (SWRCB) and the United States EPA. The Canal was one of the first units in the Central Valley Project. The Bureau has a contract to deliver the water to the Canal, but the contract includes no water quality requirements. According to the contract, the Bureau is "...to maintain the quality of the raw water to be delivered hereunder at the highest level reasonably attainable and consistent with municipal and industrial use." The Bureau is not required to meet any specific water quality level for the Canal. The future water quality depends, primarily, on two factors:

- Operation of the Los Vaqueros Project
- Outcome of the Bay-Delta proceedings

The Los Vaqueros Project, approved by the voters in November 1988, has resulted in a new 100,000-AF storage reservoir located southwest of Brentwood. This project allows CCWD to draw low salinity (as measured by total dissolved solids [TDS] or chlorides) water from the Delta during high runoff periods. This water is now available for blending with normal withdrawals from Rock Slough. Los Vaqueros Reservoir also serves as emergency storage in the event of a chemical spill in the Delta or other disruption such as a levee failure. Currently CCWD is expanding Los Vaqueros capacity to 160,000 AF.

### 4.1.2 Sacramento/San Joaquin Rivers Delta

The City and earlier local inhabitants have drawn water from the Sacramento/San Joaquin Rivers Delta as a primary source for over 145 years. Before the growth of the irrigated rice industry around World War I, there was sufficient fresh water in the river year round. However, as this major summer diversion began and the flows into the Delta decreased, saline bay waters moved further upstream replacing the fresh water. The City sought judicial relief, filing a suit asking the court to restrain the upstream Williams Irrigation District from diverting Sacramento River waters. The court granted an injunction in January 1921, but the California Supreme Court reversed it in March 1922. The Supreme Court also pointed out that a physical solution, moving the City's diversion point upstream, was available. Since that time, the City has been able to pump from the Sacramento/San Joaquin Rivers Delta for varying periods up to more than 300 days per year. No pumping occurred during the drought period of 1976 to 1977. Similarly, from 1986 to March 1991, the City was only able to pump seven days a year. The City generally stops pumping if the mean chloride concentration in the river water exceeds 250 milligrams per liter (mg/L). If the chloride concentration in the municipal reservoir water is particularly low, the City may continue limited pumping to the municipal reservoir when the chloride concentration exceeds 250 mg/L in the river.

DWR and the City have an existing agreement, which specifies that the City will be able to pump water with a chloride content less than 250 mg/L at least 208 days per year. If the long-term average days of river pumping are less than 208 days per year, DWR will pay for one-third of the incremental difference in cost to the City between using river water and Canal water. This contract was a 40 year contract that began in 1968. Since 2008, the contract has been year to year. When there is a pumping shortfall, DWR now pays the City for one-third the incremental costs, including those added raw water costs associated with the Los Vaqueros Project.

In coming years, river water quality will continue to be impacted by decisions outside the City's control. State plans call for increased water diversions from the Delta to satisfy water demands in the San Joaquin Valley and areas south and west. Any decrease in the net flow from east to west in the Sacramento/San Joaquin Rivers Delta at Antioch will tend to reduce the availability of low chloride waters. The City can presently draw no more than about 16.0 mgd from the Sacramento/San Joaquin Rivers Delta when water quality permits any withdrawal because of the limited capacity of the river pumping station and the raw water pipeline from the river to the municipal reservoir. The Water Rights Division of SWRCB identified no quantity limitation on the City's appropriation from the Sacramento/San Joaquin Rivers Delta provided that diverted water is used beneficially. Once the City fills the municipal reservoir, it can only pump water to offset water used on a day-by-day basis and the small amount lost through evaporation.

Historically, between 2005 and 2010 the City pumped an average of 6,050 AFY from the Sacramento/San Joaquin Rivers Delta. For planning purposes, in normal years, it is assumed that this amount will be available. This is more conservative than the existing agreement of 208 days per year at 16 mgd or about 10,200 AF/year. In 1998, a very wet year, the quality of the water was sufficient to allow the City to pump 12,614 AF. In comparison, between 2005 and 2010 the City has taken an average of 12,325 AFY from CCWD.

### 4.1.3 Impacts of Regulatory Processes

Planning efforts have taken new direction for the Sacramento/San Joaquin Rivers Delta since the City's 2005 UWMP was developed. The Delta is a critical natural resource for California and the nation (in terms of agricultural production) and is considered to be in ecological crisis.

Since the City's 2005 UWMP, the State passed legislation to define a planning and implementation process for the Delta. The legislation is part of a comprehensive package of four policy bills and a bond measure. One of the bills is the Delta Protection Act of 2009, Senate Bill x7-1 (SBx7-1).

SBx7-1 includes the following:

- Formation of the Delta Investment Fund in the State Treasury to fund implementation of the regional economic sustainability plan and ecosystem restoration projects.
- Formation of the Sacramento-San Joaquin Delta Conservancy. The conservancy acts as the primary state agency to implement ecosystem restoration in the Delta and supports environmental protection and economic well-being of Delta residents.
- Formation of a committee convened by the Secretary of the Natural Resources Agency to develop and submit recommendations for a strategic plan related to sustainable management of the Delta.
- Enactment of the Delta Reform Act of 2009 and establishment of the Delta Stewardship Council (DSC). The DSC is required to develop, adopt, and commence implementation of a comprehensive resources management plan (the Delta Plan) for the Sacramento-San Joaquin Delta (Delta). The DSC is required to develop the Delta Plan by January 1, 2012. Development of the Delta Plan is a significant effort that requires integration with other planning efforts, such as the Bay Delta Conservation Plan (BDCP).

The DSC efforts are built upon other related planning agencies that were formed historically. The Delta Protection Commission, which was formed by the Delta Protection Act of 1992, was formed to prepare and adopt a comprehensive long-term resource management plan for specified lands within the Delta. SBx7-1 revised and recasted the provisions of the Delta Protection Act, including a reduction in the number of commission members and a requirement for the commission to recommend redefining the primary zone of the Delta.

- Requirements of DWR in connection with the BDCP.
- Formation of the Delta Independent Science Board to develop a scientific program related to management of the Delta.
- Requirement of the SWRCB to establish an effective system of Delta watershed diversion data collection and public reporting. The SWRCB is required to develop new flow criteria for the Delta ecosystem and to submit the flow criteria to the council.
- Repeal of the California Bay-Delta Authority Act that established the California Bay-Delta Authority (CBDA). CBDA was responsible for acting as the authority and implementing agency to conduct programs, projects, and activities to address CALFED goals and objectives.
- Appropriation of \$28,000,000 in bond money from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006.

The basic goals for the Delta planning process as defined by State Legislature are as follows:

- Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.
- Protect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities.
- Ensure orderly, balanced conservation and development of Delta land resources.
- Improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety.

The component of the Delta Protection Act that most significantly affects the City and its wholesaler, CCWD, is the adoption of Delta flow criteria. In August 2003, the State Water Resources Control Board adopted new flow criteria recommendations for the Delta that call for significantly increased flows into and through the Delta, particularly during the winter and spring.

Until planning efforts result in implementation, Delta water quality is currently dependent on past actions. In August 1978, the SWRCB issued Water Right Decision 1485, setting water quality standards in the Delta to be maintained by the State Water Project and Central Valley Project as a condition of their permit to store above and divert from the Delta. Review of historical water quality data indicate that if the maximum daily mean for chloride is kept below 250 mg/L, the other drinking water standards should not be exceeded, with the possible exception of trihalomethanes (THMs). During disinfection of source water, organic carbon can react with chlorine to form carcinogenic compounds such as THMs and haloacetic acids (HAAs). The City is currently meeting all standards including those for DBPs. No problems are foreseen that will prevent the City from meeting future standards. The City may, however, need some treatment modifications to respond to changing regulations.

#### 4.1.4 Municipal Reservoir

The 735-acre-foot (240-mg) municipal reservoir provides supply reliability and volume for equalization storage for water pumped from the Contra Costa Canal. The reservoir also serves the secondary purposes of flood control and impoundment of local runoff. Water production from the small (1,300-acre) tributary watershed, however, is of negligible importance particularly since most stormwater runoff from residential areas (about 600 acres) is now diverted around the reservoir.

The reservoir will continue to provide supply reliability and sufficient volume for equalizing the City's demand for raw water from the Canal. Use of equalizing volume, for example, permits purchase of raw water at a constant rate for periods of a month or more, depending on the season of the year. Raw water is delivered at a constant rate to the reservoir and the WTP, and is withdrawn from the reservoir at varying rates to meet fluctuating demand conditions. In the past, the ability to purchase water at uniform rates has been of significant economic value to the City. Raw water reservoir equalization may also be of value in the future. The storage volume which will be needed for equalization purposes will therefore depend upon the rate schedule and service rules which will be promulgated in coming years. It is likely, however, that the 240-MG available in the municipal reservoir will be sufficient for this purpose.

## 4.2 Groundwater

The City does not currently use groundwater nor does it plan to use groundwater by the year 2030 (Tables 4-1 and 4-2).

**Table 4-1. Amount of Groundwater Pumped, AF/Y (DWR Table 18)**

Basin Name (s)	Metered or Unmetered	2006	2007	2008	2009	2010
None	Not applicable	0	0	0	0	0
Percent of total water supply		0	0	0	0	0

**Table 4-2. Amount of Groundwater Projected to be Pumped, AF/Y (DWR Table 19)**

Basin Name (s)	2015	2020	2025	2030
None	0	0	0	0
Percent of total water supply	0	0	0	0

## 4.3 Transfer and Exchange Opportunities

The City has no current or future planned agreements for short-term or long-term transfer and exchange within the City's service area (Table 4-3).

Transfer Agency	Transfer or Exchange	Short-term	Proposed Quantities	Long-term	Proposed Quantities
None	0	0	0	0	0
Total	0	0	0	0	0

## 4.4 Desalination

As part of the San Francisco Public Utility Commission's (SFPUCs) Capital Improvement Plan (CIP), desalination has been identified as a potentially viable additional source of water. The following description of the SF Bay Area Desalinization Plant study is provided on the SFPUC website (<http://www.sfwater.org>):

This project, entered into jointly by the four regional water systems, San Francisco Public Utilities Water Department (SFPUC), East Bay Municipal Utilities District (EBMUD), Santa Clara Valley Water District (SCVWD) and Contra Costa Water District (CCWD) (and later joined by Alameda County Flood Control and Water Conservation District Zone 7), has studied the feasibility of constructing a seawater desalination plant. The parties shared equally in initial feasibility study cost as well as pilot testing at Mallard Slough. MOUs will be prepared for initial and subsequent phases that will address cost sharing of those phases. Parties also are pursuing Federal and State funding that may be available for design and construction. Phase 1 of the Prefeasibility Study has been completed. It evaluated the different sites and recommended three sites for further study. Phase II of the Prefeasibility Study further evaluated these sites in greater detail and considered environmental factors, transmission capability, institutional arrangements and grant funding. Funding for additional phases will be requested as the project progresses and based on recommendations of each phase of the project.

A site located just northwest of Antioch, the East Contra Costa Power Plant site, ranked as one of the top three (<http://www.sfwater.org>).

## 4.5 Recycled Water

The purpose of this section is to provide information on recycled wastewater and its potential for use as a water resource in the service area.

### 4.5.1 Recycled Water Plan Coordination

DDSD is the agency responsible for treating and discharging treated wastewater for the Cities of Antioch and Pittsburg and the unincorporated community of Bay Point located in Contra Costa County. Currently, the region collects an estimated 14,700 acre-feet of wastewater per year. Approximately 42 percent of that wastewater is used for recycled supply for various uses. The remaining wastewater is disposed through a river outfall into the Delta at New York Slough. It is expected that the amount of recycled water used will increase in the future.

The City owns and maintains a collection system that delivers raw sewage to DDSD pumping stations. In 1999, DDSD, in cooperation with Calpine Corporation, initiated a project to deliver recycled water from

the DDS D wastewater treatment plant to two power plants and some park areas within the City of Pittsburg. DDS D has provided approximately 7 mgd of recycled water on average since completing construction of a 12.8-mgd Recycled Water Facility (RWF) in 2001.

Currently, no recycled water is used within the City. However, the City expects to begin recycled water delivery for some landscape in June 2011. Recently, DDS D and its contributing agencies have moved to expand recycled water use within DDS D's service area in order to:

- **Reduce Dependence on Delta Supplies.** Delta supplies are the primary water source in DDS D's service area. Recycled water would reduce Delta water diversions by CCWD and the City.
- **Improve Water Supply Reliability.** Recycled water is not affected by hydrologic variability, and provides additional dry-year reliability.
- **Preserve Potable Water Supplies.** Recycled water use can offset potable water supply demands by serving non-potable demands such as irrigation.
- **Reduce Wastewater Discharges.** Recycled water use reduces wastewater discharges, which is beneficial to DDS D, who currently discharges its wastewater effluent into the New York Slough. With increasingly stringent wastewater discharge regulations, reusing wastewater helps DDS D in reducing effluent volume and trace constituents in its wastewater discharges.
- **Better Use Existing Recycled Water Facilities.** DDS D's existing recycled water facilities are sized to deliver a peak flow of 12.8 mgd; however, the facilities are currently underutilized. The average demand for power plants and existing irrigation users has been approximately 7 mgd with peak flows of up to 12 mgd occurring less than 10 percent of the year (RMC 2007). Delivery of recycled water in the City's service area will make use of available capacity.

DDS D recently negotiated an agreement with the local water agency, CCWD, to allow for the development of an additional 1,654 AFY of recycled water for urban landscape and golf course irrigation projects within the DDS D service area.

Now, in partnership with the City, DDS D is exploring the potential to expand recycled water deliveries to users in the City. DDS D has asked the City, through Phil Harrington, to adopt an ordinance to modify the City of Antioch Municipal Code to require purple-colored landscaping and irrigation materials on all installations. This has two purposes: 1) to indicate the water is not intended for drinking, and 2) to accommodate future recycled water connection readily. The City and DDS D have formed a partnership to assess the full potential of the recycled water market within the City and evaluate various alternatives for expanding the existing recycled water facilities to include additional irrigation customers.

#### 4.5.2 Wastewater Quantity, Quality, and Current Uses

The following section describes the estimated wastewater generated in the service area. The wastewater is collected and conveyed out of the service area to the DDS D wastewater treatment plant. This section provides a description of the regional Water Pollution Control Facility (WPCF) process and current reuse in the regional area.

**Wastewater Facilities.** DDS D's WPCF has secondary and partial tertiary treatment capabilities with a rated average dry weather flow (ADWF) capacity of 16.5 mgd. As shown on Figure 4-1, the major treatment processes include screening and grit removal, primary clarification, tower trickling filters, aeration in an activated sludge system, secondary clarification, and disinfection/chlorination. Treated and disinfected secondary effluent discharges to New York Slough in the Sacramento/San Joaquin Rivers Delta (RMC, 1999).

2-10-2001 GGND004.DWG

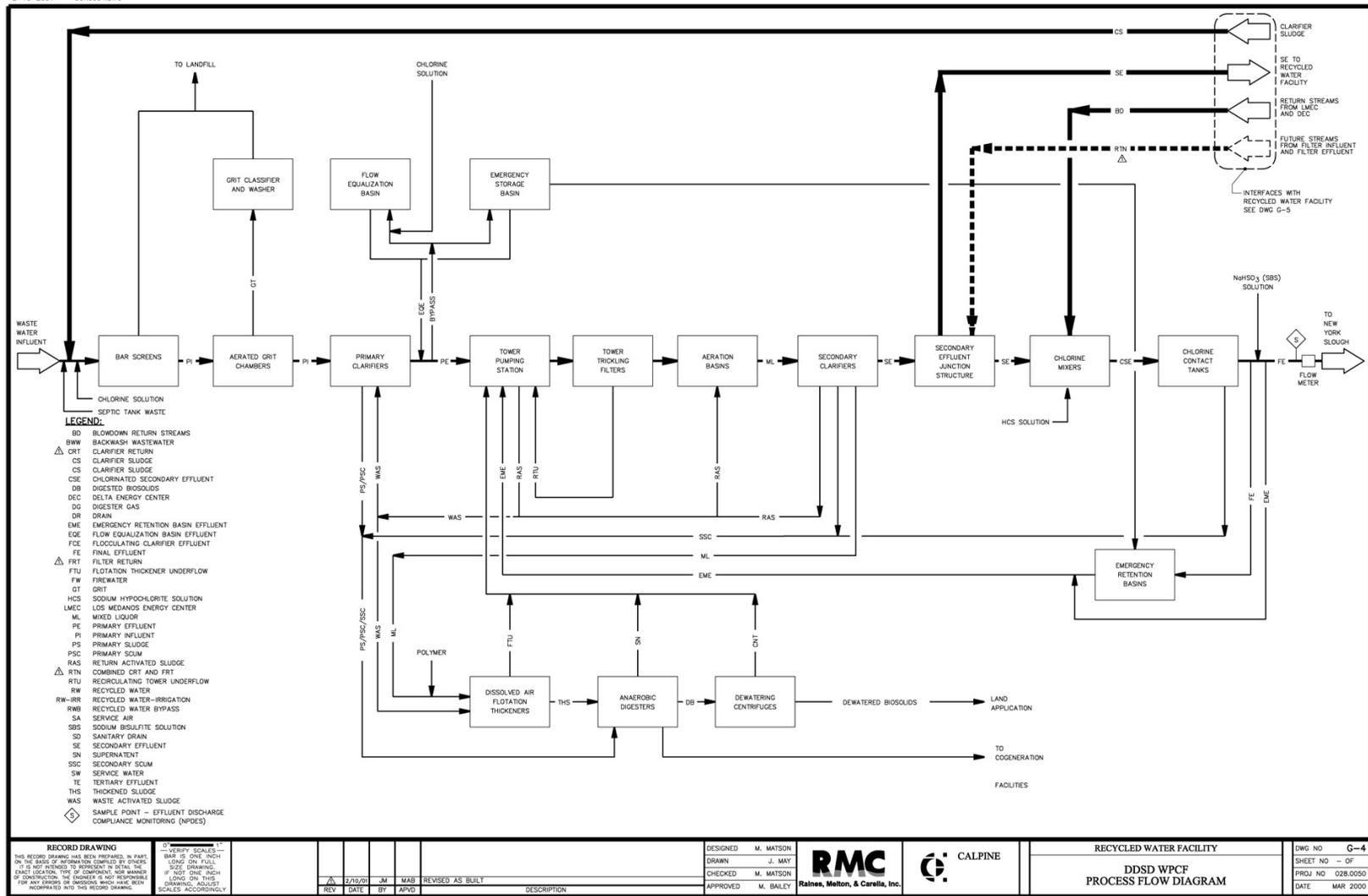


Figure 4-1. DDSS WPCF Process Flow Diagram

About half of the secondary-treated wastewater is diverted to the Recycled Water Facility prior to chlorination at a varying rate depending on recycled water demands. The RWF currently delivers approximately 7 mgd of recycled water on average for use at two nearby power plants, the Delta Energy Center (DEC) and Los Medanos Energy Center (LMEC) and irrigation of two parks owned by the City of Pittsburg. The power plants are located in an industrial area along the northern border of Pittsburg. DEC is located immediately adjacent to the RWF, while LMEC receives recycled water via a pipeline extending three miles from the RWF. The power plants return approximately 2 mgd (2,240 AFY) of cooling tower water to the WPCF, where it is combined with secondary-treated wastewater and is chlorinated and dechlorinated prior to discharge. The two parks being irrigated with recycled water are located along this route (RMC, 2007).

The Recycled Water Facility at DDSD was constructed in 2000 as part of a collaborative effort between DDSD and Calpine Corporation. It is designed to treat up to 12.8 mgd of secondary effluent from the WPCF. As shown in Figure 4-2, secondary effluent is diverted upstream of the WPCF disinfection, and undergoes flocculation, clarification, sedimentation, filtration and disinfection before being distributed to recycled water users (DDSD, 2000). Effluent quality meets or exceeds the California Department of Public Health (CDPH) Title 22 water quality requirements for “unrestricted” use of recycled water.

**Wastewater Generation.** Municipal wastewater is generated in the City from residential, commercial and industrial sources. The quantities of wastewater generated are proportional to the population and the water use in the service area. Estimates of the wastewater flows generated within the City for the present and future conditions are presented in Table 4-4 (DDSD, 2004). Table 4-4 also lists the projected quantity of treated water that meets the recycled water standards and is being discharged.

	2005	2010	2015	2020 <sup>b</sup>	2025 <sup>b</sup>	2030 <sup>b</sup>
<b>Wastewater collected in DDSD service area <sup>(a)</sup></b>	15,906	14,786	15,906	17,026	18,146	19,266
<b>Volume that meets recycled water standard</b>	7,841	6,721	14,338	14,338	14,338	14,338

Source: Personal communication with DDSD staff (Dean Eckerson) on 04/28/11..

<sup>(a)</sup> Projections provided by DDSD for the total DDSD service area. Wastewater is only collected in service area. There is not treatment in the City's service area.

<sup>(b)</sup> Projected recycled water based on utilization of DDSD's full recycled water facility capacity (12.8 mgd or 14,388 AFY).



**Wastewater Collection and Disposal.** In 2010, the annual average flow was 13.2 mgd, of which about half comes from the City. DDSD anticipates increasing the WPCF's capacity to about 25.3 mgd by 2030. These flow projections are used to estimate the timing for future expansion projects scheduled at the various pump stations, the diversion facility, and the WPCF.

The WPCF wastewater influent is primarily domestic, with approximately eight percent of the flow contributed by industrial and commercial sources. DDSD currently has an EPA-approved Pre-treatment Program. The treated effluent water quality meets the secondary standards required by DDSD's National Pollutant Discharge Elimination System (NPDES) permit. Current and planned disposal methods and quantities are presented in Table 4-5.

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030
Discharged to New York Slough through the District's deep water outfall (mgd)	Secondary effluent	8,065	1,568	2,688	3,808	4,929

Source: Personal communication with DDSD staff (Dean Eckerson) on 04/28/11..

### 4.5.3 Water Recycling Current Uses

Currently, the City uses no recycled water. However, the City expects that the DDSD recycled water connection will begin supplying about 487 AFY for landscape irrigation within the City's service area in June 2011. Together, the City and DDSD have developed an assessment of the recycled water market within Antioch and have evaluated potential alternatives to expand recycled water use to City parks, golf courses, and other irrigation customers. These efforts are documented in the following sections. As Table 4-6 indicates, the City's 2005 UWMP projected reclaimed water use of 531 AF in 2010.

Type of Use	2010 Actual Use (AFY)	2005 Projection for 2010 (AFY)
Agriculture Irrigation	0	0
Landscape Irrigation	0	531
Commercial Irrigation	0	0
Golf Course Irrigation	0	0
Wildlife habitat	0	0
Wetlands	0	0
Industrial Reuse	0	0
Groundwater recharge	0	0
Seawater Barrier	0	0
Geothermal/Energy	0	0
Indirect Potable Reuse	0	0
<b>Total</b>	<b>0</b>	<b>531</b>

#### 4.5.4 Potential and Projected Use of Recycled Water

The City is about to bring its recycled water service online in June 2011. This section presents the development and analysis of alternatives for the recycled water projects within the City.

**Potential Use for Recycled Water.** The potential for landscape irrigation with recycle water within the City is evaluated as listed in the December 2007 City of Antioch/DDSD Recycled Water Facilities Plan (RMC 2007). The existing irrigation reclaimed water demands identified are 1,577 AFY with an additional potential future irrigation demand of 750 AFY for proposed developments and 450 AFY for the Roddy Ranch area located south of the City. The potential recycled water use includes parks, golf courses, highway medians, and schoolyards for landscape irrigation. The existing recycled water demands and the potential future irrigation demands would account for approximately 16 percent of the total year 2010 water demand in the combined City area.

In addition to demand from irrigation sources, the 2007 Facilities Plan found that there is a total industrial demand of 1,210 AFY. This assessment is comprised of two existing GWF Power System plants (806 AFY demand) and a future peaker power plant (403 AFY demand). This accounts for approximately 7 percent of the City's year 2010 total water demand.

Although not evaluated as part of the 2007 Facilities Plan due to limited demands comparison to irrigation and industrial uses, other potential recycled water uses exist within the City of Antioch including: dual plumbing, car washes, and commercial laundries.

The potential recycled water demand is assumed to be constant in the future recognizing that the amount of landscaping area within the City is constant throughout the planning period. Table 4-7 shows the potential future recycled water demand for the planning period.

User Type	Treatment Level	2015	2020	2025	2030
Agriculture Irrigation	--	0	0	0	0
Landscape Irrigation <sup>a</sup>	Tertiary	1,577	1,577	1,577	1,577
Commercial Irrigation		0	0	0	0
Golf Course Irrigation		0	0	0	0
Wildlife habitat	--	0	0	0	0
Wetlands	--	0	0	0	0
Industrial Reuse	Tertiary	1,210	1,210	1,210	1,210
Groundwater recharge	--	0	0	0	0
Seawater Barrier		0	0	0	0
Geothermal/Energy		0	0	0	0
Indirect Potable Reuse		0	0	0	0
<b>Total</b>		<b>2,787</b>	<b>2,787</b>	<b>2,787</b>	<b>2,787</b>

<sup>a</sup> Does not include potential future irrigation demands related to proposed developments.

**Projected Future Use of Recycled Water.** Conceptual alternatives for recycled water projects in the City of Antioch were developed based on identifying locations of larger irrigation users (or “anchor” users) within similar geographic areas in order to receive optimal benefit with respect to cost. Table 4-8 presents a summary of the alternatives developed for the City of Antioch/DDSD Recycled Water Facilities Plan (RMC, 2007). As shown in this table, alternatives were classified by:

- **Recycled Water Source.** Each of the project alternatives receives recycled water from one or both of the following sources: (1) the DDSD RWF, and (2) a future satellite treatment plant in southeastern Antioch. Project alternatives served exclusively by the RWF are labeled with a “C”, denoting conventional treatment. Projects served by the future satellite treatment plant or combination of satellite treatment and the RWF are labeled with an “S”, denoting satellite treatment. The “C” alternatives serve existing users exclusively, while the “S” alternatives serve a combination of existing and future users.
- **Anchor Users Served.** The project alternatives were also classified by the main irrigation users served. These users provide the major end points of the distribution system, thereby dictating the backbone pipeline alignment needed to serve them.
- **Lateral Users Served.** Two project alternatives were further broken down based on the extent to which additional smaller users are served recycled water by laterals along the pipeline alignment.

Table 4-8. Project Alternatives Summary

Alternative	Recycled Water Source	Anchor Users	Number of Lateral Users	Demand Served (AFY)
<b>Conventional Alternative</b>				
C1a	RWF	Lone Tree Golf Course	5	487
C1b	RWF	Lone Tree Golf Course	15	713
C2	RWF	Lone Tree Golf Course Contra Loma Regional Park	15	818
C3	RWF	Lone Tree Golf Course Deer Valley High School	18	850
C4	RWF	Lone Tree Golf Course Contra Loma Regional Park Deer Valley High School	18	955
<b>Satellite Treatment Alternatives</b>				
S1a	RWF Satellite Treatment	Lone Tree Golf Course Sand Creek Golf Course Deer Valley High School	10	1,128
S1b	RWF Satellite Treatment	Lone Tree Golf Course Sand Creek Golf Course Deer Valley High School	20	1,364
S2	Satellite Treatment	Lone Tree Golf Course Sand Creek Golf Course Deer Valley High School	5	1,097
S3	RWF Satellite Treatment	Lone Tree Golf Course Sand Creek Golf Course Deer Valley High School FUA-2 Users	24	1,437

NOTE: “C” represents conventional alternatives, and “S” represents satellite treatment alternatives.

The 2007 Facilities Plan recommended Alternative C1a. This project was selected as the most feasible alternative for the following reasons:

- **Cost Effectiveness.** Although Alternative C1a did not have the lowest unit cost of the other “C” alternatives, it did have lowest capital (\$8.9 M) and O&M costs.
- **Timing of Demand.** All of the users served are existing irrigation customers. This allows the City to capitalize on the benefits of recycled water use as soon as infrastructure is designed and constructed.
- **Users Served.** Alternative C1a serves only municipal customers within the City. This arrangement avoids any delays associated with negotiating agreements with new users or developing public outreach programs to make users more aware of recycled water.
- **Minimal Impacts.** It involves use of existing infrastructure, thereby reducing potential environmental impacts and traffic impacts relating to new construction.
- **Multiple Benefits.** It will reduce dependence on Delta water supplies, improve water supply reliability, reduce wastewater discharges, and utilize existing recycled water or water treatment facilities.

Future phases of the Antioch/DDSD recycled water project will expand upon Phase I (Alternative C1a) to maximize potential use of recycled water in the City of Antioch. Phase II (Alternative C1b) and Phase III (expansion of Phase II) target existing irrigation customers but do not yet have a schedule for implementation. Additional phases may be implemented to serve future demands from new developments. Table 4-9 presents the projected reuse water demands in the City’s service area, based on Alternative C1a.

Type of Use	2015	2020	2025	2030
Agriculture	0	0	0	0
Landscape	487	1,000	1,500	1,500
Wildlife habitat	0	0	0	0
Wetlands	0	0	0	0
Industrial	0	0	0	0
Groundwater recharge	0	0	0	0
<b>Total</b>	<b>487</b>	<b>1,000</b>	<b>1,500</b>	<b>1,500</b>

The City does not have future plans to use financial incentives to encourage reclaimed water use. However, the City does plan on promoting reclaimed water use by means of public outreach, such as newsletters, public meetings, recycled water school curriculum development, media relations, and advertisement. As shown in Table 4-10, the projected water savings for this public outreach program have not yet been developed.

Actions	Projected Results (AFY)				
	2010	2015	2020	2025	2030
Financial incentives	N/A	N/A	N/A	N/A	N/A
Public outreach	N/A	N/A	N/A	N/A	N/A
<b>Total</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

## 4.6 Water Supplies Summary

Table 4-11 summarizes the current and projected annual water supply for normal climate years. Based on communications with CCWD staff, CCWD plans to provide the supply needed to serve the City's needs (including dry years) less the City's local supplies (i.e., the Sacramento/San Joaquin Rivers Delta, the City's municipal reservoir, and recycled water). For this reason, CCWD projected supplies fluctuate over the future years.

Water Supply Sources	Wholesale Supplied Volume	2010	2015	2020	2025	2030
Surface water purchased from CCWD	Yes	17,843	22,645	21,301	22,400	23,049
Sacramento/San Joaquin Rivers Delta	No	7,550	7,550	7,550	7,550	7,550
Municipal Reservoir	No	380	380	380	380	380
Transfers in or out	No	0	0	0	0	0
Exchanges in or out	No	0	0	0	0	0
Recycled water from DDSD <sup>a</sup>	No	0	,487	1,000	1,500	1,500
Desalination	No	0	0	0	0	0
Groundwater wells	No	0	0	0	0	0
Other	No	0	0	0	0	0
<b>Total</b>		<b>25,733</b>	<b>31,062</b>	<b>30,231</b>	<b>31,830</b>	<b>32,479</b>

<sup>(a)</sup> Developed from recycled water projections in the Antioch/DDSD Recycled Water Facilities Plan, December 2007.

## 4.7 Future Water Supply Projects

There are no expected future supply projects or programs within the City's service area (Table 4-12). This is due to the fact that the current water supply sources more than adequately meet the projected water use identified in the water supply and demand assessment (see Section 5.4). The CCWD UWMP includes information from the wholesaler's perspective on this matter.

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Future Water Supply Projects (AFY)				
				Normal-Year Supply	Single-Dry Supply	Multiple-Dry Year First Year Supply	Multiple-Dry Year Second Year Supply	Multiple-Dry Year Third Year Supply
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## Section 5

# Water Supply Reliability and Water Shortage Contingency Planning

This section describes water supply reliability and vulnerability, water shortage expectations, and water shortage revenue and expenditure impacts.

### 5.1 Water Supply Reliability and Vulnerability

Table 5-1 summarizes the water supply for normal, single, and multiple dry water years (as defined in Table 5-2) based on historic conditions. The surface water supply to the City could be reduced during a single and multiple dry-year scenario.

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
		Year 1	Year 2	Year 3
20,508 <sup>a</sup>	14,348 <sup>a</sup>	11,033 <sup>a</sup>	11,145 <sup>a</sup>	11,335 <sup>a</sup>
Percent of Normal	70	54	54	55

<sup>(a)</sup> Based on water sales data for the years listed in Table 5-2.

Water Year Type	Base Year (s)
Average water year	2000 to 2004
Single dry water year	1994
Multiple dry water year	1987 to 1990

The water supply reliability goal approved by the CCWD’s Board of Directors is to meet 100 percent of demand in normal years and at least 85 percent of demand during drought conditions. The remaining 15 percent would be met by a combination of short-term water purchases and a voluntary short-term conservation program. Based on communications from CCWD staff (Quimby, 2011), CCWD supplies deficits vary during dry years as summarized in Table 5-3.

**Table 5-3. CCWD Supply Reliability - Percent of Projected Demand Reductions based on Supply Deficits**

Year	Normal	Single-Year Drought	Multi-Year Drought (yr 1)	Multi-Year Drought (yr 2)	Multi-Year Drought (yr 3)
Near-term	0%	0%	0%	0%	9%
2015	0%	0%	0%	0%	8%
2020	0%	0%	0%	0%	8%
2025	0%	1%	0%	1%	12%
2030	0%	4%	0%	4%	15%

Note: Adapted from Table 2 of the "Urban Water Management Plan – Supply Reliability Analysis and SBx7-7 Requirements" letter from CCWD staff (Jeff Quimby) to City of Antioch staff (Phil Harrington) on February 7, 2011.

Note that near-term demands can be met under all supply conditions except for the third year of a multiple dry year scenario, which requires a 9 percent reduction in demand. CCWD assumes for its planning purposes that the City may receive 91 percent of its normal year supply from CCWD during near-term dry year scenarios, including single dry years and multiple dry years (Table 5-4). The City's direct supply from the Sacramento and San Joaquin Rivers Delta is assumed to be unavailable during second and third dry years, due to salinity restrictions. The City's municipal reservoir is assumed to not provide supplies during second and third dry years as well. Table 5-4 summarizes the supply reliability of current water supply sources.

**Table 5-4. Supply Reliability – Current Water Sources, AFY (DWR Table 31)**

Water Supply Sources	Average / Normal Water Year Supply	Single Dry	Multiple Dry Water Years		
			Year 2011	Year 2012	Year 2013
CCWD	22,677	20,636	20,636	20,636	20,636
Sacramento/San Joaquin Rivers Delta	7,550	7,550	7,550	0	0
Municipal Reservoir	380	380	380	0	0
Percent of normal Year	100%	93%	93%	67%	67%

Table 5-5 summarizes factors that result in inconsistent water supply. Surface water from CCWD is affected by climate. As shown in Table 5-4, years of multiple dry-weather will result in a reduction of water supply. Similar results are shown for water supply from the Sacramento/San Joaquin Rivers Delta. However in that case, water quality is the bigger issue. Diminishing water quality levels from the Sacramento/San Joaquin Rivers Delta will occur during dry water years but can also occur if over pumping causes a significant decrease in net water flow. If there is a need, these inconsistent sources can be supplemented by alternative sources, such as recycled water, as well as water-use efficiency measures, such as DMM/BMP and the City's water shortage contingency plan.

**Table 5-5. Factors Resulting in Inconsistency of Supply (DWR Table 29)**

Name of Supply	Specific Source Name, if any	Limitation Quantification	Legal	Environmental	Water Quality	Climatic
Surface water (wholesaler-provided)	Sacramento/San Joaquin Rivers Delta		None	None	Yes, potential impact	Yes, potential impact
Surface water	Sacramento/San Joaquin Rivers Delta		None	None	Yes, potential impact	Yes, potential impact
Surface water	Municipal Reservoir		None	None	Yes, potential impact	Yes, potential impact
Groundwater	N/A		None	None	None	None
Recycled water	DDSD		None	None	None	None

## 5.2 Wholesale Agency Water Supply Projections

The following Table 5-6 presents the amount of wholesale water that the City projects receiving. In this case, the planned and existing sources of water available to the City are the same.

**Table 5-6. Wholesale Supplies – Existing and Planned Sources of Water, AF/Y (DWR Table 17)**

Wholesaler Sources	2015	2020	2025	2030
CCWD	22,677	21,301	22,400	23,049

## 5.3 Water Quality of Existing Water Supply Sources

The City anticipates that water quality could impact water supplies, as summarized in Table 5-7.

**Table 5-7. Current & Projected Water Supply Changes Due to Water Quality (DWR Table 30)**

Water Source	Description of Condition	2010	2015	2020	2025	2030
CCWD	Dry year impacts on Delta water quality	1,606	1,814	1,704	2,688	3,457
Sacramento/San Joaquin Rivers Delta	Dry year impacts on Delta water quality	680	604	604	906	1,133
Municipal Reservoir	N/A	N/A	N/A	N/A	N/A	N/A
Recycled water	N/A	N/A	N/A	N/A	N/A	N/A

## 5.4 Water Supply and Demand Comparisons

This section presents a comparison of existing and future water supply versus demand. The comparison is based on the water demand projections developed in Section 3 and the water supply volumes determined and projected in Section 4. The comparison considers the projected normal water year

demands versus the projected normal water year supplies. Consideration was also given to water demand and supply conditions for a single dry water year and multiple dry water years.

#### 5.4.1 Current and Projected Water Supplies vs. Demand

Table 5-8 summarizes and compares the projected annual water supply and demand for normal water supply years. The City will have adequate capacity during normal years through the year 2030.

<b>Table 5-8. Supply and Demand Comparison – Normal Year, AF/Y (DWR Table 32)</b>				
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Supply totals (from DWR Table 16)	31,094	30,231	31,830	32,479
Demand totals (from DWR Table 11)	22,677	21,301	22,400	23,049
Difference	8,417	8,930	9,430	9,430
Difference as percent of supply	27%	30%	30%	29%
Difference as percent of demand	37%	42%	42%	41%

#### 5.4.2 Water Shortage Expectations

Tables 5-8 and 5-9 summarize the projected water supply and demand for single dry and multiple dry water years based on the assumptions about water reliability described in earlier parts of this section, particularly Table 5-3. Tables 5-8 and 5-9 show that the City will have an adequate water supply during normal years, single dry years, and the first year of multiple dry water years through the year 2030. However, during the second and third years of multiple dry years, CCWD will deliver reduced supplies to the City, and it is assumed that local supplies (supplies from the municipal reservoir and direct pumping from the Sacramento/San Joaquin Rivers Delta) will not be available. Thus, the City will have to request that its customers conserve or will require cutbacks in the second and third dry water years up to 15 percent. These reductions recognize that the City's water demand associated with growth will continue to occur during multiple dry years.

<b>Table 5-9. Supply and Demand Comparison – Single Dry Year, AF/Y (DWR Table 33)</b>				
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Supply totals	31,094	30,231	31,606	31,557
Demand totals	22,677	21,301	22,400	23,049
Difference	8,417	8,930	9,206	8,508
Difference as percent of supply	27%	30%	29%	27%
Difference as percent of demand	37%	42%	41%	37%

<b>Table 5-10. Supply and Demand Comparison – Multiple Dry Year Events (DWR Table 34)</b>					
		<b>Supply and Demand Comparison – Multiple Dry Year Events (AFY or percent as noted)</b>			
		<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Multiple-dry year First year supply</b>	Supply totals	31,094	30,231	31,830	32,479
	Demand totals	22,677	21,301	22,400	23,049
	Difference	8,417	8,930	9,430	9,430
	Difference as percent of supply	27%	30%	30%	29%
	Difference as percent of demand	37%	42%	42%	41%
<b>Multiple-dry year Second year supply</b>	Supply totals	22,677	21,301	22,176	22,127
	Demand totals	22,677	21,301	22,400	23,049
	Difference	0	0	(224)	(922)
	Difference as percent of supply	0%	0%	-1%	-4%
	Difference as percent of demand	0%	0%	-1%	-4%
<b>Multiple-dry year Third year supply</b>	Supply totals	20,863	19,597	19,712	19,591
	Demand totals	22,677	21,301	22,400	23,049
	Difference	(1,814)	(1,704)	(2,688)	(3,457)
	Difference as percent of supply	-9%	-9%	-14%	-18%
	Difference as percent of demand	-8%	-8%	-12%	-15%

## 5.5 Water Shortage Contingency Plan

This section outlines the estimated three-year minimum water supply, the actions and stages described in the water conservation ordinance that will be implemented in the event of a water supply shortage, and the emergency preparedness and plans for catastrophic events. Appendix D includes the Water Conservation Ordinance 2026-C-S.

### 5.5.1 Stages of Actions and Conditions

This section describes the stages of action to be undertaken in response to water supply shortages. Included is an outline of specific water supply conditions that are applicable to each stage. Per California Water Code Section 10632 (a), the City has developed four stages of action to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

The stages will be implemented during water supply shortages according to shortage level, ranging from 5 percent shortage in Stage I to 50 percent shortage in Stage IV. The stage determination and declaration during a water supply shortage will be made by the Public Works Director. Table 5-11 describes the water supply shortage levels and stages.

- During Stage I, water alert conditions are declared and voluntary water conservation is encouraged.
  - The City maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conservation messages printed in local newspapers and on the City's internet web page.

- The drought situation is explained to the public and governmental bodies.
- The City explains other stages and forecasts future actions.
- Educational programs in area schools are ongoing.
- Educational information is also available from the City’s Customer Service desk.
- During Stage II of a water supply shortage, the shortage is moderate, 10 to 20 percent, and conservation may be voluntary, consist of allotments, and/or include mandatory conservation rules.
  - The severity of actions depends upon the percent shortage.
  - The City aggressively continues its public information and education programs.
  - The City asks for 10 to 20 percent voluntary or mandatory water use reductions.
  - If necessary, the City also supports passage of drought ordinances.
- During Stage III of a water supply shortage, the shortage is severe, 20 to 35 percent, and 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 would adopt drought ordinances and implements mandatory reductions.
  - Rate changes are implemented to penalize excess usage.
  - Water use restriction is put into effect; i.e., prohibited uses can include restrictions on watering during certain daytime hours, excessive watering resulting in gutter flooding, using hoses without a shutoff device, using non-recycling fountains, washing down sidewalks or patios, not repairing leaks, etc.
  - The City monitors production weekly for compliance with necessary reductions. As a result of a customer consistently abusing use, the City would install a flow restrictor at the water meter.
- During Stage IV of a water supply shortage, the shortage is critical, 35 to 50 percent.
  - Conservation consists of allotments and mandatory conservation rules.
  - All steps taken in prior stages are intensified and production is monitored daily for compliance with necessary reductions.

**Table 5-11. Water Shortage Contingency - Rationing Stages to Address Water Supply Shortages (DWR Table 35)**

Stage	Water Supply Conditions	Percent Shortage
I - Voluntary	Minimum - voluntary	5 to 10
II - Mandatory Conservation Phase	Moderate - voluntary allotments and/or mandatory conservation rules	10 to 20
III - Rationing Phase	Severe - allotments and mandatory conservation rules	20 to 35
IV - Intense Rationing Phase	Critical - allotments and mandatory conservation rules	35 to 50

### 5.5.2 Prohibitions

California Water Code Section 10632 (d) requires mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. The City is currently operating under the State’s Water Efficient Landscape Ordinance (WELO). These regulations address landscape and

irrigation plans. In addition, the City has adopted Resolution 89-263, which addresses landscape guidelines for public open space areas within planned developments. Appendix E includes this document. Both documents are proactive means of reducing the water demand in the City of Antioch. If drought conditions warrant mandatory reductions, during Stage II of a water supply shortage, the City may adopt and implement an ordinance for mandatory conservation and water restriction plan. This ordinance may require additional tariffs for the City to enforce the plan.

The ordinance may address prohibitions on various wasteful water uses, including, but not limited to, the hose washing of sidewalks and driveways using potable water, cleaning or filling decorative fountains, and allowing plumbing leaks to go uncorrected for more than 72 hours. Table 5-12 identifies potential prohibitions and the stages during which the prohibition would be voluntary and mandatory.

<b>Prohibitions</b>	<b>Stage When Prohibition is Voluntarily Requested</b>	<b>Stage When Prohibition Becomes Mandatory</b>
Cleaning of Streets/sidewalks/walkways/parking areas/patios/porches or verandas	I	II, III, IV
Washing cars	I	II, III, IV
Watering lawns/landscapes	I	II, III, IV
Non-permanent agriculture	I	II, III, IV
Uncorrected plumbing leaks	I	II, III, IV
Cleaning/filling/operating/maintaining levels in non-recycling decorative fountains	I	II, III, IV

### 5.5.3 Consumption Reduction Methods

Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. California Water Code Section 10632 (e) requires the water supplier to provide consumption reduction methods in the most restrictive stages of a water shortage. The City will use the consumption reduction methods proposed in Table 5-13.

<b>Consumption Reduction Methods</b>	<b>Stage When Method Takes Effect</b>	<b>Projected Reduction, Percent</b>
Demand reduction program	All Stages	5 to 50
Flow restriction	III, IV	20 to 50
Restrict for only priority uses	II, III, IV	10 to 50
Use prohibitions	II, III, IV	10 to 50
Per capita allotment by customer type	III, IV	20 to 50
Plumbing fixture replacement	All Stages	5 to 50
Voluntary rationing	II	10 to 50
Mandatory rationing	III, IV	20 to 50

**Table 5-13. Water Shortage Contingency – Consumption Reduction Methods (DWR Table 37)**

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction, Percent
Excess use penalty	III, IV	20 to 50
Water conservation kits	All Stages	5 to 50
Education program	All Stages	5 to 50
Percentage reduction by customer type	III, IV	20 to 50

### 5.5.4 Penalties

Section 10632 (f) of the California Water Code requires a water supplier to penalize or charge for excessive water use, where applicable. The City, after one written warning, shall install a flow-restricting device on the service line of any customer observed by City personnel to be using water for any non-essential or unauthorized use defined in a City ordinance. The City also has Administrative Citations for \$100, \$200, and \$500 for each subsequent violation of the Antioch Municipal Code.

An excess use penalty per 100 cubic feet of water used in excess of the applicable allocation during each billing period shall be charged by the City for all service rendered on and after the effective date of an ordinance. Repeated violations of unauthorized water use will result in discontinuance of water service. Table 5-14 presents penalties and charges and the stage during which they take effect.

**Table 5-14. Water Shortage Contingency – Penalties and Charges (DWR Table 38)**

Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	III, IV
Charge for excess use	III, IV
Charge per unit over allotment	III, IV
Flow restriction	III, IV
Termination of service	III, IV

### 5.5.5 Mechanisms for Determining Actual Reductions

California Water Code 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 normal water supply conditions, water production figures are recorded daily within and monitored by the Superintendent. Totals are reported monthly and are 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 City's Superintendent.

<b>Table 5-15. Water Use Monitoring Mechanisms</b>	
<b>Mechanisms for Determining Actual Reductions</b>	<b>Type Data Expected</b>
Water production meters	Water production meters are monitored on a monthly basis.
Customer records	Provides information on consumers exceeding maximum consumption limits and tracks abnormal increases and decreases in consumption.

### 5.5.6 Revenue and Expenditure Impacts During Shortages

Section 10632 (g) of the California Water Code requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. The City will establish memorandum accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. The City will implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts. Tables 5-15 and 5-16 display the Components of Revenue and Expenditure Impacts and summary of effects.

<b>Table 5-16. Proposed Measures to Overcome Revenue</b>	
<b>Names of Measures</b>	<b>Summary of Effects</b>
Development of reserves	There is a reserve policy (contingency fund) in place to help offset expenditure impacts during times of emergency.
Surcharge	The City will implement a surcharge to recover revenue shortfalls recorded in its drought memorandum accounts.

<b>Table 5-17. Proposed Measures to Overcome Expenditure Impacts</b>	
<b>Names of Measures</b>	<b>Summary of Effects</b>
Development of reserves	There is a reserve policy (contingency fund) in place to help offset expenditure impacts during times of emergency.

### 5.5.7 Catastrophic Supply Interruption Plan

The Water Code Section 10632 (c) requires actions to be undertaken by the water supplier to prepare for and implement during a catastrophic interruption of water supplies. A catastrophic event that constitutes a proclamation of a water shortage would be any event, either natural or manmade, that causes a severe shortage of water, synonymous with or with greater severity than the Stage III or Stage IV water supply shortage conditions. Facilities are inspected annually for earthquake safety. Auxiliary generators and improvements to the water storage facilities to prevent loss of these facilities during an earthquake or any disaster causing an electric power outage have been budgeted for and installed as part of the annual construction process. Table 5-18 is a summary of items discussed regarding the preparation actions for a catastrophe.

**Table 5-18. Preparation Actions for a Catastrophe**

<b>Summary of Actions</b>
<ul style="list-style-type: none"><li>• Determine what constitutes a proclamation of a water shortage</li></ul>
<ul style="list-style-type: none"><li>• Stretch existing water storage</li></ul>
<ul style="list-style-type: none"><li>• Obtain additional water supplies</li></ul>
<ul style="list-style-type: none"><li>• Determine the funding source</li></ul>
<ul style="list-style-type: none"><li>• Contact and coordinate with other agencies</li></ul>
<ul style="list-style-type: none"><li>• Create an Emergency Response Team/Coordinator</li></ul>
<ul style="list-style-type: none"><li>• Create a catastrophe preparedness plan</li></ul>
<ul style="list-style-type: none"><li>• Put employees/contractors on-call</li></ul>
<ul style="list-style-type: none"><li>• Develop methods to communicate with the public</li></ul>
<ul style="list-style-type: none"><li>• Develop methods to prepare for water quality interruptions</li></ul>

## Section 6

# Demand Management Measures

Water conservation is a method available to reduce water demands, thereby reducing the City's water supply needs. As presented in Table 3-2, the City's baseline water use is 186 gpcd. Using Method 3 the 2020 target is 165 gpcd, a reduction of about 11 percent of historical usage (i.e., the 10-year baseline usage). In 2009, water use had dropped to 164 gpcd, less than the 2020 target. The City assumes that the recent, rapid decrease in per capita water use results from voluntary water conservation during a drought period and the economic recession. The recession has encouraged reduced water use directly to save money. The City has also invested in its WTP operations, capturing and re-treating its lost streams (backwash water and water in solids) to produce more potable water. As presented in Section 3, the City, in conjunction with Delta Diablo Sanitation District, has constructed recycled water distribution facilities that come online this year.

As economic conditions improve and some drought-driven conservation abates, the City expects that per capita water use may increase. This section describes the City's water conservation program. The City will continue its historical water conservation measures, better implement existing programs, and possibly add new programs in the future. To ensure compliance with the 2020 reductions, it will also use means other than DMMs. Table 6-1 summarizes the City's projects for achieving the 11 percent reduction.

**Table 6-1. Proposed Methods to Achieve 2020 Per Capita Water Use Goal**

Item	No. of Interventions	Water Savings per Intervention (gpd/intervention)	Annual Savings in year 2020 (AFY)	Projected Percent of Required Savings	Comments
Water Treatment Plant Lost Water Recovery	N/A	N/A	660	27%	Already implemented.
Use Offset with Recycled Water	N/A	N/A	1,000	41%	About 50 percent implemented in 2011. Will be expanded incrementally
DMM 1 Residential Water Surveys: Single Family	2000	44	99	4%	Water savings based on 2002 data analysis for SODs grant program. Assumes about 10% of single family residential (SFR) customers participate and have not been targeted previously.
DMM 2 Residential Plumbing Retrofits	2000	5	11	0%	Water savings based on A&N BMP Costs & Savings Study, March 2005 City has over 18,600 pre-1992 single family residential units and over 3,700 pre 1992 multi-family residential units.
DMM 3 System water Audits, Leak Detection, and Repair	N/A	N/A		0%	City will implement this program, but no water conservation credit is taken.

Table 6-1. Proposed Methods to Achieve 2020 Per Capita Water Use Goal					
Item	No. of Interventions	Water Savings per Intervention (gpd/ intervention)	Annual Savings in year 2020 (AFY)	Projected Percent of Required Savings	Comments
DMM 5 Large Landscape Conservation Programs	500	6%	112	5%	Water savings of 6% based on A&N BMP Cost & Savings Study. Assumes 50% of landscape accounts participate and have not previously participated.
DMM 6 High Efficiency Washing Machine Rebate Program	2000	81	181	7%	Water savings based on A&N BMP Costs & Savings Study, March 2005. Assumes about 10% of SFR customers participate and have not been targeted previously.
DMM 9 Conservation Programs for Commercial, Industrial and Institutional Accounts	N/A	N/A		0%	City will implement this program, but no water conservation credit is taken.
DMM 11 Conservation Pricing: Residential	33,935	5	190	8%	City's most recent rate increase (in 2010) of about 11% is assumed to reduce water use by about 1.5 gpcd.
DMM 14 Residential Toilet Replacement Program	2500	33	92	4%	Water savings are based on professional judgment. Assumes about 15% of SFR customers participate and have not been targeted previously.
Water Sense Standard-- Efficiencies in New Residential Construction	3000	22	74	3%	
<b>Total</b>	--	--	<b>2,419</b>	<b>100%</b>	

Note: This table does not list DMMs where the City can attribute no direct measurable water savings.

## 6.1 Demand Management Measures

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 urban DMMs for conserving water. This consensus-building effort resulted in the CUWCC's MOU, as amended December 10, 2008, among parties. The MOU formalizes an agreement to implement these DMMs and makes a cooperative effort to reduce the consumption of California's water resources. Table 6-2 lists the MOU-defined DMMs. The MOU-defined DMMs are generally recognized as standard definitions of water conservation measures. The CUWCC administers the MOU. The City has not signed the MOU.

The MOU requires that a water utility 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.

Previously, the DMM numbering system followed the CUWCC BMP numbering system. Since development of the 2005 Plan, the CUWCC has revised its classification of BMPs. Table 6-2 lists both the revised (current) and former BMP classifications.

<b>Table 6-2. Water Conservation Demand Management Measures Listed in MOU</b>				
<b>Revised (Current) CUWCC BMP Category</b>			<b>Former DMM/CUWCC BMP Name</b>	
<b>Category</b>	<b>BMP No.</b>	<b>BMP Name</b>	<b>DMM/BMP No.</b>	<b>DMM/BMP Name</b>
<b>Foundational BMPs</b>	<b>BMP 1</b>	<b>Utility Operations</b>		
	<b>BMP 1.1</b>	<b>Operations Practices</b>		
	<b>BMP 1.1.1</b>	<b>Conservation Coordinator</b>	<b>12</b>	<b>Conservation Coordinator</b>
	<b>BMP 1.1.2</b>	<b>Water Waste Prevention</b>	<b>13</b>	<b>Water Waste Prohibition</b>
	<b>BMP 1.1.3</b>	<b>Wholesale Agency Assistance</b>	<b>10</b>	<b>Wholesale Agency Assistance Programs</b>
	<b>BMP 1.2</b>	<b>Water Loss Control</b>	<b>3</b>	<b>System Water Audits, Leak Detection, and Repair</b>
	<b>BMP 1.3</b>	<b>Metering with Commodity Rates</b>	<b>4</b>	<b>Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections</b>
	<b>BMP 1.4</b>	<b>Retail Conservation Pricing</b>	<b>11</b>	<b>Conservation Pricing</b>
	<b>BMP 2</b>	<b>Educational</b>		
	<b>BMP 2.1</b>	<b>Public Information</b>	<b>7</b>	<b>Public Education Programs</b>
<b>BMP 2.2</b>	<b>School Education</b>	<b>8</b>	<b>School Education Programs</b>	
<b>Programmatic BMPs</b>	<b>BMP 3</b>	<b>Residential</b>		
	<b>BMP 3.1</b>	<b>Residential Assistance</b>	<b>1 &amp; 2</b>	<b>Water Survey Programs for Single-Family and Multi-Family Residential Customer (Indoor) and Residential Plumbing Retrofit</b>
	<b>BMP 3.2</b>	<b>Landscape Water Survey</b>	<b>1</b>	<b>Water Survey Programs for Single-Family and Multi-Family Residential Customer (Outdoor)</b>
	<b>BMP 3.3</b>	<b>High-Efficiency Clothes Washers</b>	<b>6</b>	<b>High-Efficiency Washing Machine Rebate Programs</b>
	<b>BMP 3.4</b>	<b>Water Sense Standard (WSS) Toilets</b>	<b>14</b>	<b>Residential ULFT Replacement Programs</b>
	<b>BMP 3.5</b>	<b>Water Sense Standard (WSS) for New Residential Development</b>	<b>(new)</b>	
	<b>BMP 4</b>	<b>Commercial Industrial Institutional (CII)</b>	<b>9</b>	<b>Conservation Programs for Commercial, Industrial, and Institutional Accounts</b>
	<b>BMP 5</b>	<b>Landscape</b>	<b>5</b>	<b>Large Landscape Conservation Programs and Incentives</b>

## 6.2 Current Water Conservation Program

The City conducts an ongoing water conservation program. As a raw water customer of CCWD, all Antioch customers are eligible for conservation programs provided by CCWD. These services were not regularly marketed to Antioch customers until 2000. CCWD implements all DMMs and tracks most expenses and savings associated with the DMMs. The City assists in the marketing of the programs and provides staffing assistance for some DMMs. This section presents a description of each DMM that is currently being implemented or scheduled for implementation, a schedule of implementation, and a method to evaluate effectiveness. Table 6-3 includes a summary the City's status in implementing each DMM.

Appendix F includes the City's DMM implementation reports for 2006 through 2010.

Table 6-3. Summary of City of Antioch Water Conservation Program

Demand Management Measure (New Numbering System)		Implementation Status	Required Next Steps	Comments
Number	Description			
A	Single Family and Residential Water Surveys	Started in 2000	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
B	Residential Plumbing Retrofits	Started in 1991	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
C	System Water Audits, Leak Detection, and Repair	Ongoing Leak Repair	Continue existing program.	Antioch has very low unaccounted for water and hence has no ongoing leak detection program. It repairs leaks whenever they are found.
D	Metering with Commodity Rates for all new Connections and Retrofit of Existing Connections	Ongoing Metering	Continue existing program.	Antioch meters all water connections.
E	Large Landscape Conservation Programs and Incentives	Started in 2003	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
F	High-efficiency washing machine rebates	Started in 2000	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
G	Public Information Programs	Started in 1970s.	Continue existing program.	Antioch publicizes water conservation opportunities and importance through various outreach programs.
H	School Education Programs	Ongoing	Continue existing program.	Antioch provides tours when request.
Ia	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Started in 2004	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
Ib	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Started in 2000	Continue existing program.	CCWD implements this program on behalf of all its wholesale customers including Antioch.
J	Wholesale Agency Assistance Programs	NA	NA	Antioch does not wholesale water.
K	Conservation Pricing	Adopted new rates in 2010.	Implement new rates.	Antioch has adopted new rates; however, the new rates are not based on tiered pricing.

Table 6-3. Summary of City of Antioch Water Conservation Program

Demand Management Measure (New Numbering System)		Implementation Status	Required Next Steps	Comments
Number	Description			
L	Conservation Coordinator	Started in 2000	Hire full time coordinator.	Antioch will hire a full time water conservation coordinator to supplement existing staff.
M	Water Waste Prohibit	Ongoing for many years.	Continue existing program.	
N	Residential Toilet Retrofit Programs	Started in 1994.	Continue existing program.	Started in 1994 for ULFT; converted to HET in 2007. CCWD implements this program on behalf of the Antioch.

### 6.2.1 DMM A—Water survey programs for single-family residential and multi-family residential connections

**Description:** Water survey programs for single and multi-family residential connections were implemented in 2000. The Single-Family (SF) Residential Survey Program offers free on-site evaluations of home water use. The survey takes between one to two hours to complete, and includes a thorough review of both interior and landscape water uses; however, the primary focus of the survey is landscape water use. The surveyor inspects each irrigation station, and notes specific problems and suggested repairs or improvements. Precipitation tests are conducted on individual sprinkler stations, and a site-specific monthly irrigation schedule is prepared. The schedule is programmed into the controller and the customer is taught how to adjust the timer. After participating in the program, customers are sent four (4) post cards each year to remind them to adjust their watering schedules and to check their irrigation systems. The Multi-Family (MF) Residential Survey Program targets apartment complexes and other multi-family customers. The program is marketed to the highest water-using customers and is implemented in conjunction with the MF ULFT Replacement Program. During the survey, plumbing fixtures are flow tested and high-efficiency fixtures are installed or provided to replace high-volume fixtures, such as showerheads, faucet aerators and toilet flappers. Each customer receives a report on the completed survey, which lists the number and location of leaks found, an inventory of toilets by flush volume, and a list of showerheads, aerators or flappers installed. The customer also receives information about other CCWD programs, such as the ULFT Distribution Program, Large Landscape Survey Program and Commercial Clothes Washer Program. In addition, the City advertises the water audit program on the City website: <http://www.ci.antioch.ca.us/citygov/publicworks/water/default.htm>

**Schedule:** The implementation of this DMM is ongoing. The program started in year 2000.

**Evaluation of DMM Effectiveness:** CCWD implements this program; the City is responsible for marketing and conducts some of the single family surveys. Table 6-4 lists the number of surveys conducted in Antioch from 2006 to 2010 for single-family and multi-family units. CCWD has not provided the City with costs related to this program.

**Table 6-4. Actual Conservation Activities (DMM A)**

Year	2006	2007	2008	2009	2010
Single family surveys	87	58	50	72	62
Multi family surveys	29	328	136	2	28

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30.

## 6.2.2 DMM B—Residential plumbing retrofit

**Description:** Plumbing retrofit of existing residential accounts consists of providing low flow showerheads, faucet aerators, and toilet leak detection tablets to customers. The City has no enforceable ordinance in effect in the service area requiring the replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts. As of yet, the City has not achieved the 75 percent saturation requirement for single-family and multi-family housing units has not yet been satisfied. From 2006 to 2010, a total of approximately 1,979 and 619 low flow showerheads were installed or distributed to single-family and multi-family units, respectively. CCWD, not the City, tracks the distribution and cost of low-flow devices using MS Access.

The City markets the retrofit program in conjunction with the residential survey program. The City sends marketing letters in batches by meter reading routes. It selects neighborhoods to receive the marketing letters if there is a history of over irrigation in the neighborhood or if participation in the retrofit program needs to be increased; routes with pre-1992 homes are targeted. Marketing letters are sent to all households in the selected route that have a monthly consumption of over 750 gpd (30 units) or more per month. This has been effective in targeting the City's larger consumers where the most water can be conserved. Marketing efforts are tracked so that each route is marketed at least once every two to three years. Routes where over consumption occurs receive sent letters every one to two years. The City currently has realized close to a five percent response rate to marketing letters on average since 2001.

**Schedule:** The implementation of this DMM is ongoing. The program started in 1991.

**Evaluation of DMM Effectiveness:** CCWD implements this program; the City only does marketing. CCWD accrues program expenditures, other than marketing. The City has about 18,621 pre-1992 single-family accounts and about 3,787 pre-1992 multi-family accounts. Table 6-5 lists the number of devices distributed, which includes showerheads, faucet aerators and flappers.

**Table 6-5. Actual Conservation Activities (DMM B)**

Year	2006	2007	2008	2009	2010
Single-family devices	165	113	100	1359	242
Multi-family devices	77	187	101	54	200

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30.

## 6.2.3 DMM C—System water audits, leak detection and repair

**Description:** Because the City's system losses percentage is so low (see Section 3.2.7), the City has no ongoing program for leak detection. Through City staff investigations, when leaks are found, the City repairs the leaks.

The City also has an ongoing water main replacement program. On a yearly basis it budgets for removing and replacing older mains and valves. This activity helps substantially to reduce leakage potential. From 2006 through 2010, the City invested about \$0.5 million annually for water main replacement. It has budgeted \$2.5 million for similar work in the next five fiscal years,

**Schedule:** Leaks repaired when found. Carry out regular replacement of older water mains.

Table 6-6. Actual Conservation Activities (DMM C)					
Year	2006	2007	2008	2009	2010
Percent unaccounted-for water	N/A	N/A	N/A	N/A	N/A
Miles of distribution lines survey	N/A	N/A	N/A	N/A	N/A
Miles of distribution lines repaired	N/A	N/A	N/A	N/A	N/A
Expenditures <sup>(a)</sup> , dollars	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000

#### 6.2.4 DMM D—Metering with commodity rates for all new connections and retrofit of existing connections

**Description:** The City has implemented this program fully. The City requires meters for all new connections; customers are billed by volume-of-use. The City has no unmetered accounts. The City also meters its internal uses such as park and landscape median irrigation. The City has not conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters. And the City has not tracked the number of CII accounts with mixed-use meters and the number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters so related data are unavailable.

**Schedule:** This program has been fully implemented.

**Evaluation of DMM Effectiveness:** There are no unmetered accounts in existence from 2006 to 2010 (Table 6-7). An estimate of water saved as a result of meter retrofits, the number of accounts without commodity rates, and expenditures to-date are unavailable.

Table 6-7. Actual Conservation Activities (DMM D)					
Year	2006	2007	2008	2009	2010
Unmetered accounts	0	0	0	0	0
Retrofit meters installed	N/A	N/A	N/A	N/A	N/A
Accounts without commodity rates	N/A	N/A	N/A	N/A	N/A

#### 6.2.5 DMM E—Large landscape conservation programs and incentives

**Description:** The Landscape Water Budget Program is directed at those commercial and multi-family sites with dedicated irrigation water accounts. Water budgets are prepared using real-time local evapotranspiration (ET<sub>o</sub>) data and actual landscape area measurements obtained through an aerial photo. The data are integrated into a detailed water budget equation, which integrates monthly landscape coefficients, irrigation efficiency, and real-time ET<sub>o</sub>. Water budget site reports are prepared comparing the water budget to actual water use. The program provides participating customers with water budget site reports tailored specifically to their properties. These reports enable the customer to adjust their water use to reflect seasonal weather changes and, therefore, control the costs of their

water bills. CCWD implements this program; the City markets the program. Currently, the City does not provide water use notices to accounts with budgets each billing cycle, nor has it developed a marketing/targeting strategy for landscape surveys. Elements of the current Landscape Surveys are as follows:

- Irrigation system check
- Distribution uniformity analysis
- Review/develop irrigation schedules
- Measure landscape area
- Measure total irrigable area
- Provide customer report/information
- CCWD also tracks survey offers and results as well as provides follow-up surveys for previously completed surveys.

**Schedule:** The implementation of this DMM is ongoing. The program started in 2003.

**Evaluation of DMM Effectiveness:** CCWD implements this program and accrues program expenditures (see Table 6-8). Table 6-8 provides the number of landscape audits completed. CCWD has not provided the City with costs related to this program.

Table 6-8. Actual Conservation Activities and Expenditures (DMM E)					
Year	2006	2007	2008	2009	2010
Budgets developed	0	0	0	0	0
Landscape audits completed	4	8	2	7	0
Follow-up visits	0	0	0	0	0
Expenditures, dollars	0	2360	0	0	11,162

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30

## 6.2.6 DMM F—High-efficiency washing machine rebate programs

**Description:** CCWD implements this program. CCWD, in coordination with six other water agencies, implemented a Bay Area Regional Clothes Washer Rebate Program. CCWD's program has offered rebates from \$50 to \$100 to residential customers who purchase clothes washers with a minimum water use efficiency, or water factor. The program is marketed primarily through the retail appliance stores. In addition, CCWD markets the program through the City of Antioch newsletter, Citygram, the Single Family Survey Program, and through newspaper advertisements.

PG&E also offers rebates of \$35 and \$75 for high-efficiency washers. To qualify for these rebates the water heater must be heated by natural gas distributed to the installation address by PG&E or electricity distributed to the installation address by PG&E. Water heaters that use propane do not qualify. For a \$35 rebate (Level 1), the clothes washer must have a Modified Energy Factor (MEF) of 1.42-1.59 and a Water Factor (WF) of 9.5 or lower. For a \$75 rebate (Level 2), the clothes washer must have a MEF of 1.60 or greater and a WF of 8.5 or lower (PG&E, 2005).

**Schedule:** The implementation of this DMM is ongoing. The program started in 2000.

**Evaluation of DMM Effectiveness:** CCWD implements this program. The number of rebates is provided in Tables 6-7.

Table 6-9. Actual Conservation Activities (DMM F)

Year	2006	2007	2008	2009	2010
Rebates paid	345	247	315	636	753

### 6.2.7 DMM G—Public information programs

**Description:** Public information is an ongoing component of the City’s water conservation program. Activities incorporated in this program include bills inserts, newsletters, City website postings, and brochures, participation in media events, and speaker’s bureau. In addition, the City is a participating agency in the Contra Costa County Green Business Program. The Green Business Program is a partnership of environmental agencies, professional associations, waste management agencies, and utilities, working together to recognize and assist businesses and government agencies that operate in an environmentally friendly manner.

**Schedule:** The implementation of this DMM is ongoing. The City has been doing conservation outreach, on some level, for a very long time, starting during the 1976/1977 drought and the City’s first UWMP (Brown and Caldwell 1986).

**Evaluation of DMM Effectiveness:** Savings from this program cannot be quantified directly. Table 6-10 lists the activities performed in this program. CCWD has not provided the City with costs related to this program.

Table 6-10. Actual Conservation Activities (DMM G)

Year	2006	2007	2008	2009	2010
Bill inserts/newsletters/brochures	N/A	N/A	N/A	N/A	N/A
Speaker events, media events, dollars	N/A	N/A	N/A	N/A	N/A
Speaker’s bureau	N/A	N/A	N/A	N/A	N/A
Program to coordinate with other government agencies, industry, and public interest groups and media	N/A	N/A	N/A	N/A	N/A

### 6.2.8 DMM H—School education programs

**Description:** The City makes the Water Treatment Plant (WTP) available for Antioch schools to come out and tour the facility as an educational fieldtrip. These tours involve an age-appropriate guided WTP tour. Students receive booklets and conservation material when they visit the plant. This program has primarily been used by 3rd grade classes.

The City has not tracked the participation in this program over the years and has suspended fieldtrips in 2001 for water supply safety and then in subsequent years while WTP expansion and improvements were under construction. Currently, fieldtrips are scheduled as requested.

**Schedule:** This is an ongoing program.

**Evaluation of DMM Effectiveness:** As with most education programs, the direct effectiveness of our fieldtrips is difficult to quantify. The program is well received by the students and the teachers that have come out continue to schedule for years to come.

Table 6-11 Actual Conservation Activities (DMM H)					
Year	2006	2007	2008	2009	2010
Grades K-3rd	N/A	N/A	N/A	N/A	N/A
Grades 4th-6th	N/A	N/A	N/A	N/A	N/A
Grades 7th-8th	N/A	N/A	N/A	N/A	N/A
High School	N/A	N/A	N/A	N/A	N/A

### 6.2.9 DMM Ia—Conservation programs for commercial, industrial, and institutional accounts

**Description:** CCWD implements this program; the City markets the program. The CII survey program targets a variety of commercial, institutional and industrial customers. Individual water-using devices are inspected, and customers receive a report listing improvements that can be made to the equipment and to the maintenance of that equipment. Rebates are offered as an incentive to upgrade to more efficient equipment.

**Schedule:** The implementation of this DMM is ongoing. The program started in 2004.

**Evaluation of DMM Effectiveness:** CCWD implements this program. CCWD does not track CII program interventions and water savings. Table 6-12 lists the activities performed in this program.

Table 6-12. Actual Conservation Activities (DMM Ia)					
Year	2006	2007	2008	2009	2010
On-site surveys completed	13	8	1	4	0
Rebates provided	27	0	0	2	0

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30

### 6.2.10 DMM Ib—Conservation programs for commercial, industrial, and institutional accounts

**Description:** In addition to the existing survey program, CCWD provides CII toilet replacement. The program was based on ULFTs until 2007, when high efficiency toilets (HETs) replaced ULFTs. The program targets various commercial and institutional customers through several means: direct mail, bill inserts, bill message, newsletter, telephone, website, trade publications, trade shows, or through the CII Survey Program. The most effective form of marketing was found to be direct mailing. Though, bill inserts and bill messages are inexpensive, they have resulted in modest participation. Customers are targeted based on consumption ranking, potential savings, oldest meter, CII sector or subsector, and CII toilet replacement study subsector targeting. Repeated targeting seems to be the most effective method. CCWD keeps and maintains customer participant information and is willing to share this information for use in a CUWCC study. Customers are offered a rebate of 100% of the material cost up to \$150 per HET. In addition, CCWD negotiated with local plumbing wholesalers to offer select high quality toilets at wholesale prices to any participant. This assures that toilets installed will have long-term savings and customer satisfaction.

**Schedule:** The implementation of this DMM is ongoing. The program started in 2000.

**Evaluation of DMM Effectiveness:** CCWD implements this program. Table 6-13 lists activities performed in this program. CCWD has not provided the City with costs related to this program.

Year	2006	2007	2008	2009	2010
# of commercial replacements	20	0	3	2	19

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30

### 6.2.11 DMM J—Wholesale agency assistance programs

This DMM is not applicable to the City because the City is not a wholesale agency.

### 6.2.12 DMM K—Conservation pricing

**Description:** The City's price rate structure includes a monthly service charge and a charge per 100 cubic feet of water use. The City does not divide rates by account type. Rather, the monthly service charge is based on water line size and the quantity charge is based on zone. Since 2005, the City has increased its water rates by about 11 percent.

**Schedule:** N/A

**Evaluation of DMM Effectiveness:** The City has not evaluated the effectiveness of the rates schedule.

Zone	Rate (\$ per 100 cfs)
Zone I	\$1.92
Zone II <sup>a</sup>	\$2.00
Zone III <sup>a</sup>	\$2.10
Zone IV <sup>a</sup>	\$2.31
Outside City	Double

<sup>a</sup> Zones II through IV include a pumping quantity surcharge of \$0.08, \$0.18 and \$0.39 respectively.

Meter/Size	Residential & Commercial		Fire Protection	
	Inside (\$/mo)	Outside (\$/mo)	Inside (\$/mo)	Outside (\$/mo)
5/8", 3/4"	12.40	24.79		
1"	20.02	40.16		
1 1/2"	37.94	75.88		
2"	60.09	120.18		
3"	124.58	249.17		
4"	196.06	392.12	12.31	24.62
6"	388.14	776.28	17.50	35.00
8"	576.61	1,153.23	37.32	74.64

**Table 6-14b. Description of District Rate Structures (DMM K)**

Meter/Size	Residential & Commercial		Fire Protection	
	Inside (\$/mo)	Outside (\$/mo)	Inside (\$/mo)	Outside (\$/mo)
10"	1,235.47	2,470.94	67.03	134.06
12"	2,231.70	4,463.40	108.34	216.68

### 6.2.13 DMM L—Conservation coordinator

**Description:** The conservation coordinator is 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. A conservation coordinator has been in place since July of 2000. The position title is Environmental Resource Coordinator. The Environmental Resource Coordinator is Julie Haas-Wajdowicz, who is a full time staff person but only devotes 1/3 of her time to water conservation. Regional conservation work is done through a partnership with CCWD. There is no additional staff provided by the City; however, meter readers and other field workers do some leak checking and initial outreach and customer service representatives often provide conservation and leak detection advice to customers. Conservation coordinator and staff information including historical annual expenditures is provided in Tables 6-13. In 2010, the City adopted new water rates that include additional budget for a full-time conservation coordinator. The City plans to fill that position in Fiscal Year 2011.

**Schedule:** The implementation of this DMM is ongoing. The program started in 2000.

**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 District's water conservation program.

**Table 6-15. Actual Conservation Activities (DMM L)**

Year	2006	2007	2008	2009	2010
Part-time staff	1/3	1/3	1/3	1/3	1/3

### 6.2.14 DMM M—Water waste prohibition

**Description:** Water waste prohibition is an ongoing component of the City's water conservation program. This City has adopted a water waste prohibition ordinance. The City's most current water waste ordinance is as follows:

#### **Antioch Municipal Code**

##### **§ 6-5.10 WASTE OF WATER.**

No person shall misuse or waste water. Any person misusing or wasting water shall be guilty of an infraction. The term MISUSE or WASTE shall mean the use of water which, to a reasonable person, is clearly in excess of the need or intended purpose. MISUSE or WASTE may also mean the use of water in excess of quantity standards imposed during any water shortage emergency declared by the City Council. In the event of any misuse or waste of water, in addition to criminal prosecution, the Finance Department may install flow restrictors at the premises where misuse or waste has occurred, following procedures established for such installation, which shall include at least one warning notice to the consumer prior to such installation.

('66 Code, § 6-5.10) (Ord. 76-A, passed 12-17-23; Am. Ord. 817-C-S, passed 7-11-91) Penalty, see § 6-5.33

The majority of the cases of water wasting involve over irrigation. The City refers all violators to CCWD to take advantage of its water conservation programs and assistance. The City's Neighborhood Improvement Officers or Environmental Resource Coordinator carries out enforcement. To date, the City has issued no citations for water wasting violations, as compliance is typically reached with courtesy notices and abatement letters. On-site visits noted in Table 6-15 below are verified cases created in the City's code violation tracking database. This is an under reporting of the efforts as most instances do not reach the code enforcement level of involvement. Currently, the City does not include water softener checks in the home water survey nor does it include information about Demand Initiated Regenerating and exchange-type water softeners in education efforts.

**Schedule:** The implementation of this DMM is ongoing.

**Evaluation of DMM Effectiveness:** Water savings from this program cannot be directly quantified.

Table 6-15. Actual Conservation Activities (DMM M)					
Year	2006	2007	2008	2009	2010
Waste ordinance in effect	Yes	Yes	Yes	Yes	Yes
Water softener ordinance	N/A	N/A	N/A	N/A	N/A

### 6.2.15 DMM N—Residential toilet replacement programs

**Description:** CCWD implements this program; the City assists in program marketing. CCWD offers both single-family and multi-family residential customers toilet replacement rebates. The program was based on ULFTs until 2007, when HETs replaced ULFTs. The program is marketed directly to customers with homes built prior to 1992 through the survey programs. The program is also marketed through articles in the City's newsletter, The Citygram, distributed in the water bills. Eligible customers receive a voucher and pick up their new HET at a specific vendor who contracts with CCWD. Customers are responsible for installation and CCWD conducts random inspections to insure proper installation. Multi-family customers who replace more than six toilets receive free delivery. The Multi-family program is marketed at least one time each year to a Property Managers Group that meets monthly with the Police Department and Neighborhood Improvement Services staff. Prior to the HET Distribution Program, CCWD offered rebates to single-family customers as an incentive to install ULFTs.

**Schedule:** The implementation of this DMM is ongoing. The program started in 1994 with ULFTs.

**Evaluation of DMM Effectiveness:** CCWD implements this program is implemented by CCWD. The number of HET rebates and installs performed in the City of Antioch for single and multi-family units is provided in Table 6-16.

Table 6-16. Actual Conservation Activities (DMM N)					
Table N1-Actual	2006	2007	2008	2009	2010
# of single-family ULFT/HET rebates	315	26	81	348	752
# of multi-family ULFT/HET rebates	25	423	51	13	23

Source: CCWD BMP Data Reports, FY06-FY10.

Data recorded for fiscal year from July 1 to June 30

## 6.3 Water Use Monitoring

The City evaluates the effectiveness of its water conservation program based on metered water use data. Monitoring involves determining the per capita water use for residential users and the water use per account for non-residential customer categories.



## Section 7

# Recommendations

The City currently uses surface water from the Sacramento/San Joaquin Rivers Delta and CCWD as its primary water supply sources with the City's municipal reservoir providing a relatively minor amount of supply. Specific water supply recommendations are given below.

- Continue to use surface water 1) pumped from the Sacramento/San Joaquin Rivers Delta and 2) purchased from CCWD as the primary sources of supply and continue using water from the City's municipal reservoir.
- Continue implementing its recycled water program wherever it is cost-effective.
- Continue to implement water conservation DMMs/BMPs) in accordance with the MOU.
- Monitor water use and progress in meeting 2015 and 2020 SB7 targets.
- Monitor Sacramento/San Joaquin Rivers Delta legislation as it pertains to the City's supplies.
- Monitor progress in implementing water use efficiency measures as summarized in Table 6-1, including targeted customer categories, number of interventions, and associated costs.



## Section 8

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## **Appendix A: California Department of Water Resources 2010 Urban Water Management Plan Checklist**

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**Table A-1 Urban Water Management Plan checklist, organized by legislation number**

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Section 3.1
2	<i>Wholesalers</i> : Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. <i>Retailers</i> : Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Section 1.6
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	Section 3.1
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	Plan Preparation		Section 1.5 Section 1.6
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability		Section 1.2
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		Section 1.6
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	Plan Preparation		City to provide

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
8	Describe the service area of the supplier	10631(a)	System Description		Section 2.1 Section 2.2
9	(Describe the service area) climate	10631(a)	System Description		Section 2.3
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.6
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.6
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 2.6
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 4.1 – surface water Section 4.2 - groundwater Section 4.3 – transfers and exchanges Section 4.4 - desalination Section 4.5 – recycled water Section 4.6 - summary

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . . ?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.2
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		Not applicable (Section 4.2)
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Not applicable (Section 4.2)
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		Not applicable (Section 4.2)
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		Not applicable (Section 4.2)
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		Not applicable (Section 4.2)

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		Not applicable (Section 4.2)
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Not applicable (Section 4.2)
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability		Section 5.1
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability		Section 5.1
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.3
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	System Demands	Consider "past" to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2.1 Section 3.2.2 Section 3.2.3

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		Section 6.3
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		N/A

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	Section 6.2
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		Section 4.7
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		Section 4.4

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not applicable
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 3.3
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Section 3.2.4
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Water Supply Reliability		Section 5.5.1
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Water Supply Reliability		Section 5.1
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Water Supply Reliability		Section 5.5.7

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Water Supply Reliability		Section 5.5.2
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Water Supply Reliability		Section 5.5.3
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability		Section 5.5.4
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Water Supply Reliability		Section 5.5.6
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability		Section 5.5 Section 5.5.2
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability		Section 5.5.5
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		Section 4.5
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	System Supplies		Section 4.5.2
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		Section 4.5.2

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		Section 4.5.3
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		Section 4.5.4
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		Section 4.5.4
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	System Supplies		Section 4.5.4
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		Section 4.5.4
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability	For years 2010, 2015, 2020, 2025, and 2030	Section 4.1.2 Section 5.3

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability		Section 5.4.1 Section 5.4.2
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		Section 1.6
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Plan Preparation		Section 1.6
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		Section 1.6
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Section 1.6
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Section 1.6

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Subject <sup>b</sup>	Additional clarification	UWMP location
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		Section 1.6
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	Plan Preparation		Section 1.6

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

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



## **Appendix B: Public Hearing Notice, Coordination, and Resolution to Adopt the Urban Water Management Plan**



**NOTICE OF PUBLIC HEARING and AVAILABILITY OF  
DRAFT URBAN WATER MANAGEMENT PLAN FOR PUBLIC INSPECTION**

**NOTICE IS HEREBY GIVEN** that the City Council of the City of Antioch will hold a public hearing in the City Council Chambers, City Hall, 200 "H" Street at **7:00 P.M.**, or thereafter on **TUESDAY JUNE 14, 2011**, on the following matter:

The City of Antioch has prepared a Draft Urban Water Management Plan. The UWMP documents the City's planning activities to ensure adequate water supplies to meet existing and future demands for water. The UWMP presents forecasted supplies and demands, describes the City's conservation programs, and identifies recycled water opportunities to the year 2030. The UWMP also includes a water shortage contingency analysis and a description of the plan adoption, public coordination, and planning coordination activities.

If any person challenges the decision of the City in this matter in court, he or she may be limited to raising only those issues that were raised at the public hearing described in this notice, or in written correspondence delivered to the City at, or prior to, the public hearing.

A copy of the proposed plan is available for public inspection after May 30, 2011 at the City Clerk's Office, City Hall, 200 "H" Street, Antioch and the Antioch Public Library, 501 West 18th Street. The Draft Plan will also be available review on the City website at [www.antiochwater.com](http://www.antiochwater.com). Written statements in favor of, or in opposition to this matter, may be filed with the City Clerk, City Hall, 200 "H" Street (P.O. Box 5007), Antioch, CA 94531-5007, at any time prior to the hearing. Written comments should be submitted no later than *June 13, 2011*. All interested persons are invited to be present at aforesaid hearing and be heard thereon. The meeting facility is accessible to the handicapped. Auxiliary aides will be made available, upon request in advance, for persons with hearing or vision disabilities.

L. Jolene Martin

L. JOLENE MARTIN, City Clerk

Dated: May 18, 2011

Publish: May 26 and June 2, 2011

# ANNOTATED AGENDA

for  
June 14, 2011

## *CITY COUNCIL/ADA MEETING*

Order of Council vote: AYES: Council Members Harper, Rocha, Agopian and Mayor Davis

Order of Agency Vote: AYES: Agency Members Harper, Rocha, Agopian and Chairman Davis

Absent: Council / Agency Member Kalinowski

### **Notice of Availability of Reports**

This agenda is a summary of the actions proposed to be taken by the City Council. For almost every agenda item, materials have been prepared by the City staff for the Council's consideration. These materials include staff reports which explain in detail the item before the Council and the reason for the recommendation. The materials may also include resolutions or ordinances which are proposed to be adopted. Other materials, such as maps and diagrams, may also be included. All of these materials are available at the City Clerk's Office, located on the 1<sup>st</sup> floor of City Hall, 3<sup>rd</sup> and H Streets, Antioch, CA 94509, during normal business hours for inspection and (for a fee) copying. Copies are also made available at the Antioch Public Library for inspection. Questions on these materials may be directed to the staff member who prepared them, or to the City Clerk's Office, who will refer you to the appropriate person.

### **Notice of Opportunity to Address Council**

The public has the opportunity to address the Council on each agenda item. To address the Council, fill out a yellow Speaker Request form, available on each side of the entrance doors, and place in the Speaker Card Tray. See the Speakers' Rules on the inside cover of this Agenda. Comments regarding matters not on this Agenda may be addressed during the "Public Comments" section.

**6:00 P.M. ROLL CALL for Council/Agency Members for Closed Session – C/M Kalinowski absent (excused)**

**PUBLIC COMMENTS for Closed Session**

**CLOSED SESSION: CONFERENCE WITH LEGAL COUNSEL — EXISTING LITIGATION – Discovery Builders Inc. v. City of Antioch; City Council of the City of Antioch (Contra Costa Superior Court, Case No. N11-0539). This closed session is authorized by California Government Code section 54956.9(a). ANTICIPATED LITIGATION – Initiation of litigation pursuant to California Government Code §54956.9(c) regarding Seeno Homes and Discovery Builders: Black Diamond Ranch: Markley Creek Culvert Crossing Project – 1 case.**

***No reportable action***

**7:00 P.M. ROLL CALL for Council/Agency Members – C/M Kalinowski absent (excused)**

**PLEDGE OF ALLEGIANCE**

**RECOGNITION to Dozier-Libbey Medical High School for California Distinguished School Award**

**ANNOUNCEMENTS OF CIVIC AND COMMUNITY EVENTS**

**PUBLIC COMMENTS—Only unagendized issues will be discussed during this time**

**CITY COUNCIL SUBCOMMITTEE REPORTS**

**MAYOR'S COMMENTS**

**1. COUNCIL CONSENT CALENDAR**

**A. APPROVAL OF COUNCIL MINUTES FOR MAY 10, 2011**

Recommended Action: Motion to approve the minutes

***Approved***

**B. APPROVAL OF COUNCIL WARRANTS**

Recommended Action: Motion to approve the warrants

***Approved***

**COUNCIL CONSENT CALENDAR — Continued**

**C. REJECTION OF CLAIMS**

1. Juanita Patterson 10/11-1995 (personal injury)
2. Paula Sparks and John Reisbeck 11/12-2005 (failure to arrest)
3. Duke and Heather Duarte 11/12-2008 (property damage)
4. Paul H. Schmidt 11/12-2013 (property damage)
5. Brandon Lim 11/12-2017 (property damage)

**Rejected**

Recommended Action: Motion to reject the listed claims

**D. PACHECO BROTHERS GARDENING, INC. PARK MAINTENANCE SERVICES CONTRACT**

**Approved**

Recommended Action: Motion to authorize the City Manager to execute the park and restroom maintenance services contract extension with Pacheco Brothers Gardening, Inc. for the term of two years in the amount of \$1,398,000.00 (FY11/12 \$463,000, FY12/13 \$467,000 and FY13/14 \$468,000)

**END OF COUNCIL CONSENT CALENDAR**

**2. COUNCIL / AGENCY CONSENT CALENDAR**

**A. BLACK DIAMOND RANCH PROJECT: CONSTRUCTION OF MARKLEY CREEK CULVERT CROSSING PROJECT AND SOMERSVILLE ROAD WIDENING PROJECT**

Recommended Action: Motion to approve the resolution approving an Amendment to Settlement Agreement, Mutual Release and Covenant Not to Sue entered into by and between the City of Antioch and Antioch Development Agency, on the one hand, and Discovery Builders, Inc., Black Diamond Land Investors, LLC, Seecon Financial & Construction Co., SPPI-Somersville, Inc. and Somersville-Gentry, Inc., on the other hand

**Reso 2011/40, 3/0**

**Reso ADA-447, 3/0**

**C/M Harper recused, C/M Kalinowski absent**

**3. AGENCY CONSENT CALENDAR**

**A. ANTIOCH DEVELOPMENT AGENCY ANNUAL REPORT**

**Received and filed**

Recommended Action: Motion to receive and file

**PUBLIC HEARING**

**4. APPROVAL OF THE 2010 URBAN WATER MANAGEMENT PLAN UPDATE**

**Reso 2011/41, 4/0**

Recommended Action: Motion to approve the resolution adopting the Urban Water Management Plan (Plan), incorporating appropriate comments at the close of the Public Hearing

**COUNCIL REGULAR AGENDA**

5. PRESENTATION AND DISCUSSION OF THE HILLCREST E-BART STATION DESIGN AND STATION OPERATION

***Received***

Recommended Action: Motion to receive and provide direction

6. LONE TREE GOLF COURSE AD-HOC SUBCOMMITTEE

***Appoint Brian Kalinowski and Mayor Jim Davis***

Recommended Action: Motion to approve appointments by Mayor Davis to an ad-hoc subcommittee related to the Lone Tree Golf Course and Event Center

**PUBLIC COMMENT**

**STAFF COMMUNICATIONS**

**COUNCIL COMMUNICATIONS**

**ADJOURNMENT – 8:08 p.m.**

**STAFF REPORT TO THE MAYOR AND CITY COUNCIL MEMBERS  
FOR CONSIDERATION AT THE COUNCIL MEETING OF JUNE 14, 2011**

**FROM:** Phillip L. Harrington, Director of Capital Improvements/Water Rights

**PREPARED BY:** Julie Haas-Wajdowicz, Administrative Analyst

**DATE:** June 2, 2011

**SUBJECT:** Approval of the 2010 Urban Water Management Plan Update



**RECOMMENDATION**

It is recommended that the City Council approve the Resolution adopting the Urban Water Management Plan (Plan), incorporating appropriate comments at the close of the Public Hearing.

**BACKGROUND INFORMATION**

The Urban Water Management Plan's (Plan) purpose is to ensure the efficient use of available water supplies, as required by the Urban Water Management Act (Act). The Act requires that every urban water supplier with more than 3,000 connections or supplying more than 3,000 acre-feet of water annually adopt and submit a plan every five years to the California Department of Water Resources (DWR). The Plan, prepared by Brown & Caldwell, is the City's required 2010 Update. New to the 2010 Plan is the establishment of water use reduction goals and the conservation programs needed to reach the mandated 20% per capita reduction in water consumption by 2020 set by SBx7-7. The Act requires a public hearing prior to adoption of the Plan.

The Plan documents the City's planning activities to ensure adequate water supplies to meet existing and future demands for water. The Plan presents forecasted supplies and demands, describes the City's conservation programs, develops an estimate of the per capita water use, in terms of gallons per capita per day (GPCD) target options for the City and identifies recycled water opportunities to the year 2030. The Plan also includes a water shortage contingency analysis and a description of the plan adoption, public coordination and planning coordination activities. The Table of Contents and Introduction Section of the Plan are attached to this staff report (Attachment A). The Plan, in its entirety, is available for review on the City's water service website at [www.antiochwater.com](http://www.antiochwater.com) or hard copies are available at the City Clerk's office, the Community Development Department or at the Antioch Public Library.

**Plan Highlights**

With the exception of the recycled water project that will be online this summer, the basic water system infrastructure and supply information has not changed much in the 5 years since the last update was done. However, there are several items worth pointing out in the proposed Plan. The general recommendations of the Plan are as follows:

- Continue to use surface water 1) pumped from the Sacramento/San Joaquin Delta and 2) purchased from CCWD as the primary sources of supply.
- Continue implementing its recycled water program wherever it is cost-effective.
- Continue to implement water conservation Demand Management Measures (formally Best Management Practices) in accordance with the Memorandum of Understanding (MOU).

Drought Planning

The Plan shows that the City will have an adequate water supply during normal years, single dry years and multiple dry water years through the year 2025. In order to insure that water is used wisely during dry years, City will advocate conservation and request or require cutbacks in the second and third dry water years of 10 and 15 percent, respectively.

Below are tables 5-11 and 5-12 of the Plan, highlighting the City’s proposed Shortage Stages and Prohibitions. The stages will be implemented during water supply shortages according to shortage level, ranging from 5 percent shortage in Stage I to 50 percent shortage in Stage IV. The stage determination and declaration during a water supply shortage will be made by the Director of Capital Improvements/Water Rights.

**Table 5-11. Water Shortage Contingency (DWR Table 35)**

Stage No.	Water Supply Conditions	% Shortage
I - Voluntary	Minimum - voluntary	5 to 10 percent
II – Mandatory Conservation Phase	Moderate – voluntary allotments and/or mandatory conservation rules	10 to 20 percent
III – Rationing Phase	Severe – allotments and mandatory conservation rules	20 to 35 percent
IV – Intense Rationing Phase	Critical – allotments and mandatory conservation rules	35 to 50 percent

**Table 5-12. Voluntary and Mandatory Prohibitions (DWR Table 36)**

Prohibitions	Stage when prohibition is voluntarily requested	Stage when prohibition becomes mandatory
Cleaning of Streets/sidewalks/walkways/parking areas/patios/porches or verandas	I	II, III, IV
Washing cars	I	II, III, IV
Watering lawns/landscapes	I	II, III, IV
Non-permanent agriculture	I	II, III, IV
Uncorrected plumbing leaks	I	II, III, IV
Cleaning/filling/operating/maintaining levels in non-recycling decorative fountains	I	II, III, IV

Due to our projected water supply and demand during a drought, we are anticipating the following demand reductions:

- During the second year of multiple dry years, voluntary/mandatory reductions in demand will be 10 percent. (Stage I)
- During the third year of multiple dry years, voluntary/mandatory reductions in demand will be 15 percent. (Stage II)

### Recycled Water

*Delta Diablo Sanitation district (DDSD) is the agency responsible for treating and discharging treated wastewater for the Cities of Antioch, Pittsburg and the unincorporated community of Bay Point located in Contra Costa County. Currently, the region collects an estimated 14,700 acre-feet of wastewater per year. Approximately 42 percent of that wastewater is used for recycled supply for various uses. The remaining treated wastewater is disposed through a river outfall into the Delta at New York Slough.*

*Currently, no recycled water is used within the City. However, the City expects to begin recycled water delivery to the Lone Tree Golf Course and several City parks and landscaped medians in June 2011. The City of Antioch will continue to develop means to expand the use of recycled water within our service district in order to:*

- *Reduce Dependence on Delta Supplies*
- *Improve Water Supply Reliability*
- *Potable Water Supplies*
- *Reduce Wastewater Discharges back into the Delta*

### Water Conservation

Water conservation is a method available to reduce water demands, thereby reducing water supply needs for the City. Water conservation implementation can also decrease costs for wastewater treatment and disposal. Section 6 of the Plan presents a description of the City's water conservation program. The majority of the City's conservation activities are offered in partnership with Contra Costa Water District (CCWD). As raw water customers, all of the City's customers are eligible for the water conservation programs offered by CCWD. As signatories of the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, CCWD agrees to implement the Demand Management Measures (DMMs) presented in Table 6-2 of the Plan as listed below. The City is not currently an MOU signatory.

#### **Water Conservation Demand Management Measures**

##### 1. Utility Operations

- Conservation Coordinator
- Water Waste Prevention
- Wholesale Agency Assistance
- Water Loss Control
- Metering with Commodity Rates

- Retail Conservation Pricing
2. Educational
    - Public Information
    - School Education
  3. Residential
    - Residential Assistance
    - Landscape Water Survey
    - High-Efficiency Clothes Washers
    - Water Sense Standard Toilets
    - Water Sense Standard for New Residential Development
  4. Commercial Industrial Institutional
  5. Landscape

The City's primary responsibility in regards to water conservation is to provide the marketing and outreach of the DMMs to our customers. This marketing is done through direct mail to qualifying customers, brochures and information tables and local events and through referrals for Customer Service Representatives. Two of the DMMs that the City has been focusing its efforts on in the past 5 years have been Single-Family Surveys and Residential Ultra Low Flow Toilet Replacement.

Staff continues to work on residential water conservation outreach and programs and hopes to expand the participation in the commercial and industrial DMMs in the coming years. Any increases in water conservation will help the City reduce demand in normal and dry years.

**FINANCIAL IMPACT**

None

**OPTIONS**

1. Adopt the Plan as submitted
2. Adopt the Plan incorporating comments from the Public Hearing

**ATTACHMENT**

1. Urban Water Management Plan - Table of Contents & Plan Preparation: to review the complete Draft Plan, please view on the city website at [www.antiochwater.com](http://www.antiochwater.com) or review the hard copy at the City Clerk's Office, Community Development Department or the Antioch Branch Library.

**RESOLUTION NO. 2011/41**

**RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ANTIOCH  
ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN**

---

**WHEREAS**, the Urban Water Management Planning Act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers to adopt and submit a Urban Water Management Plan to the California Department of Water Resources every five years; and

**WHEREAS**, the City of Antioch is an urban water supplier providing water for municipal purposes to more than 30,000 customers; and

**WHEREAS**, the City of Antioch has prepared the required plan, allowed public review and held the appropriate Public Hearing; and

**NOW, THEREFORE BE IT RESOLVED** by the City Council of the City of Antioch, that it does hereby adopt the 2010 update to the Urban Water Management Plan and authorizes City staff to submit the Plan to the Department of Water Resources.

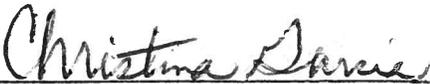
\* \* \* \* \*

**I HEREBY CERTIFY** that the foregoing resolution was passed and adopted by the City Council of the City of Antioch at a regular meeting thereof, held on the 14th day of June, 2011 by the following vote:

**AYES:** Council Members Harper, Rocha, Agopian and Mayor Davis

**NOES:** None

**ABSENT:** Council Member Kalinowski

  
for L. JOLENE MARTIN, City Clerk

ATTACHMENT A

DRAFT

City of Antioch  
2010 UWMP

---

Prepared for  
City of Antioch  
Antioch, CA  
June 6, 2011

DRAFT

City of Antioch  
2010 UWMP

---

Prepared for  
City of Antioch, Antioch, CA  
June 6, 2011

Project No.: 140259

This is a draft and is not intended to be a final representation  
of the work done or recommendations made by Brown and Caldwell.  
It should not be relied upon; consult the final report



201 North Civic Drive, Suite 115  
Walnut Creek, California 94596

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## List of Abbreviations

ABAG	Association of Bay Area Governments	gpm	gallons per minute
Act	Urban Water Management Planning Act		
ADWF	average dry weather flow	HAA	haloacetic acids
AF	acre-feet	HET	high efficiency toilet
AFY	acre-feet per year	In	inches
BDCP	Bay-Delta Conservation Plan		
BMP	best management practice	LMEC	Los Medanos Energy Center
BPS	booster pump station		
Bureau	United States Bureau of Reclamation	MG	million gallons
		mg/L	milligrams per liter
Canal	Contra Costa Canal	mgd	million gallons per day
CBDA	California Bay-Delta Authority	MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
CCWD	Contra Costa Water District		
CDPH	California Department of Public Health		
CIMIS	California Irrigation Management Information System	NPDES	National Pollutant Discharge Elimination System
CIP	Capital Improvement Plan	Plan	Urban Water Management Plan
City	City of Antioch	PRV	pressure reducing valve
CUWCC	California Urban Water Conservation Council	psig	pounds per square inch gage
		PWSS	Public Water System Statistics
DDSD	Delta Diablo Sanitation District		
DEC	Delta Energy Center	RBP	Randall-Bold Plant
DOF	Department of Finance	RWF	Recycled Water Facility
DMM	demand management measure		
DSC	Delta Stewardship Council	SB7	Senate Bill SBx7-7
DWD	Diablo Water District	SCVWD	Santa Clara Valley Water District
DWR	California Department of Water Resources	SFPUC	San Francisco Public Utilities Commission
		SFR	single family residential
EBMUD	East Bay Municipal Utilities District	SWRCB	State Water Resources Control Board
EPA	United States Environmental Protection Agency		
ET <sub>o</sub>	reference evapotranspiration	TDH	total dynamic head
		TDS	total dissolved solids
°F	degrees Fahrenheit	THM	trihalomethane
ft	feet		
		ULFT	ultra low flow toilet
gpcd	gallons per capita per day	UWMP	Urban Water Management Plan
gpd	gallons per day		

WELO	water efficient landscape ordinance
WPCF	Water Pollution Control Facility
WTP	water treatment plant
yr	year

AG

## Section 1

# Plan Preparation

This Urban Water Management Plan (Plan) addresses the City of Antioch's (City's) water system, which currently serves about 103,000 people within a 28.8 square mile area located in eastern Contra Costa County. In 2009, the City provided approximately 5,700 million gallons of water to 30,668 connections. The City currently relies entirely on surface water. Its primary sources are the Sacramento/San Joaquin Rivers Delta through water purchased from Contra Costa Water District (CCWD).

This Plan fulfills several purposes:

1. It is the year 2010 Urban Water Management Plan Update as required by the Urban Water Management Planning Act (Act).
2. It provides the analysis of water conservation measures in accordance with the guidelines of the California Urban Water Conservation Council (CUWCC).
3. It serves as the long-term water supply plan for the City of Antioch Water System.

This Plan serves as a long-range planning document for the City's water supply. Details regarding the wholesaler's, Contra Costa Water District's (CCWD), water supplies are included in the CCWD UWMP.

## 1.1 Urban Water Management Planning Act

This Plan has been prepared in accordance with the Act (Assembly Bill-AB797 as amended). The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit UWMPs every five years to the California Department of Water Resources (DWR). In November 2009, the State most recently amended the Act with the adoption of Senate Bill (SB) x7-7 (SB7). The most significant revision is the requirement for establishing per capita water use targets and an option to delay Plan adoption to July 1, 2011.

Appendix A includes the DWR checklist of components required for UWMPs with cross-referencing to indicate where this UWMP addresses each requirement.

## 1.2 Resource Maximization and Import Minimization

The City has used water management tools to maximize local water resources and minimize imports. The City has and continues to participate with CCWD to implement some water conservation measures as part of CCWD's wholesaler water conservation program in order to maximize the use of local water resources. The City is responsible for water conservation marketing and outreach to the City's customers.

## 1.3 California Urban Water Conservation Council

Addressing the efficient use of water supplies in accordance with CUWCC guidelines is another purpose of this Plan. The CUWCC is a voluntary organization comprised of water utilities, environmental organizations, and other interested groups that are responsible for administering the implementation of water conservation measures in California. The Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) (CUWCC, 2008) defines the water conservation measures or demand management measures (DMMs). The signatories of the CUWCC submit a semi-annual report regarding

their implementation of DMMs. The City is not currently a MOU signatory. However, the City implements the water conservation program collaboratively with CCWD and CCWD is a signatory. This Plan provides a description of the City's water conservation program.

## 1.4 Previous Reports

Several reports have been prepared in the past decade, which address water supply and demand for the City of Antioch water system and for the Contra Costa Water District which supplies a portion of Antioch's water supply. An understanding of these previous studies' results provides a broader context for preparing an updated water supply plan for the future. This section provides a summary of these recent planning reports.

Five east county public agencies jointly sponsored an investigation of groundwater resources in the East Contra Costa Area (Luhdorff, March 1999). The purpose of the study was to define the aerial and vertical extent of the aquifer system better, characterize the water quantity and quality, define how groundwater is recharged and discharged out of the area, and define the reliable supply and whether conjunctive use plans should be developed.

A Water System Master Plan Update was prepared in September 1999 (Brown and Caldwell, 1999). This document included long-term demand forecasts and water supply capital improvement recommendations to meet future water supply needs for the City of Antioch.

A Water System Master Plan: Updated Executive Summary was prepared in October 2001 (Brown and Caldwell, 2001). This document summarizes changes in water use characteristics and study area demographics and presents significant findings, conclusions and recommendations for existing and future facilities through the year 2028.

The Antioch/DDSD Recycled Water Project Facilities Plan was prepared in December 2007 to describe the project currently being pursued by Delta Diablo Sanitation District (DDSD) and the City to expand recycled water use within the City (RMC, 2007).

The Urban Water Management Plan 2005 Update was prepared in January 2006 (Brown and Caldwell, 2006). This document provided a comprehensive summary of the existing water system, historical and projected water use, water supply (sources), water conservation best management practices, water supply versus demand comparison, and recommendations.

The CCWD 2010 UWMP includes a forecast of supplies and demands and describes the District's water demand management and recycled water opportunities to the year 2035. It also presents a water shortage contingency analysis and a description of the plan adoption, public coordination and planning coordination activities.

## 1.5 Public Agency Coordination

This Plan has been prepared with the cooperation and assistance of the City of Antioch, CCWD, and DDSD. Table 1-1 summarizes the efforts the City has taken to include additional agencies and citizens in its planning and preparation process.

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

	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
Contra Costa Water District						X	
Delta Diablo Sanitation District						X	
City of Antioch	X			X	X	X	
Relevant public agencies						X	
Public Library					X		
General Public (via the City's website and bill inserts)						X	

## 1.6 Public Participation

The DWR Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (DWR March 2011) includes a description of the requirements for public participation and Plan adoption. The requirements include the following:

- At least 60 days prior to the public hearing, water suppliers must notify any city or county within which the supplier provides water supplies that the supplier is in process of updating their Plan.
- Water suppliers must encourage the involvement of diverse social, cultural, and economic elements of the population within the service area.
- Water suppliers must make the UWMP available for public inspection prior to adoption. Prior to the public hearing, the water supplier must provide public notification of the time and place for the hearing. The water supplier must provide such notification in two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates.
- If a water supplier makes changes to the UWMP after plan adoption, the supplier must hold another public hearing and have the UWMP readopted.
- A copy of the UWMP adoption resolution must be included in the UWMP.
- The water supplier must provide information on how it will implement the UWMP.
- No later than 30 days after submitting a UWMP to DWR, water suppliers must provide a copy of the UWMP to the California State Library and any city or county within which the supplier provides water supplies and must make the UWMP available for public review during normal business hours

For this update to the UWMP, the City Council noticed the public hearing on May 26, 2011 and June 2, 2011 and then held a formal public hearing on June 14, 2011, to receive public comment on the draft Plan. During the public hearing, the City described the general plan for compliance with the Water Conservation Bill of 2009.

The City posted notice of the public hearing on the City's homepage on the internet. The City arranged to publish legal public notices for the hearing in the local newspaper and posted them at City facilities. Copies of the draft Plan were available at City offices, libraries, and City Hall.

The hearing provided an opportunity for the City's water service customers and all residents, employers, and employees in the service area to learn about the water supply system and the plans incorporated to provide a reliable, safe, high-quality water supply into the future. The hearing also allowed people to ask questions regarding the current system and the viability of future plans. Upon City Council's approval at the conclusion of the public hearing, the City adopted this Plan.

Appendix B includes the resolution to adopt the UWMP.

## 1.7 Plan Organization

This section provides a summary of the sections in the Plan.

- Section 1 describes how the City prepared the Plan.
- Section 2 provides a description of the service area, climate, water supply facilities, and distribution system.
- Section 3 presents historical and projected water use.
- Section 4 describes water supplies.
- Section 5 provides a summary of water supply reliability and water shortage contingency planning.
- Section 6 addresses water conservation.
- Section 7 provides recommendations.
- Appendices provide relevant supporting documents.



## Appendix C: Senate Bill 7 Water Use Targets Technical Memorandum

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# Technical Memorandum

## DRAFT

Prepared for: City of Antioch  
Project Title: 2010 Urban Water Management Plan  
Project No: 140259-002

### Technical Memorandum No. 1

Subject: Senate Bill 7 Water Use Targets  
Date: June 6, 2011  
To: Phil Harrington, PE, City of Antioch  
From: Jenny Gain, PE, Brown and Caldwell

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## 1. Introduction

For many years, the efficient and economic use of water has been a City of Antioch (City) objective. Water conservation is also a statewide priority in meeting the future water needs of the state and region as outlined in the 2009 California Water Plan.

This technical memorandum describes the City's water use characteristics and develops an estimate of the per capita water use, in terms of gallons per capita per day (GPCD), target options for the City. This memorandum presents the key results of this evaluation that result in the four GPCD targets.

## 2. Water Use Targets

New requirements regarding water use targets are in the Senate Bill 7 (SBx7-7) passed by the state legislature in early November 2009. The legislation defines four methods for establishing a GPCD target. Water suppliers have to select one of the methods to establish their 2020 water use target, as well as the interim 2015 target. The City must select the GPCD method that it will use for the urban water management plan (UWMP) to be adopted by July 1, 2011. The four methods available to establish a water agency's GPCD target are as follows.

1. Eighty percent of the urban retail water supplier's baseline per capita daily water use using a 10-year average, starting no earlier than 1995. Method 1 is relatively straight forward in that it involves computing the population divided by the total water production by year.
2. The per capita daily water use estimated using the sum of several defined performance standards for water use for indoor residential; outdoor landscape; and commercial, industrial, and institutional (CII) purposes. This method requires quantifying the landscaped area and the baseline CII GPCD. Outdoor water use would be limited to the amount of landscape water use defined for the 1992 and 2010 Model Landscape Ordinance.
3. Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's 20x2020 Water Conservation Plan (dated February 2010). Method 3 is the simplest of the methods as it involves looking up a table value for the applicable hydrologic region. As shown on Figure 3-1 the City is in Department of Water Resources (DWR) Hydrologic Region 6 (San Joaquin River).
4. While Methods 1 through 3 are included in the SB7 law, the law required that DWR develop Method 4 through a public process. DWR released the result of the Method 4 development as the Provisional Method 4 for Calculating Urban Water Use Targets dated February 16, 2011. Method 4 involves calculating water savings based on indoor residential water savings, metering savings, CII savings, and landscape and water loss savings. Water savings can be estimated using a calculation tool called the Best Management Practice (BMP) Calculator.

On October 1, 2010, DWR issued "*Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*" (DWR Methodology) (DWR 2010). The methodologies document presents standardized approaches to calculate the GPCD targets for Methods 1 and 2.

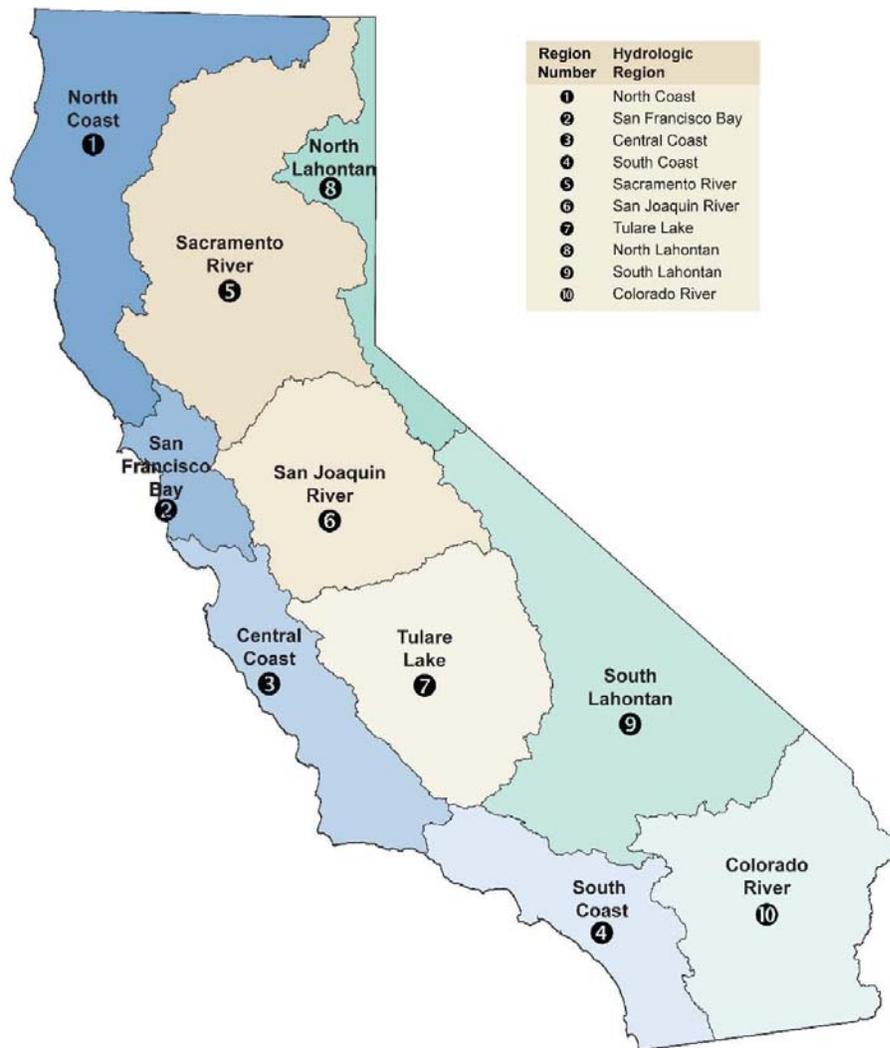


Figure 3-1. California Hydrologic Regions for SB7 Analysis

### 3. Historical Population

This section describes the determination of the City’s historical population for the retail service area. Figure 3-2 presents the historical population and number of connections or customers that are served by the City’s retail water system. Year 2000 total population is based on the year 2000 Census. Per the DWR Methodology, Methodology 2: Service Area Population, the City falls into Category 1, a water supplier whose actual distribution area overlaps substantially ( $\geq 95$  percent) with city boundaries during baseline and compliance years. As a Category 1 water supplier, DWR Methodology encourages the City to use population data published by the Department of Finance (DOF) demography unit as its basis. The City’s analysis relied on DOF data (State of California, Department of Finance, 2007; State of California, Department of Finance 2010).

As depicted on Figure 3-2, the City’s total annual retail water system population grew steadily until 2003, when the population tapered off at about 100,000 and when the number of connections tapered off at 30,000.

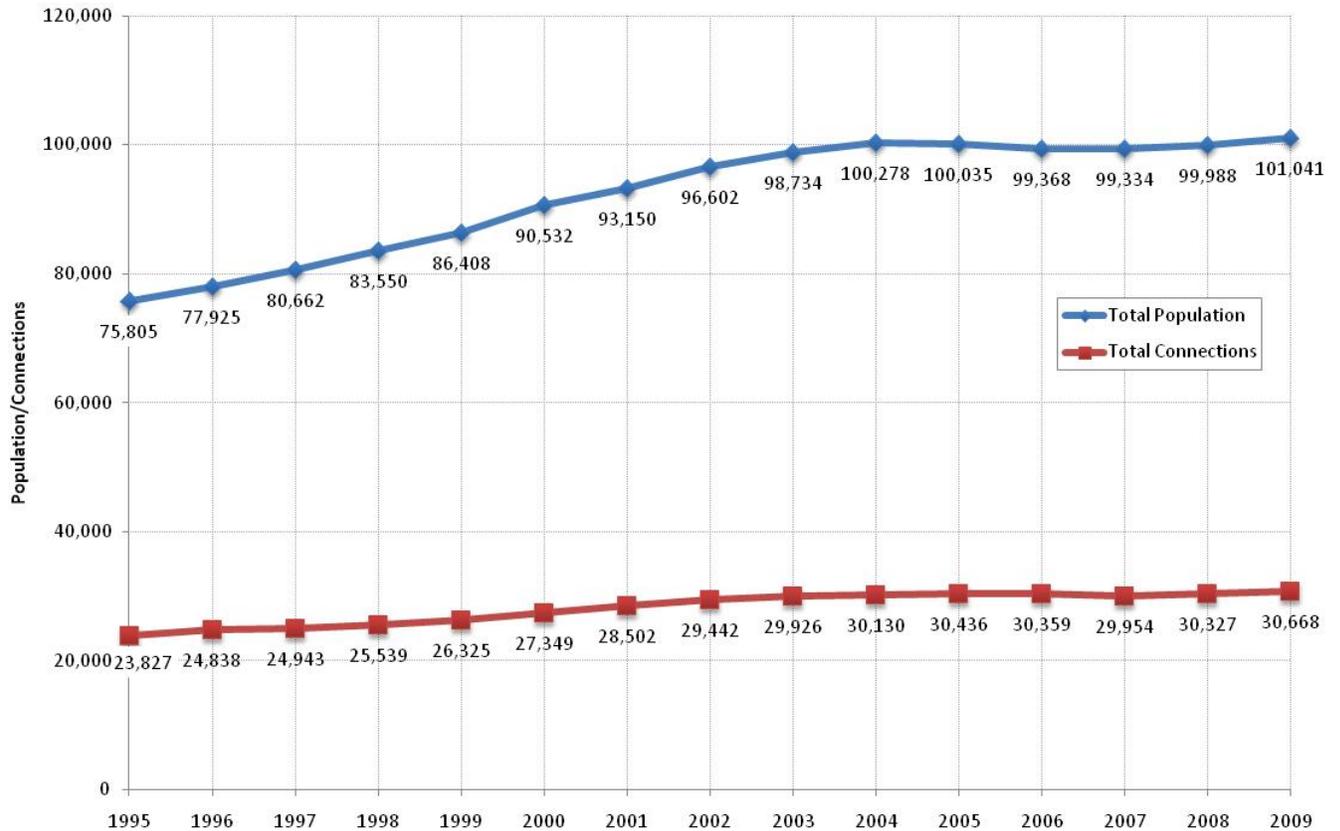


Figure 3-2. Historical Population and Total Connections for the City of Antioch

## 4. Historical Water Production

This section describes the City’s historical water use characteristics and trends over time.

Total water production is measured based on the total water produced from the water treatment plants (WTPs) and includes water use that is not metered, such as water used for pipe flushing and fire hydrant flow testing and system leaks. Available data related to raw water used to irrigate the Lone Tree Golf Course are limited to 2002 through 2010 and are added to the water treatment plant production data for those years. The average amount of raw water used in 2002 through 2010 (389 AF) was added to the water treatment plant production data for the years 1995 through 2001 to estimate the gross water production for those years.

Total water production from 1995 through 2009 is shown on Figure 4-1. Figure 4-2 depicts the total annual water use per connection. Figure 4-3 depicts the City’s total annual water use per person expressed as GPCD. The highest 10-year average is the 1999 to 2008 period.

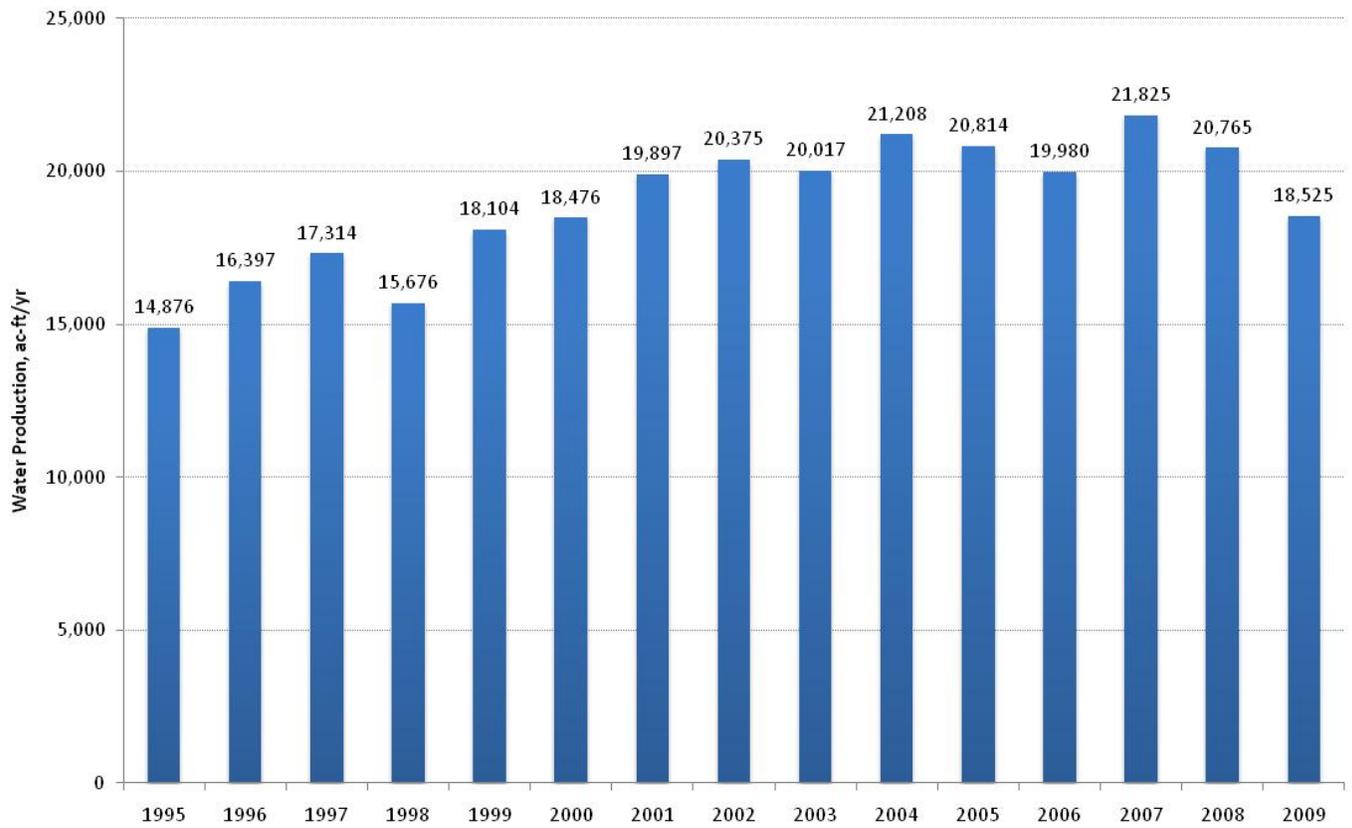


Figure 4-1. Historical Water Production for the City of Antioch

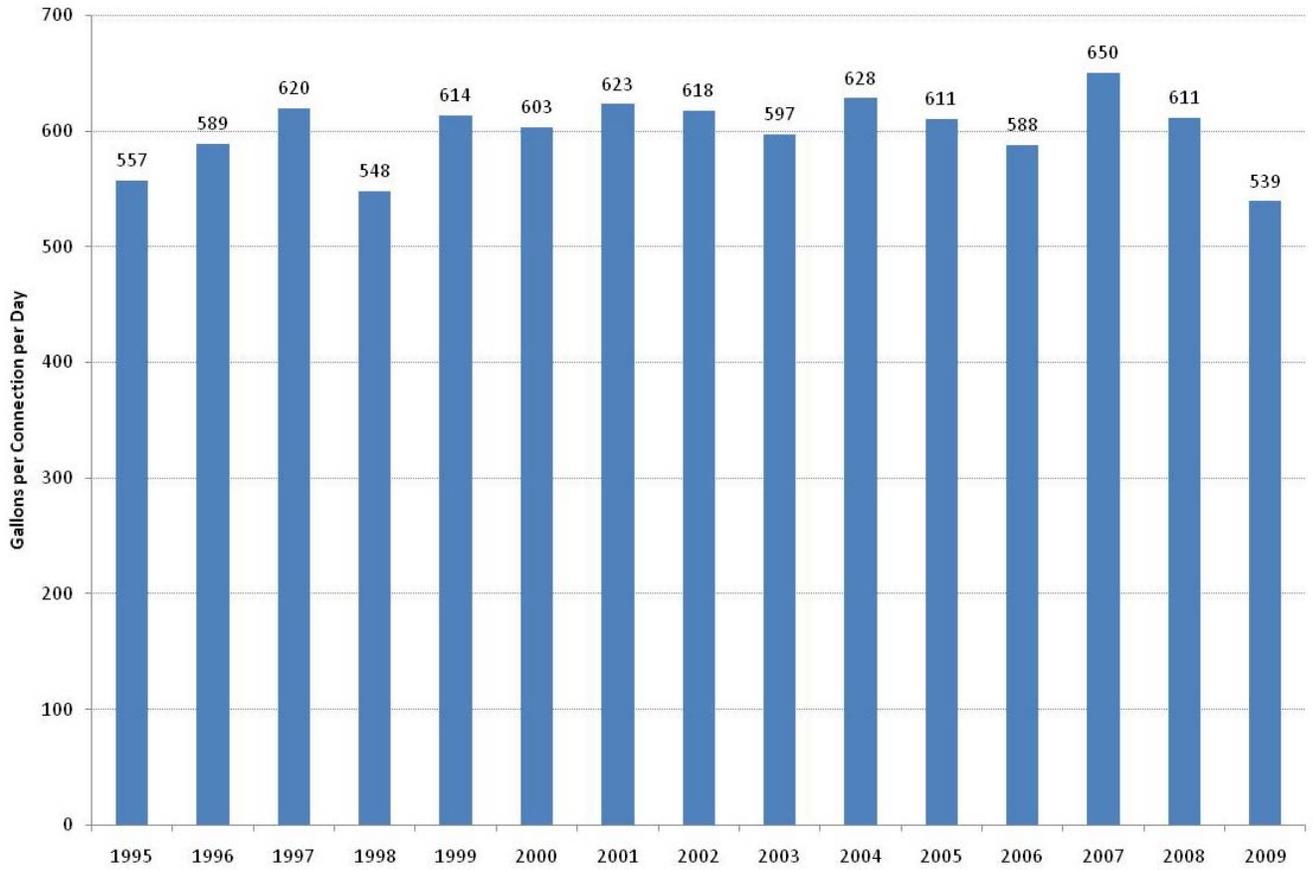
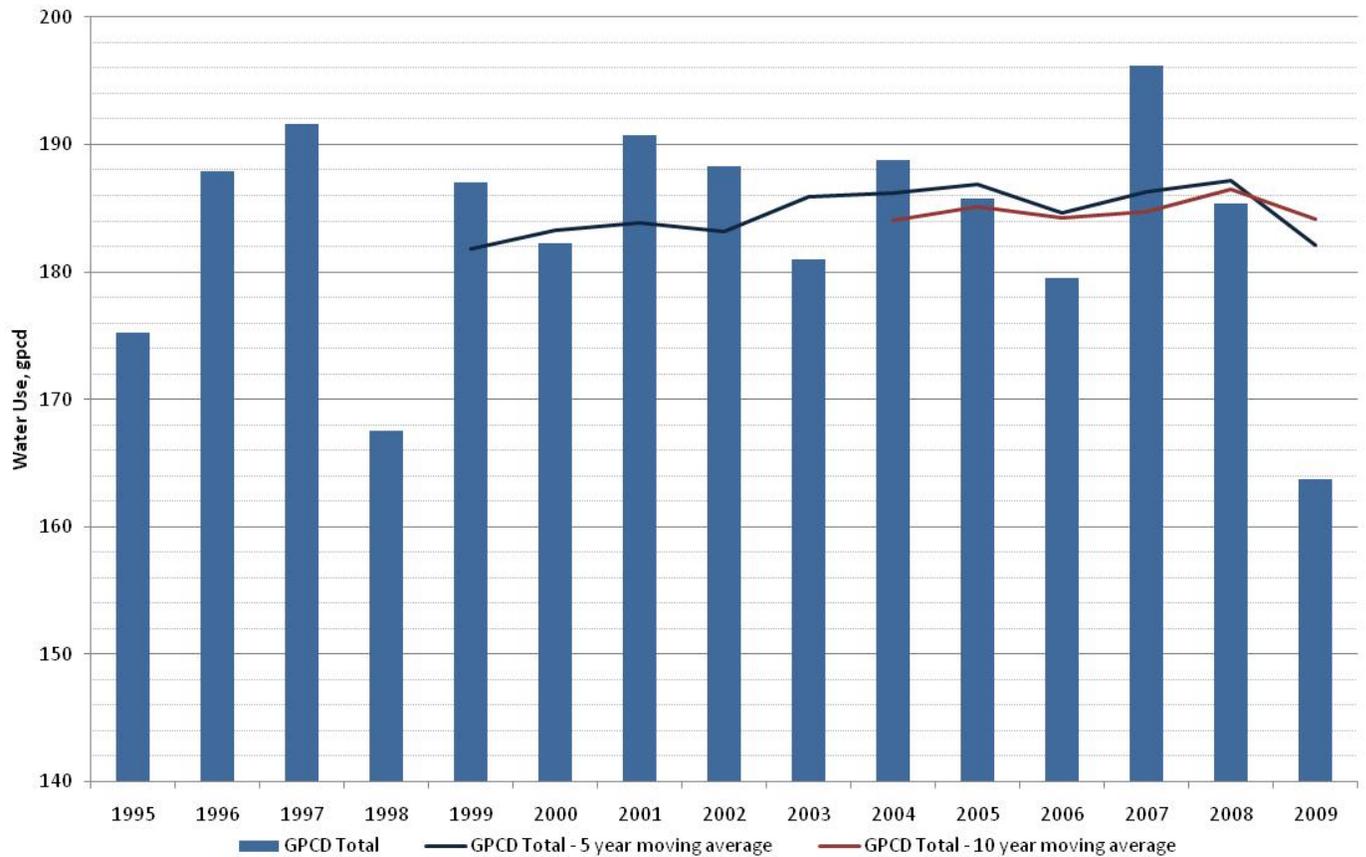


Figure 4-2. Historical Water Production per Connection for the City of Antioch



**Figure 4-3. Historical Gallons per Capita per Day for the City of Antioch**

Figure 4-4 presents the historical number of connections by category. The City’s water customers are divided into several categories—single family residential, multi-family residential, commercial-institutional, industrial, and landscape. As shown on Figure 4-4, most of the City’s customers are single family.

Figure 4-5 depicts the total annual water use by each customer category over time. As shown on Figure 4-5, the largest amounts of water are used by the single family customer category. Comparing gross production to water sales allows for the determination of estimates of non-revenue water occurring in the distribution system.

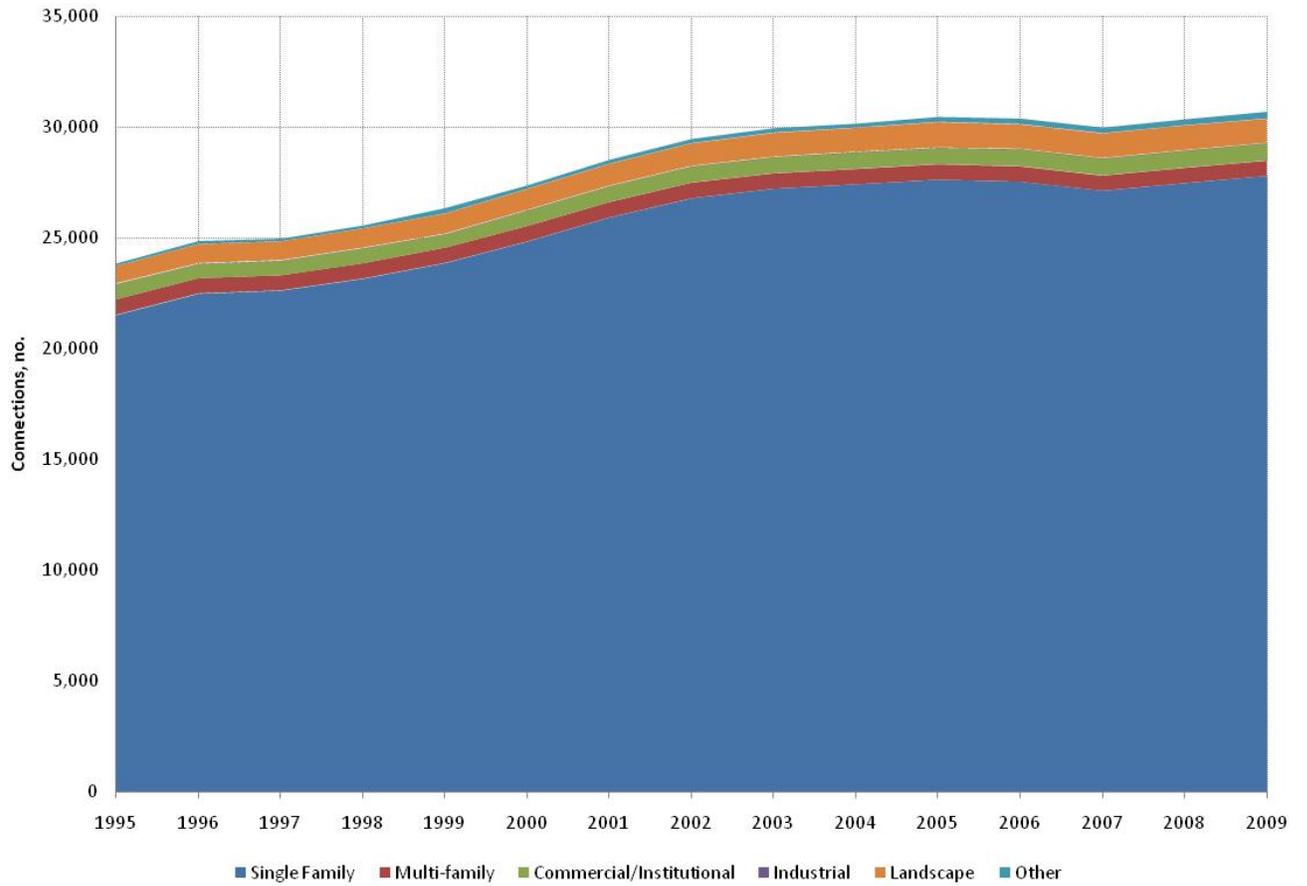
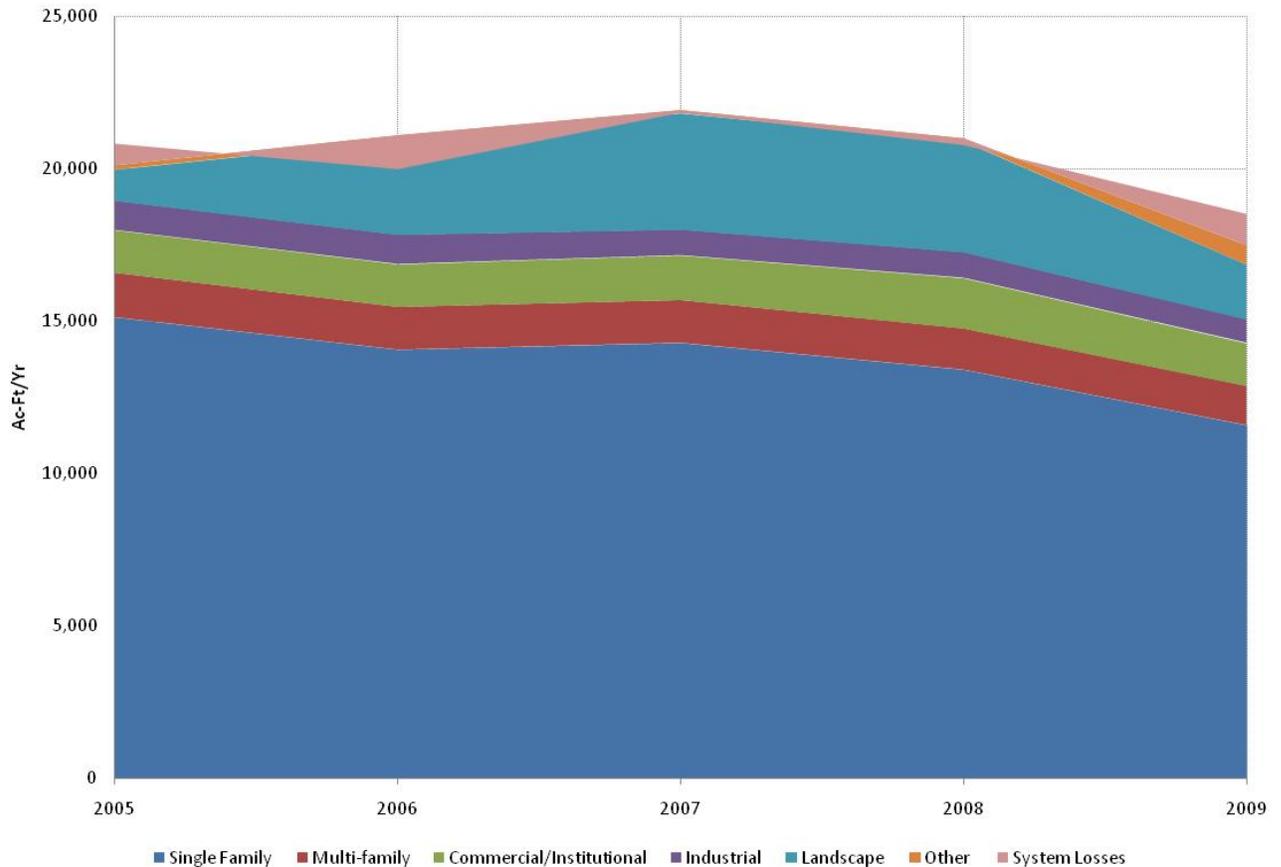


Figure 4-4. Historical Number of Connections by Customer Category for the City of Antioch Retail



**Figure 4-5. Historical Water Use by Customer Category for the City of Antioch <sup>a</sup>**

<sup>a</sup>According to City staff, reported measurement of water demands lags approximately one month in schedule behind measurement of water production. This occurs because water produced is not necessarily measured as sold in the same timeframe. The year-to-year differences in system losses, including a negative value in 2008 rate may be due in part to the difference in time periods between production data and meter readings. That is, the City measures water production daily and total water use is measured in arrears. For example, water produced in December is billed as consumption in January. The difference in measurement timing may result in variability of reported system losses. Overall, the system losses are still low.

## 5. GPCD Targets

This section describes the City’s baseline water use and the City’s GPCD targets as calculated for three of the four methods. Because the City chose not to pursue Method 2, this evaluation excludes Method 2. Table 5-1 contains the detailed input and calculations for this evaluation.

**Table 5-1. City of Antioch Water Use Analysis**

Parameter	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Water Use</b>															
Water Treatment Plant Production, AF	14,486	16,007	16,925	15,287	17,714	18,087	19,507	20,070	19,630	20,790	20,439	19,606	21,377	20,294	18,134
Golf Course Raw Water, AF	389	389	389	389	389	389	389	305	388	418	375	374	448	471	391
Total Gross Production, AF	14,876	16,397	17,314	15,676	18,104	18,476	19,897	20,375	20,017	21,208	20,814	19,980	21,825	20,765	18,525
CIJ sales, AF	2,320	2,415	2,426	2,491	2,799	2,861	3,027	3,015	2,222	2,452	2,352	2,354	2,298	2,492	2,174
Water sales outside service area, AF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Population</b>															
Population (Dept. of Finance data)	75,805	77,925	80,662	83,550	86,408	90,532	93,150	96,602	98,734	100,278	100,035	99,368	99,334	99,988	101,041
<b>Connections</b>															
Single family	21,531	22,496	22,633	23,166	23,876	24,847	25,932	26,802	27,234	27,432	27,644	27,550	27,143	27,486	27,812
Multi-family	700	689	681	692	693	697	699	707	693	693	695	695	680	688	688
Commercial/Institutional	689	645	654	671	594	697	707	721	721	743	719	760	763	769	775
Industrial	18	19	19	19	19	18	18	18	19	20	19	19	19	18	18
Landscape Irrigation	786	857	843	866	906	938	976	1,011	1,068	1,073	1,143	1,092	1,103	1,105	1,079
Other	103	132	113	125	237	152	170	183	191	169	216	243	246	261	296
Total	23,827	24,838	24,943	25,539	26,325	27,349	28,502	29,442	29,926	30,130	30,436	30,359	29,954	30,327	30,668
Production per Connection (gal/connection/day)	557	589	620	548	614	603	623	618	597	628	611	588	650	611	539

**Table 5-1. City of Antioch Water Use Analysis**

Parameter	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>GPCD</b>															
GPCD-Total	175	188	192	168	187	182	191	188	181	189	186	180	196	185	164
GPCD-Total 5 year moving average					182	183	184	183	186	186	187	185	186	187	182
GPCD Total - 10 year moving average										184	185	184	185	186	184
GPCD-CII only	27	28	27	27	29	28	29	28	20	22	21	21	21	22	19
<b>Baseline GPCD</b>															
GPCD Total - 10 year average										184	185	184	185	186	184
GPCD CII only - 10 year average										26	26	25	25	24	23

## 5.1 Baseline Per Capita Water Use

Water suppliers must define a 10-year baseline period for daily per capita water use to be considered the agency's baseline water use. The determination of the baseline water use involves the following steps:

1. Estimating the service area population for each year in the base period,
2. Calculating gross water use for each year in the base period,
3. Calculating daily per capita water use for each year in the base period by dividing the gross water use by the service area population, and
4. Calculating the average per capita water use by annual GPCD values for the 10-year periods occurring between 1995 and 2009.

The determination of the historical annual population is in conformance with the DWR technical methodologies and is based on DOF population estimates. Section 3 of this memorandum describes the determination of historical population. Water production values used for determining the 10-year baseline are based on the retail water system WTP production meter data for the retail service area, as reported to DWR in Public Water System Statistics (PWSS) annual reports, and the raw water used by the Lone Tree Golf Course.

We calculated the daily per capita water use for each year from 1995 through 2009 by dividing the gross water production for each year by the service area population for each year, respectively. If the City's 2008 recycled water percent is less than 10 percent of the total 2008 deliveries, then the first base period is a continuous 10-year period. Because the City's did not deliver recycled water in 2008, the City's base period will be a 10-year period, as shown in Table 5-2. In order to calculate the baseline per capita water use, the annual daily per capita water use is averaged for 10-year periods ending no earlier than December 31, 2004 and no later than December 31, 2010. The City's baseline daily per capita water use of 186 GPCD is based on a base period starting in 1999 and ending in 2008. Table 5-3 shows the annual daily per capita water use and 10-year average per capita water use for the City.

A second baseline period that must be calculated is a 5-year range. This value is used as a check for the minimum water use reduction against the City's selected GPCD target method. If the City's selected GPCD target method results in a GPCD target that is greater than 95 percent of the 5-year base daily per capita range, then the City's target shall be 95 percent of its 5-year base daily per capita range. As shown in Table 5-4, the City's 5-year base daily per capita range is 187 GPCD. Applying the 95 percent factor to this value results in 178 GPCD. This value will be used later in this analysis as a check against the recommended method GPCD value. If the selected GPCD target method results in a GPCD target greater than 95 percent of the 5-year baseline GPCD, the City will be required to adjust its target to meet a target equal to 95 percent of the 5-year baseline GPCD (178 GPCD).

<b>Table 5-2. Base Period Ranges (DWR Table 13)</b>			
<b>Base</b>	<b>Base Period Ranges</b>		
	<b>Parameter</b>	<b>Value</b>	<b>Units</b>
<b>10- to 15-year Base Period</b>	2008 total water deliveries	6,838	million gallons
	2008 total volume of delivered recycled water	0	gallons
	2008 recycled water as a percent of total deliveries	0	Percent
	Number of years in base period	10	Years
	Year beginning base period range	January 1999	
	Year ending base period range	December 2008	
<b>5-year Base Period</b>	Number of years in base period	5	Years
	Year beginning base period range	January 2004	
	Year ending base period range	December 2008	

<b>Table 5-3. Base Daily per Capita Water Use – 10- to 15-year Range (DWR Table 14)</b>				
<b>Base Period Year</b>		<b>Distribution System Population</b>	<b>Daily System Gross Water Use (mgd)</b>	<b>Annual Daily Per Capita Water Use (gpcd)</b>
<b>Sequence Year</b>	<b>Calendar Year Ending</b>			
Year 1	December - 1999	86,408	16.2	187
Year 2	December - 2000	90,532	16.5	182
Year 3	December - 2001	93,150	17.8	191
Year 4	December - 2002	96,602	18.2	188
Year 5	December - 2003	98,734	17.9	181
Year 6	December - 2004	100,278	18.9	189
Year 7	December - 2005	100,035	18.6	186
Year 8	December - 2006	99,368	17.8	180
Year 9	December - 2007	99,334	19.5	196
Year 10	December - 2008	99,988	18.5	185
Year 11	--	--	--	--
Year 12	--	--	--	--
Year 13	--	--	--	--
Year 14	--	--	--	--
Year 15	--	--	--	--
<b>Base Daily Per Capita Water Use</b>				<b>186</b>

Table 5-4. Base Daily per Capita Water Use – 5-year Range (DWR Table 15)				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year Ending			
Year 1	December - 2004	100,278	18.9	189
Year 2	December - 2005	100,035	18.6	186
Year 3	December - 2006	99,368	17.8	180
Year 4	December - 2007	99,334	19.5	196
Year 5	December - 2008	99,988	18.5	185
Base Daily Per Capita Water Use				187

## 5.2 Method 1

For Method 1, the 1999 to 2008 period gives the highest 10-year GPCD baseline for the City, 186 GPCD. The Method 1 GPCD 2020 target is 149 GPCD, which is 80 percent of the 10-year baseline. The interim 2015 target is 168 GPCD, which is 90 percent of the 10-year baseline.

## 5.3 Method 3

The Method 3 GPCD target is based on 95 percent of the Hydrologic Region Number 6 GPCD target of 174 GPCD as set forth in the states 20x2020 Water Conservation Plan (dated February, 2010). The interim 2015 target is 200 gallons per capita per day (gpcd) (i.e., 95 percent of 211 gpcd), while the 2020 target for the City is 165 gpcd (i.e., 95 percent of 174 gpcd).

## 5.4 Method 4

While Methods 1 through 3 are included in the SB7 law, the law requires that DWR develop Method 4 through a public process. DWR released the result of the Method 4 development as the Provisional Method 4 for Calculating Urban Water Use Targets dated February 16, 2011. Method 4 involves calculating water savings based on indoor residential water savings, metering savings, CII savings, and landscape and water loss savings. Water savings can be estimated using a calculation tool called the BMP Calculator.

The BMP Calculator allows the option of either entering detailed information related to saturation of water conservation measures related to residential water users or using default values. This evaluation is based on the use of the BMP Calculator default savings values for indoor residential end uses.

Table 5-5 summarizes the parameters used to develop the Method 4 water use targets. Utilizing Method 4, the City’s 2020 GPCD target would be 149 GPCD, while the interim 2015 target would be 168 GPCD.

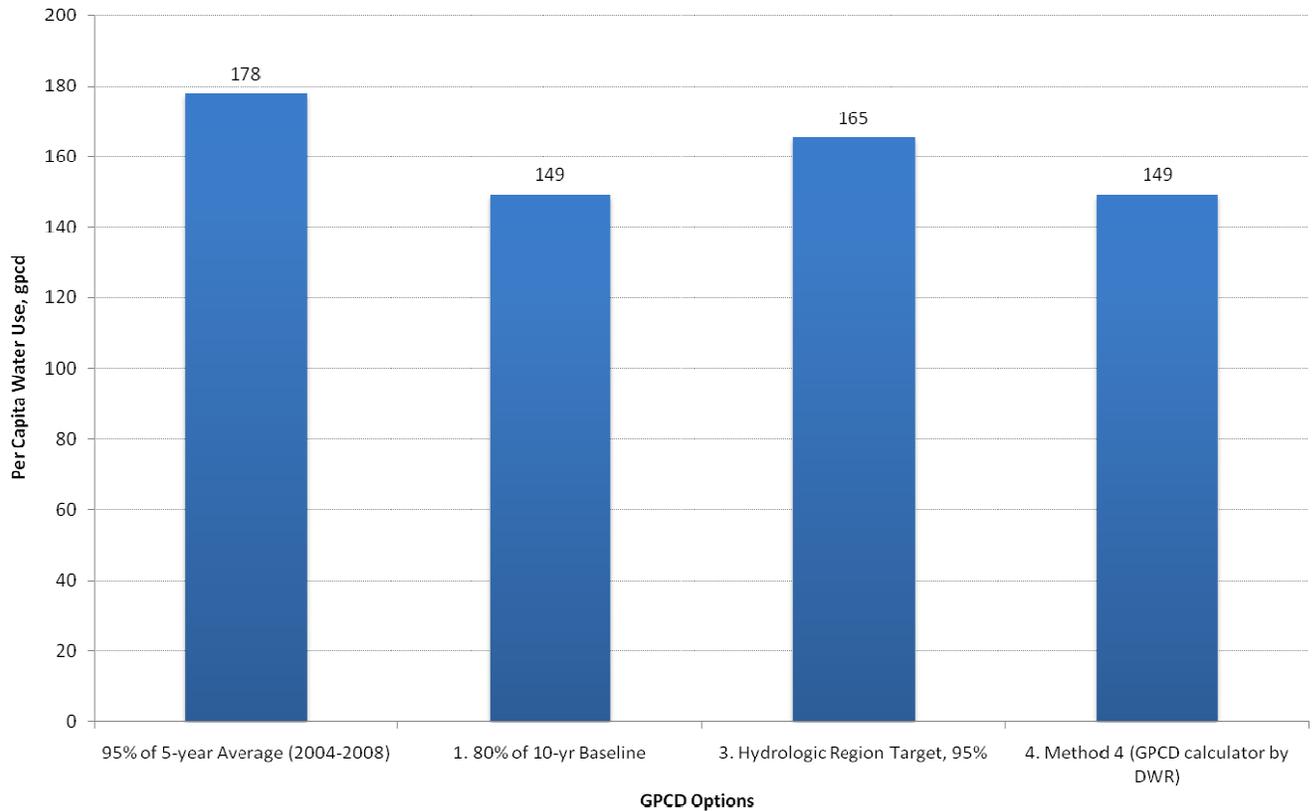
Table 5-5. Provisional Method 4 for Determining Water Use Targets			
Parameter	Value	Units	Notes
10-year Baseline GPCD	186	gpcd	
Metering savings	0	gpcd	City is fully metered

Table 5-5. Provisional Method 4 for Determining Water Use Targets			
Parameter	Value	Units	Notes
Indoor residential savings	15	gpcd	Default value, since saturation levels are unknown
CII savings	2	gpcd	10-year CII baseline (for 1999-2008) x 0.1
Landscape irrigation and water loss savings	20	gpcd	(Baseline - stnd indoor residential (70 gpcd) - CII water use) x 0.216
Total savings	37	gpcd	Total savings include sum of indoor residential, CII, landscape irrigation and water loss savings
Method 4 2020 Target	149	gpcd	10-year baseline GPCD minus Method 4 total savings
Method 4 2015 Interim Target	168	gpcd	Halfway between Baseline per capita daily water use and 2020 target.

## 6. Conclusions and Recommendations

Table 6-1 presents the City’s baseline and 5-year average GPCD and the results of the analysis for Methods 1, 3 and 4. Figure 6-1 provides a graphical representation of these results.

Table 6-1. 2020 GPCD Targets by Method			
Option	Interim 2015 gpcd Target	2020 gpcd Target	Notes/Comments:
10-year Baseline (1999-2008)	--	186	1999-2008 baseline
95% of 5-year Baseline (2004-2008)	--	178	2004-2008 baseline
1. 80% of 10-yr Baseline	168	149	1999-2008 baseline
3. Hydrologic Region Target, 95%	200	165	
4. Method 4 (GPCD calculator by DWR)	168	149	



**Figure 6-1. Year 2020 GPCD Target Options for the City of Antioch**

The conclusions of this analysis are as follows:

- The City’s 2020 GPCD target using Method 1 is 149 GPCD (2015 interim target is 168 GPCD).
- The City’s 2020 GPCD target utilizing Method 3 is 165 GPCD (2015 interim target is 200 GPCD).
- The City’s 2020 GPCD target utilizing Method 4 is 149 GPCD (2015 interim target is 168 GPCD).
- The City’s 10-year baseline is 186 GPCD (1999 through 2008). This baseline is used for the determination of the Method 1 GPCD.
- The City’s 5-year baseline is 187 GPCD (2004 through 2008), and 95 percent of the City’s 5-year baseline is 178 GPCD.

Based on the quantified targets, we recommend that the City select Method 3, requiring a retail water system use of no greater than 165 GPCD by 2020 with a 2015 interim target of 200 GPCD. Based on water use data from 1995 through 2009, the City is meeting the 2015 interim target and would require a nine percent reduction from the 2007 through 2009 three-year average per capita water use to meet the 2020 target.

## References

State of California, Department of Water Resources (DWR), 2010. Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use, October 2010.

State of California, Department of Finance (DOF), 2010. E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010.

State of California, Department of Finance (DOF), 2007. E-4 Historical Population Estimates for City, County and the State, 1991-2000, with 1990 and 2000 Census Counts. Sacramento, California, August 2007.



## Appendix D: Past Water Conservation Ordinance 834-C-S



## ORDINANCE No.

### AN ORDINANCE OF THE CITY OF ANTIOCH ESTABLISHING DROUGHT MANAGEMENT REGULATIONS AND WATER CONSERVATION GOALS, IMPOSING MEASURES TO CONTROL THE EXCESSIVE USE OF WATER

The City Council of the City of Antioch does ordain as follows:

#### SECTION 1. INTRODUCTION AND FINDINGS

The City of Antioch purchases both raw and treated water from the Contra Costa Water District (CCWD) which the City subsequently treats, distributes and sells to our residential, commercial and industrial customers. In addition, the City does have a pre-1914 “non-statutory” appropriative right that allows the City to take raw water directly from the San Joaquin River when the quality is determined to be suitable for municipal use. Even under the most favorable conditions, the City obtains the largest percentage of our raw water from CCWD.

CCWD is part of the federal water project, Central Valley Project (CVP), controlled by the United States Bureau of Reclamation. Because California is currently experiencing a third consecutive year of below normal rainfall and because federal reservoirs continue to be at below normal levels for this time of year, the Bureau of Reclamation has decided to reduce the amount of water available to users including CCWD, which is the largest municipal contractor of the CVP; additionally, the CVP is CCWD’s primary source of untreated water.

Due to the Bureau of Reclamation decreasing CCWD’s 2009 water allocations to 55% of historical use, CCWD has requested that their Wholesale Water Customers, such as the City of Antioch, establish Drought Management Regulations with a goal of achieving 15% reductions in water use based on their historical average consumption for the three year period 2005-2007. The focus on our Drought Management Regulations and 15% water reduction goal would be on reducing outside water use while minimizing impacts on jobs and the economy. In addition, CCWD has implemented an excessive use penalty for consumption that does not meet specific requirements outlined in their 15% reduction program.

On March 24, 2009, the City Council adopted Resolution No. 2009/24 declaring a water shortage emergency and directing the preparation of a drought emergency program ordinance. The focus of the Drought Management Regulations and 15% water reduction goals would be on reducing outside water use while minimizing impacts on jobs and the economy, as well as ensuring that the City has the resources to pay any excess use penalty imposed by CCWD.

The City intends to implement an extensive customer outreach and public education program to help ensure that customers are knowledgeable about the 15% water reduction

goals. The City will provide educational information, services and resources to assist customers in establishing and meeting their water reduction goal.

The City Council finds that the notice of the consideration of this ordinance was published pursuant to the requirements of Water Code §352.

## SECTION 2. DECLARATION OF WATER SHORTAGE

In accordance with the California Water Code, the City Council recognizes the need to implement Drought Management Regulations. Council hereby finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the City and that there could be insufficient water for human consumption, sanitation and fire protection unless regulations and water conservation goals specified herein are implemented.

The regulations specified herein shall be effective from the effective date of this ordinance until such time as the City Council declares that the condition has ended.

## SECTION 3. ALLOCATION OF WATER

In order to achieve the recommended 15% water conservation reduction goal, the City does hereby allocate as follows:

<u>Customer Type</u>	<u>Allocation</u>
Each single unit residence	15% below historical use
Apartments and condominiums	15% below historical use
Commercial	15% below historical use
Industrial	5% below historical use
Municipal/Institutional	15% below historical use
Landscaping	15% below historical use

Historical use shall be determined by averaging the corresponding month's actual use for the years 2005, 2006 and 2007. The water use year of 2008 will not be considered in the historical use calculation due to many customers already implementing water conservation measures. If there has not been water service at a location since 2005, the available corresponding monthly consumption history will be used. For residential customers who began water service in 2008 or later, the monthly consumption goal of 20 units will be used.

#### SECTION 4. NONESSENTIAL USE OF WATER PROHIBITED

- A. No person shall use any water provided by the City for a nonessential purpose.
- B. For the purposes of this Ordinance, each of the following is declared a nonessential use of water:
  - 1. Permitting water to flow onto a sidewalk, driveway or street, or escape down a gutter, ditch or other service drain;
  - 2. Outside watering that results in excessive flooding or runoff into a gutter, drain, walkway or street;
  - 3. Using City-furnished water for non-recirculating decorative fountains or filling of decorative lakes or ponds;
  - 4. Washing of paved or other hard surface areas, including sidewalks, walkways, driveways, patios and parking areas with City-furnished water;
  - 5. Failing to repair a controllable leak of water; and/or
  - 6. Using a hose without an automatic shutoff nozzle.

#### SECTION 5. EXCESSIVE USE OF WATER

All customers that have a monthly consumption of 21 units or more and who do not meet their established 15% water reduction goal, will be subject to an excess use charge of four times the quantity charge applied to consumption in excess of their reduction goal if excessive use charges are imposed upon the City by CCWD. All customers who increase their usage above their historical use will also be subject to an excess use charge of four times the quantity charge applied to consumption in excess of their historical use for the amount of the overage if excessive use charges are imposed upon the City by CCWD.

#### SECTION 6. RULES AND VARIANCES

The City Manager and/or his designee are hereby authorized to promulgate further rules and regulations further implementing the policies in this ordinance. The City Manager and/or his designee is also authorized to settle disputes regarding definitions of terms, applicability and other disputes or questions that may arise regarding the implementation of this ordinance. Requests for dispute resolution shall be made in writing to the City Manager and/or his designee.

The City Manager and or his designee are also authorized to provide procedures for, and to consider, grant, or deny requests for variances or exceptions to the provisions of this ordinance. For example, provisions shall be made for exceptions of this water reduction goal based upon medical needs.

Any appeals shall be made through the appeals process set by Chapter 4 of Title 1 of the Antioch Municipal Code.

SECTION 7. EFFECTIVE DATE

This ordinance shall take effect thirty (30) days after adoption. This ordinance, or summary, shall be published once in the East Contra Costa Times as required by state law.

\* \* \* \* \*

The foregoing ordinance was introduced at a regular meeting of the City Council of the City of Antioch held on May 12, 2009, and was adopted on May 26, 2009 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

---

James D. Davis, Mayor

Attest:

---

L. Jolene Martin, City Clerk

## **Appendix E: Resolution 89-263 for Landscape Guidelines for Public Open Space Area with Planned Developments**



# LANDSCAPE GUIDELINES FOR PLANNED DEVELOPMENTS

APPROVED BY COUNCIL RESOLUTION 89-263, 8/22/89  
CITY OF ANTIOCH

## Introduction

### I. PURPOSE

To assure that the public open space areas within Planned Developments provide the maximum aesthetic benefit to the community while minimizing the costs of landscape installation, maintenance, and water use. Public open space areas are defined as parcels within the development which are owned and/or maintained by either the city, a landscape maintenance district, or a public/private utility (EBMUD, PG&E etc.). Public open space areas are identified and established as part of the development review process (ie planned development, tentative map, etc.)

### II. ORGANIZATION OF GUIDELINES

These guidelines are divided into 3 (three) sections. The first, "Design Standards", addresses the different types and uses of landscaping and explains the relationship between grading and landscape design. The second section, "Landscape Plan Review Process", explains the requirements for plan submittal and the steps leading to plan approval. The third section addresses the regulation of the installation and initial maintenance of landscaping, as well as the requirements for final acceptance of landscape improvements by the City.

# Design Standards

## I. TYPES OF LANDSCAPES

The degree of landscaping provided should be tailored to the visibility of the site and the nature of grading that will be taking place. Generally, there are three classes of landscaping that will be used in open space areas. Class I is the most intense with Class III being the least. All open space areas will be classified as requiring one of the 3 (three) treatments. The components of the three classes are defined below, and their applications are discussed in the following section labeled "Uses of Landscape Types".

- A. CLASS I - Class I is what may be called "conventional landscaping". This class will have the highest aesthetic impact, along with the highest water use.

All areas will have either turf or ground cover planted from flats. A variety of shrubs, vines, and trees will also be utilized. For this traditional type of planting, all trees must be at least 15 gallon, with 5 gallon shrubs. 1 gallon shrubs may be considered on a case by case basis. In many cases, street trees will be selected from pallets to be established for the various arterial and collector roads. Full, permanent and automatic irrigation will be provided with conventional spray and bubbler systems.

- B. CLASS II - Class II is to be considered a mid-range landscape, providing limited irrigated planting in place of either conventional Class I Landscaping or unirrigated grasses. While no low growing ground covers would be required, the main purpose of the Class II landscape is to cover graded slopes using a "shrub cover". The shrub cover may be used to either: a) provide coverage for 100% of total slope area; or b) provide partial slope coverage by clustering shrubs in irregular forms to simulate naturally occurring mixes of grasses and chaparral growth. In many cases, the two approaches will be used together, so that a highly visible slope face will receive 100% coverage and then "feather out" gradually into a less visible area.

Initially, areas to receive Class II shrub plantings shall be hydroseeded with an unirrigated "nurse crop"

for erosion control. Ultimate cover shall be provided by low growing, quick spreading shrubs. These shrubs may be planted from 1 gallon containers at 6' on center or if approved on a case by case basis, from liners at approximately 3' on center. Ideally, the desired cover should be provided in about three (3) years.

Other native and drought tolerant trees and shrubs are to be planted in clusters. Trees and large shrubs should be added to the "shrub cover" to provide accents and mass screening where needed. Selected plants should reflect a naturalistic setting, avoiding highly ornamental plantings. (NOTE, a list of appropriate trees and shrubs is attached as an appendix to these guidelines. Staff intends to update this list as new information regarding plant performance becomes available).

At this class, a variety of liners one, five and 15 gallon plant sizes may be used. Since all of the plants used in Class II are drought tolerant, water use should be less than with Class I. Automatic irrigation will either be from a permanent drip system (such as Pepco, or equal) or conventional spray and/or bubblers. Flow sensors to detect pressure loss (such as Data Industrial, or equal) shall be incorporated into the irrigation system, when required, so the affected system would shut down if there was a break in the line.

- C. CLASS III - Class III plantings introduce the fewest changes to the natural landscape. Most of the areas to receive Class III treatment will be undisturbed open spaces where the natural grasses will be retained. In these undisturbed situations, the only additions to the existing landscape would be plantings of coast live and blue oaks, along with California Buckeyes. These trees will be clustered as non-irrigated seedlings at a rate of approximately 50 per acre. The intent is to recreate the Savannah landscape that has currently survived only in the higher foothills above Antioch. Special containers made for dry seedling plantings known as slips or liners shall be used. These containers shall provide wire protection and water retaining polymers shall be placed in planting holes. In some unique or transitional situations, 5 and 15 gallon oak trees from nursery stock may be required.

In disturbed areas, a low growing hydroseed mix shall be used to replace the existing grasses. A variety of mixes, such as hard fescue will be considered on a case by case basis. In addition to replacing the grassland cover, oak seedlings and trees shall be planted as discussed above.

In both disturbed and undisturbed situations, the only irrigation used may be for the occasional planting of oak tree clusters from nursery stock as discussed above. As with Class II, low water use bubblers will be used.

## II. USES OF LANDSCAPE TYPES

The three general classes of landscape types will be used both separately and in combination to match the aesthetic requirement of the specific situation. The plantings of the different classes should blend into each other, creating transitions where some shrubs and trees overlap the different zones. Highly linear "divisions" between the zones should be avoided.

Basically, Class I is to be used only in highly visible and accessible situations. Parkways and landscape strips adjacent to arterial and collector streets will be mostly planted with Class I landscapes. Open space areas adjacent to local streets and cul-de-sacs will receive a band of Class I landscaping of approximately 8' to 15' in depth.

Class II landscaping shall be used on graded slopes which are both highly visible and artificial in appearance. The most typical situation where Class II shall be used is on a 2 to 1 or 3 to 1 slope which is both adjacent to an arterial road and contains mid-slope benches. Because these slopes have the highly visible and unnatural horizontal "banding" from the benches, and are usually steeper than the natural topography, they require the addition of irrigated landscaping to soften their appearance.

Another common use of Class II landscaping will be to act as a backdrop for the Class I plantings used along arterials, collectors, and local streets where they abut open space. This backdrop should extend for approximately 10' to 15' back from the Class I plantings. In this and in most situations, Class I and II landscapes should blend into each other, varying the limit line of the more refined Class I plantings.

Class III treatment will be used for ungraded slopes and graded slopes which have either low visibility, or have been graded to reflect the pre-existing contours. The use of Class III treatment is more likely to be acceptable if the graded slope appears as natural as possible. This would require these slopes to:

- a) generally have slopes no steeper than three to one.
- b) have curvilinear contours which simulate natural forms.
- c) utilize concrete drainage benches only at the bottom of

slopes. Mid-slope benches, if required for soil engineering purposes, would highlight the artificial aspects of the slope and necessitate Class II level planting.

It should be stressed that the use of naturalistic grading with Class III treatment is highly desirable as it both preserves the image of natural hillsides and reduces landscaping costs to both developer and maintenance district.

### III. REDUCTION OF FIRE HAZARDS IN OPEN SPACE AREAS

The Riverview Fire Protection District requires that fire risk be reduced by the provision of a 30' fire break immediately adjacent to all homes which join an open space area. The fire district has stated that this "fire break" can be established by either:

- a) removing all growth by discing or chemical control.
- b) limiting height of natural grasses to approximately 6 inches by cutting or chemical control.
- c) use of "wet belt" landscaping which uses both permanent spray irrigation and fire retardant plant materials.

Where the fire break is immediately uphill from the homes, the area will have little visibility since the homes will block views of the slope. In these situations, grass removal or growth restrictor is the most appropriate. Where the need for the fire break is downhill from homes, and therefore likely to be highly visible, a "wet belt" landscaped treatment will most likely be required.

This wet belt can be achieved in many ways. All Class I landscapes will qualify as wet belt plantings.

But because some of the plants most likely to be used in Class II situations may not be considered fire retardant, Class II plantings will not automatically be considered a wet belt zone.

For a list of appropriate shrubs and ground covers to use in place of standard Class II scrubs, see Attachment #1.

The different shrubs species should be placed in multiple small clusters, so the risk of die out from too large of area of one species of shrub is reduced. This type wet belt may be irrigated by drip or spray.

This approach is intended to blend with Class II planting. Plants from the Attachment #1 list could be blended throughout a bank of Class II planting so that plantings

within and without the wet belt zone appear related. Furthermore, trees that are not a high fire risk (such as Coast Live and Blue Oak) which are used in Class II planting may be occasionally placed inside the wet belt zone to further blend the planting zones.

An alternate form of wet belt planting would be the establishment of a low growing grass or legume from hydroseed. These areas would be spray irrigated and must be kept green at all times. This treatment may blend best with the unirrigated Class III areas, although its use due to the greater addition of surface water, is subject to soils engineers' approval.

A final note on fire breaks address large parcels (ie. over 5 acres) of ungraded open spaces areas. These areas will be divided by seasonal discing to create areas of natural grasses not larger than 5 acres apiece. The location of these annual fire breaks should be determined early in landscape/plan development so that no oak seedlings are planted where discing will take place.

It must be stressed that the specific requirements of the fire district will vary from site to site so plantings related to fire safety will be reviewed on a case by case basis.

#### IV. UNIQUE SITUATIONS

Some sites may have unique features (such as long and narrow utility easements) that require additional treatment other than found in Class III, but where the more intense Class II treatment may be unnecessary. In these cases, use of an irrigated meadow grass may be considered on a case by case basis. This treatment would be implemented by occasional trees irrigated by individual bubblers.

# Landscape review process

## I. PLANNED DEVELOPMENT PLAN REVIEW

As part of the planned development/tentative map review process, a "landscape zones" map must be submitted. This plan conceptually shows where the three classes of planting will be utilized, as well as the locations of "wet belt" planting. Although most of this initial landscape plan review will be limited to the degree of landscape treatment proposed for an open space area (ie: Class II versus Class III) rather than specific plant materials, street trees for the major arterials should be included. The landscape zones map should use the preliminary grading plan for the planned development as a base (usually @ 100 scale). It should be noted that just as the preliminary grading plan is subject to change due to evolving information on the soils and geology of the site, the location of landscape zone may vary at the time more precise grading plans are developed.

While detailed "conceptual landscape plans" for the entire site are not required, preliminary meetings with staff may indicate that a conceptual plan that highlights specific areas of concern (such as a neighborhood entry, highly visible slope, or linear trailway) is desirable.

## II. USE PERMIT REVIEW AND PRE-HEARING STAFF REVIEW

After the final development plan/tentative map have been approved, use permit review is required for the specific phases of the project. The use permit allows for more detailed review of grading, landscaping and exact unit and lot line locations. Use permit review shall precede engineering services' plan checking of the final map and civil improvement plans.

To begin the process, the applicant should review a preliminary grading and lot layout plan with planning staff. As a result of staff's comments, regarding grading refinements and landscape requirements, the applicant should prepare the required use permit submittals.

### III. USE PERMIT SUBMISSION REQUIREMENTS

The use permit submittal shall include both grading and planting plans at 40 scale. The planting plan shall be of at least a "design development" stage, including a proposed plant pallet and ground cover and shrubs shown as masses. Specific tree and shrub "call outs" are desirable, so a draft of the final working drawings is acceptable in lieu of the "design development" drawing. These plans shall be reviewed by Planning, Engineering, Maintenance Services, and Fire District for conformance to the planned development approval and these landscape policy guidelines. It should be noted that in cases of hardship, due to project scheduling, the Zoning Administrator may allow landscape "design development" plans to be submitted after use permit hearing.

Once the use permit is approved, the plan changes required by "project specific conditions" shall be incorporated into the final grading and landscape working drawings submitted to Engineering Services.

With final grading and planting plans approved, precise working drawings of layout, irrigation, and planting must be submitted for final approval by the Public Works Department, Engineering Services.

### IV. FINAL WORKING DRAWING SUBMISSION REQUIRED

The final working drawing submittal shall:

- a) be on 24" X 36" size sheets and be to an engineering scale (1" = 10', 20' or 40'), as required by Engineering Services
- b) call out all quantity totals and/or spacing requirements for all ground cover and shrubs planted from 1 and 5 gallon containers
- c) utilize base sheets with approved grading and lot layout. Grading informations should be screened to 50%. All information extraneous to landscape issues (ie. building footprints, grading and drainage notes etc.) should be screened and/or removed so that all landscape call outs and irrigation lines are clearly legible.
- d) utilize standard City irrigation details and specify previously accepted irrigation products whenever possible. Applicants should contact Engineering Services prior to plan submittal for information.

Three copies shall be submitted to Engineering Services. A set shall be routed to Planning to verify compliance of use permit conditions. Once all Engineering concerns are addressed, a final set of photo mylars shall be submitted for acceptance by the City Engineer. All applicable licenses and signatures shall be on each page of the set to be accepted.

# Landscape installation, maintenance and final acceptance

## I. INSTALLATION AND ACCEPTANCE FOR MAINTENANCE

The bond posted by the builder for the general infrastructure improvements shall include the streetscape and open space landscape improvements. None of this bond shall be released until the landscape installation is initially accepted by both Planning and Engineering staff. Initial acceptance for maintenance shall be based on compliance with the approved grading plan and the final working drawings as approved by the City Engineer. Should all other aspects of the infrastructure improvements be completed prior to the completion of the landscape work, all or part of the general improvement bond may be released with the approval of the City Engineer. But prior to this general bond release, the builder must post performance bond for the remaining landscape work. This bond shall cover the complete cost of the work, as estimated by either the builder's landscape architect, contractor, or City staff. (Note: the release and posting of all bonds shall be in compliance with the subdivision requirements of the Antioch Municipal Code.)

## II. MAINTENANCE PERIOD

Once the acceptance for maintenance is given, the builder is responsible for 90 days maintenance of the landscape improvements. A portion of the general bond posted for subdivision improvements shall be retained to reflect the cost of potential replanting should the builder fail to provide proper maintenance during this 90 day period. During this period, officials from the Engineering Services (parks and maintenance services) shall schedule regular walk-throughs with the builder's contractor to review the project's status, help refine maintenance practices, and to correct current deficiencies. Problems with the irrigation system shall be corrected by the next watering cycles, and all others by the next walk-through.

## III. FINAL ACCEPTANCE

At the end of the 90 days maintenance period, both Planning and Engineering shall review landscape improvements for final acceptance, using the following criteria (It should be noted

ATTACHMENT #1

Suggested plant list for Class II plantings - July 1989

Subject to revision - additional plants not currently on list will be considered on a case by case basis.

TREES

- Pinus elderica
- Pistacia Chinensis (Chinese Pitache)
- Quercus douglasii (Blue Oak)
- Quercus agrifolia (Coast Live Oak)
- Schinus molle (California Pepper)

SHRUBS

- Acacia redolens
- Arctosaphylos (Manzanita - various species)
- Baccharis pulularis - Pigeon Pt. (Prostrate Coyote Brush)
- Ceanothus (various species)
- Westringia Rosemarniformis

Shrubs that qualify for "wet zone" plantings:

- Atriplex Semibaccata (Creeping Saltbush)
- Artemesia caucasia (Spreading Sagebrush)
- Ceanothus (prostrate forms only)
- Myoporum parvitolium (Prostrate Myoporum)

NOTE: resources for possible additional plantings include:

- Water-Conserving Plants And Landscapes For The Bay Area, EBMUD, 1986
- Trees And Shurbs For Dry California Landscapes, by Bob Perry, Land Design Publishing, 1981

Corey\landscap

PLAN CHECK GUIDELINES date \_\_\_\_\_

AS BUILT PLANS MUST BE SUBMITTED TO CITY BEFORE PROJECT WILL BE FORMALLY ACCEPTED. Must Include 1 Set of Laminated 8 1/2" x 11" Reduced Scale Irrigation Plans.

THE DEVELOPER WILL BE RESPONSIBLE FOR SCHEDULING. 30 Day Inspections During Required 90 Day Maintenance Period.

Yes No N/A

Irrigation System:

- --- --- Check valves on any 10' or higher slope (KBI brand).
- --- --- Control valves as per our CD one valve/box.
- --- --- Isolation valves as required.
- --- --- 44 NP Quick coupler with locking lid and box located 12" from central valves installed as per our detail, ratio = 1 qc:4 valves or valve manifold area.
- --- --- Quick coupler 3" below box lid.
- --- --- Quick couplers next to tennis courts, picnic tables - 1 quick coupler at 2 opposing corners of tennis courts.
- --- --- 1 Quick coupler within 40' of tables.
- --- --- 1 Quick coupler/cul-de-sac.
- --- --- Controller - Rain Master EV-XX-SAT series for 8 stations or above. EVADJS sensors (if used).
- --- --- Irritrol MC+ on jobs under eight stations.
- --- --- Controllers installed per our CD details. Cabinet 4X size of controller.
- --- --- Pop up sprinklers instead of risers. Pop up bubblers 1-shrub, 2-tree.
- --- --- As Built plans made available before release of job.
- --- --- Sequence valves in order. Mark valve number on lid of valve box (2 1/2" letters and numbers).
- --- --- Manual sprinkler system for baseball infield.
- --- --- 1 PVC union on all valves with one gate valve.
- --- --- Brooks #1419 Box for Automatic Valves.  
#1100 Box for Gate & Quick Coupler Valves.
- --- --- Irrigation system designed to complete summer watering (80% ET) in 12 hours.
- --- --- Pressure check system 125 PSI for 2 hours on main lines.
- --- --- Sleeves under pavement and identifying marks put on pavement.
- --- --- RP Febco 825Y supported by concrete pad.
- --- --- Coverage check and 14 day watering period before planting.
- --- --- Swing joints on all heads.
- --- --- Sprinkler system guarantee shall be 1 year and any manufacturers warranties.
- --- --- Pipe shall be no closer than 4" to walkways 8" from buildings.
- --- --- Pipe-main line = PVC - 1120-1220, type I, schedule 40  
lateral line = PVC - 1120-1220, class 200.
- --- --- PVC solvent welds - all cuts shall be square; primer to be used.
- --- --- Fittings - schedule 80 - main line, schedule 40 - laterals.
- --- --- Thread sealant - non hardening compatible with pipe.
- --- --- Wire - U.L. approved for direct burial, copper, AWG-UF 600 volt #14 (minimum). Common wire shall be white (2 per system), control wires all same color other than white. Wires can be color coded according to use (i.e. orange = shrubs, red = turf, etc.).

Yes No N/A

- --- --- One bubbler per tree (min.) in all areas including turf.
- --- --- Wires shall be labelled at clock with station number.
- --- --- Splicing - no splices other than in automatic valve boxes.
- --- --- Packaged approved underground splice connectors only (i.e. Pentite, snaptite. 3M-DBY Seal Pack).
- --- --- Extra wires (of one different color other than what is already used) shall run along mainline at a ratio of 1 extra wire per 6 stations used on clock. These wires shall loop inside all valve boxes.
- --- --- Operations Manual - to be supplied in three ring binder. Shall include manufacturers data sheets, maintenance and parts information of any equipment installed and supplier from where it was obtained.
- --- --- Flow monitor and shut-off master valve on slopes over 3:1 (Data Industrials).
- --- --- Pepco Drip Systems only. Emitter tubing not to exceed 15'. Emitters and pip shall be buried.
- --- --- Irrigation Heads - located 4" inside fences, curbs, structures, walks.
- --- --- Supply a laminated, color coded (by station) reduced scale 8-1/2"x11" layout plan at each controller.
- --- --- Pop-up bubblers only on cul-de-sacs - 1/shrub, 2/tree.
- --- --- Phone line to controllers.

Landscaping:

- --- --- Deep root boxes on all trees within 10' of pavement.
- --- --- Trees shall not be planted in areas confined by pavement that are less than 10' from the pavement.
- --- --- All trees to be 15 gallon size unless other sizes approved.
- --- --- Contractor to provide City with soil analysis recommendations from City approved laboratory.
- --- --- Contractor shall follow recommendations of testing lab. and inform City of recommendation for approval.
- --- --- Amendments shall be 6 cubic yards/1,000 sq ft of nitrified redwood of fir compost rototilled 8" into native soil.
- --- --- Two inch layer of bark mulch (size 1/4"-1/2" or shredded) shall be distributed over all ground cover areas and 3" under shrubs and unplanted areas.
- --- --- City shall be notified 3 days prior to amending or fertilizing planting areas for inspection during work.
- --- --- Pre-emergent herbicide applied to all ground cover, non-planted areas and tot lots, prior to sand and bark installation, at manufacturer's recommended rates. Contact City 24 hours prior to application.
- --- --- All plant material to be inspected by City prior to installation.
- --- --- Agriform (20-10-5) tablets installed at manufacturers recommendation rates under all trees and shrubs.
- --- --- Fertilizer shall be a urea based 16-6-8, or City approved product at recommended rate approved by City.
- --- --- Developers to provide City standard park name signs as per our detail, and install.
- --- --- Ninety day maintenance period after final inspection on all areas. Maintenance period shall require weekly maintenance. Provide schedule prior to 90 day maintenance

Yes No N/A

- --- --- period. Schedule 1 inspection per month with City.
- --- --- Concrete "V" ditch at base of slope adjacent to property line.
- --- --- Use Hard Fescue (*Festuca Longifolia*) for slope erosion control.
- --- --- One year guarantee on trees.
- --- --- One year guarantee on shrubs.
- --- --- Shrub type to be a maximum of 3' in height when mature on any median or intersection radius in view of traffic.
- --- --- As Built plans made available before release of job.
- --- --- Jute netting on any planted slope greater than 3:1.
- --- --- Areas under trees and shrubs shall be excavated to a depth of 3' in areas where compaction has previously occurred, i.e. cul-de-sacs, medians, etc.

Rest Room:

- --- --- Provide 1 gallon of each paint color used to City.
- --- --- Vandal proof fasteners on all inside fixtures.
- --- --- Two inch water supply to building.
- --- --- Cleanout at drinking fountain trap.
- --- --- Pressure regulator on supply.
- --- --- Roof detail (to match subdivision).
- --- --- Santana Plastic Partitions.
- --- --- Fluorescent lights - vandal proof Kenall fixtures: one on each exterior corner of building, one over lavatory, one over toilet area, one in storeroom. All on timer except storeroom.
- --- --- Pneumatic closers on men's and women's doors.
- --- --- State approved signing.
- --- --- Separate shut-off valve for drinking fountain.
- --- --- Shut-off valve for building.
- --- --- Hose bib with check valve inside each room.
- --- --- Stainless steel mirrors.
- --- --- Toilet Paper Dispensers shall be roll type. Vandal Stop Products, 851 Al Marida Dr., Cambell, CA 95008
- --- --- Cap on sewer vent.
- --- --- Phone line stubbed into storeroom.
- --- --- Separate 100 amp service to circuit breaker panel.

Paving:

- --- --- Concrete only - unless approved.
- --- --- 10' width on main access paths.
- --- --- Sweeping curves for vehicular traffic from street through park.
- --- --- 12" wide mowbands.
- --- --- Metal pipe, capped, painted, locking ballards - locks above grade (see bollard detail).

Play Equipment Area:

- --- --- Do not locate drinking fountain within 100'.
- --- --- Metal, powder coated as per our specifications.
- --- --- Lappis #16-20 sand - 12" deep minimum.
- --- --- Drainage system as per our detail.

Yes No N/A

--- --- --- Concrete curb and minimum 10' sidewalk around play area.  
 --- --- --- Meets all federal and state product and installation codes.  
 --- --- --- Provide 1-Mar-Ga sand comb to City. Mar-Ga Simple Concepts, P.O. Box 4910, Salinas, CA 93912.

Structures:

--- --- --- Removable ballards shall be color-coated round steel pipe timberform 2190-3R or equivalent (per our detail).  
 --- --- --- 3'vinyl clad chain link perimeter fence around entire site or property lines. 6 gauge fabric. Top-rail, bottom wire. 12" mowband at base of fence.  
 --- --- --- Centrecon Area Lights with vandal proof screws on access plates.  
 --- --- --- Picnic tables per our detail.  
 --- --- --- Ratio of 2 barbecues/3 tables and 1 garbage can/2 tables.  
 --- --- --- Garbage can holders - Patterson Williams 1151-01 or 1151-02 with lockable hold downs.  
 --- --- --- Two #1151-02/tot lot located at opposite ends of area.  
 --- --- --- One #1151-01 next to rest room.  
 --- --- --- Two #1151-01 next to dugouts at baseball field.  
 --- --- --- All drinking fountains connected to drain system. Install drain cleanout and shut off valve.  
 --- --- --- Barbecue - Miracle #1104 or equivalent.  
 --- --- --- Drinking Fountain Haws standard with vandal proof screws - drain installed into park drainage system.  
 --- --- --- Basketball offset upright = 1525 with #14 backstop and #8131 goal ring.  
 --- --- --- Tennis Court - post = Patterson Williams #2201-40 with #8351 net.  
 --- --- --- Prep. Tennis Courts for future lighting.  
 --- --- --- Picnic Tables - Mexico Forge 866-1576.  
 --- --- --- Area lights on timers or one photocell in central location next to circuit breakers or on rest room building.  
 --- --- --- Park regulation signs (our detail) at each Park entrance.  
 --- --- --- Park name sign (our detail) provided by developer.

Baseball Field:

--- --- --- Use Hollywood brand: (Contractor to install per our detail)  
                     Base anchors - BBP-44  
                     Homeplate - HPS  
                     Pitching - BBPB  
                     Bases - BBP  
 --- --- --- Check detail for infield - minimum 4" infield mix. Areas to slope away from infield (including pavement behind backstop).  
 --- --- --- Concrete under dugout.  
 --- --- --- Install 2"x 12" finished Pressure Treated Douglas Fir at base of fence on infield side of fence - 3 high behind home plate, 1 high along the rest of the fence.

Yes No N/A

Plant Material

--- --- --- Turf varieties shall be fine tall fescues, such as:  
 Olympic, Adventure, Jaguar, Falcon, Hound, Apache.  
 --- --- --- Irrigated meadows and slope situations shall be: hard  
 fescue (festuca ovina ssp. duriuscula) at a rate of:  
 seed = 220 lbs/acre (95% purity; 85% germination)  
 mulch = 1800 lbs/acre  
 R-binder = 60 lbs/acre  
 Fertilizer = 400 lbs/acre

--- --- --- Non irrigated erosion control.  
 --- --- --- The following erosion control mixture is to be used as the  
 City Standard for all non-irrigated hydro-seeded  
 applications (unless noted otherwise):

<u>BOTANICAL NAME</u> <u>(COMMON NAME)</u>	<u>MIN. %</u> <u>PURITY</u>	<u>MIN. %</u> <u>GERMINATION</u>	<u>LB/ACRE</u>
Festuca Meglura (Zorro Annual Fescue)	95%	85%	20
"Hycon" Rose Clover	90%	70%	20
Lupinus Nanus (Sky Lupine)	90%	70%	4
Eschscholtzia Californica (California Poppy)	90%	70%	4
Lobularia Maritima (Sweet Alyssum)	90%	70%	4

--- --- --- The erosion control materials shall be mixed and applied  
 in approximately the following proportions:

<u>MATERIAL</u>	<u>PER ACRE (SLOPE MEASUREMENT)</u>
Seed	52 Pounds
Wood Fibre Mulch	1800 Pounds
R Binder	60 Pounds
Fertilizer (20-20-10)	400 Pounds
Water	As Needed for Application



## Appendix F: Demand Management Measures Reports for 2006-2010

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# BMP Data Report: FY06

Antioch

July 1, 2005 to June 30, 2006

<b>BMP 1</b>	
Number of SF Residential Surveys conducted	87
Number of MF Residential Surveys conducted	29
<b>BMP 2</b>	
# of showerheads distributed to MF sites	9
# of showerheads installed in MF sites	0
# of showerheads distributed to SF sites	31
# of showerheads installed in SF sites	5
Total # of showerheads distributed and installed to SF and MF	45
# of faucet aerators installed or distributed to MF sites	68
# of faucet aerators installed or distributed to SF sites	129
# of flappers installed or distributed to MF sites	0
# of flappers installed or distributed to SF sites	2
# Waterwise Gardening CD ROMs	2
<b>BMP 5</b>	
Number of Mixed use CII landscape audits conducted	4
Number of dedicated irrigation account landscape audits conducted	0
Number of Accounts with Water Budgets who received 2 or more Budget Site Reports in FY(	0
FY 06 Total Water Budget for 'confirmed' accounts	0
FY 06 Total Water Consumption for 'confirmed' accounts	0
Number of Standard Controller Rebates	0
Number of ET Controller Rebates (SF)	0
Number of ET Controller Rebates (CII or MF)	0
Number of Drip Retrofits (# OF STATIONS)	0
Number of Sprinkler Rebates (# of HEADS)	0
Number of Rain sensors	0
Number of Other Irrigation Devices	0
\$\$ Landscape REBATE DOLLARS	0
<b>BMP 6</b>	
Number of washer rebates (WF=6.0 or less)	294
Number of washer rebates (WF= 6.1 to 8.5)	51
Number of washer rebates (WF= 8.6 to 9.5)	0
Total Residential Washer Rebates	345
<b>BMP 9</b>	
Number of audits completed at commercial accounts (20)	13
Number of audits completed at Industrial accounts (30)	0
Number of audits completed at Institutional accounts (40)	0
Number of CII ULFTs installed in:	0
Offices	0
Eating Establishments	4
Hotels/ Motels	0
Retail/ Wholesale	0
Industrial	0
Health	0
Churches	4
Schools	0
Government	0
Other	12
Total Number of CII ULFTs Installed	20
Number of CII washer rebates given	0
Number of CII Urinal Rebates	0
Number of Pre-Rinse Spray Nozzles installed	27
Number of other CII Devices	0
Number of other CII Devices	0
Number of other CII Devices	0
<b>BMP 14</b>	
Number of SF ULFT distribution	315
Number of MF ULFT distribution	25
Total number of SF and MF ULFTs distributed	340

# BMP Data Report: FY07

□ July 1, 2005 to June 30, 2007

Antioch

<b>BMP 1</b>	
Number of SF Residential Surveys conducted	58
Number of MF Residential Surveys conducted	328
<b>BMP 2</b>	
# of showerheads distributed to MF sites	25
# of showerheads installed in MF sites	25
# of showerheads distributed to SF sites	6
# of showerheads installed in SF sites	3
Total # of showerheads distributed and installed to SF and MF	59
# of faucet aerators installed or distributed to MF sites	117
# of faucet aerators installed or distributed to SF sites	103
# of flappers installed or distributed to MF sites	20
# of flappers installed or distributed to SF sites	1
# Waterwise Gardening CD ROMs	0
<b>BMP 5</b>	
Number of Mixed use CII landscape audits conducted	8
Number of dedicated irrigation account landscape audits conducted	0
Number of Accounts with Water Budgets who received 2 or more Budget Site Reports in FY07	0
FY 07 Total Water Budget for 'confirmed' accounts	0
FY 07 Total Water Consumption for 'confirmed' accounts	0
Number of Standard Controller Rebates	0
Number of SMART Controller Rebates (SF)	0
Number of SMART Controller Rebates (CII or MF)	2
Number of Drip Retrofits (# OF STATIONS)	0
Number of Sprinkler Rebates (# of HEADS)	0
Number of Rain sensors	0
Number of Other Irrigation Devices	0
\$\$ Landscape REBATE DOLLARS	2360
<b>BMP 6</b>	
Number of washer rebates (WF=4.5 or less)	149
Number of washer rebates (WF= 4.6 to 6.0)	62
Number of washer rebates (WF= 6.1 to 7.5)	36
Total Residential Washer Rebates	247
<b>BMP 9</b>	
Number of audits completed at commercial accounts (20)	8
Number of audits completed at Industrial accounts (30)	0
Number of audits completed at Institutional accounts (40)	0
Number of CII HETs in:	0
Offices	0
Eating Establishments	0
Hotels/ Motels	0
Retail/ Wholesale	0
Industrial	0
Health	0
Churches	0
Schools	0
Government	0
Other	0
Total Nunumber of CII HETs:	0
Number of CII washer rebates given	0
Number of CII Urinal Rebates	0
Number of Pre-Rinse Spray Nozzles installed	0
Number of other CII Conductivity Meters	0
Number of other CII Devices	0
Number of other CII Devices	0
<b>BMP 14</b>	
Number of SINGLE FAMILY HETs (rebate or installed)	26
Number of Multi-Family HETs (rebate or installed)	723
Total number of SF and MF HETs	749

# BMP Data Report: FY08

□ July 1, 2007 to June 30, 2008

Antioch

BMP 1	
Number of SF Residential Surveys conducted	50
Number of MF Residential Surveys conducted	136
BMP 2	
# of showerheads distributed to MF sites	17
# of showerheads installed in MF sites	7
# of showerheads distributed to SF sites	11
# of showerheads installed in SF sites	1
Total # of showerheads distributed and installed to SF and MF	36
# of faucet aerators installed or distributed to MF sites	77
# of faucet aerators installed or distributed to SF sites	88
# of flappers installed or distributed to MF sites	0
# of flappers installed or distributed to SF sites	0
# Waterwise Gardening CD ROMs	0
BMP 5	
Number of Mixed use CII landscape audits conducted	0
Number of dedicated irrigation account landscape audits conducted	2
Number of Accounts with Water Budgets who received 2 or more Budget Site Reports in FY07	0
FY 07 Total Water Budget for 'confirmed' accounts	0
FY 07 Total Water Consumption for 'confirmed' accounts	0
Number of Standard Controller Rebates	0
Number of SMART Controller Rebates (SF)	0
Number of SMART Controller Rebates (CII or MF)	0
Number of Drip Retrofits (# OF STATIONS)	0
Number of Sprinkler Rebates (# of HEADS)	0
Number of Rain sensors	0
Number of Other Irrigation Devices	0
\$\$ Landscape REBATE DOLLARS	0
BMP 6	
Number of washer rebates (WF=4.5 or less)	240
Number of washer rebates (WF= 4.6 to 6.0)	75
Number of washer rebates (WF= 6.1 to 7.5)	0
Total Residential Washer Rebates	315
BMP 9	
Number of audits completed at commercial accounts (20)	1
Number of audits completed at Industrial accounts (30)	0
Number of audits completed at Institutional accounts (40)	0
Number of CII HETs in:	0
Offices	0
Eating Establishments	3
Hotels/ Motels	0
Retail/ Wholesale	0
Industrial	0
Health	0
Churches	0
Schools	0
Government	0
Other	0
Total Number of CII HETs:	3
Number of CII washer rebates given	0

Number of CII Urinal Rebates	0
Number of Pre-Rinse Spray Nozzles installed	0
Number of other CII Conductivity Meters	0
Number of other CII Devices	0
Number of other CII Devices	0
<b>BMP 14</b>	
Number of SINGLE FAMILY HETs (rebate or installed)	81
Number of Multi-Family HETs (rebate or installed)	51
Total number of SF and MF HETs	132

<b>BMP Data Report: FY09</b>	<b>Antioch</b>
<b>July 1, 2008 to June 30, 2009</b>	
<b>Residential</b>	
Number of SF Residential Surveys conducted (assume Indoor and Landscape included)	72
Number of MF Residential INDOOR Surveys conducted	2
Number of SF Showerheads provided	598
Number of SF Aerators provided	761
Number of MF Showerheads provided	51
Number of MF Aerators provided	3
Number of Residential Washer Rebates (tier 3)	563
Number of Residential Washer Rebates (tier 2)	73
Number of MF Washer Rebates (common laundry facility) (tier 3)	0
Number of SF HET Rebates	348
Number of MF HET Rebates	13
New Development Standards (# of new SF accounts)	0
New Development Standards (# of new MF dwellings)	0
<b>Landscape</b>	
Number of Mixed use CII or MF landscape audits conducted	0
Number of dedicated irrigation account landscape audits conducted	7
Number of Accounts with Water Budgets who received 2 or more Budget Site Reports during year	0
Annual Total Water Budget for accounts with Water Budgets	0
Annual Total Water Use for accounts with Water Budgets	0
Number of SF SMART Controller Rebates (# of stations)	0
Number of SF SMART Controller Rebates (# of controllers)	0
Number of CII/ MF SMART Controller Rebates (# of stations)	0
Number of CII/ MF SMART Controller Rebates (# of controllers)	0
Total Smart Timer REBATE DOLLARS Provided	\$ -
Number of CII/ MF Drip Retrofits (# OF STATIONS)	0
Number of CII/MF Sprinkler Rebates (# of HEADS)	0
Number of CII/ MF MP Rotator Rebates (# of nozzles)	0
Number of Large Rotors	0
Number of None Drip Pressure Regulators	0
Total Landscape REBATE DOLLARS provided for Irrigation upgrades other than Smart timers	\$ -
Number of SF Cash for Grass Rebates	0
Total SF Cash for Grass Rebate Dollars Provided in Year	0
Number of CII/ MF Cash for Grass Rebates	0
Total CII/ MF Cash for Grass Rebate Dollars Provided in Year	\$ -
Fall Back Watering Campaign	0
<b>Commercial</b>	0
Number of CII audits completed	4
Number of CII Washer Rebates (Laundrymat)	0
Number of CII HET Rebates	2
Number of CII Urinal Rebates	0
Number of CII Pre-Rinse Spray Nozzles provided	0
Number of Water Brooms Rebated	2
Car Wash Recycling Rebate	0
Number of CII Conductivity Meters	0
Number of CII Restaurant Food Steamer Retrofits	0
Number of CII Restaurant Dishwasher Retrofits	0
New Development Standards (# of new CII accounts)	0

<b>BMP Data Report: FY10</b>	<b>Antioch</b>
<b>July 1, 2009 to June 30, 2010</b>	
<b>Residential</b>	
Number of SF Residential Surveys conducted (assume Indoor and Landscape included)	62
Number of MF Residential INDOOR Surveys conducted	28
Number of SF Showerheads provided	98
Number of SF Aerators provided	144
Number of MF Showerheads provided	100
Number of MF Aerators provided	100
Number of Residential Washer Rebates (tier 3)	694
Number of Residential Washer Rebates (tier 2)	59
Number of SF HET Rebates	752
Number of MF HET Rebates	23
New Development Standards (# of new SF accounts)	0
New Development Standards (# of new MF dwellings)	0
<b>Landscape</b>	
Number of Mixed use CII or MF landscape audits conducted	0
Number of dedicated irrigation account landscape audits conducted	0
Number of Accounts with Water Budgets who received 2 or more Budget Site Reports during year	0
Annual Total Water Budget for accounts with Water Budgets	0
Annual Total Water Use for accounts with Water Budgets	0
Number of SF SMART Controller Rebates (# of stations)	21
Number of SF SMART Controller Rebates (# of clocks)	2
Number of CII/ MF SMART Controller Rebates (# of stations)	230
Number of CII/ MF SMART Controller Rebates (# of controllers)	6
Total Smart Timer REBATE DOLLARS Provided	9725
Number of CII/ MF Drip Retrofits (# OF STATIONS)	0
Number of CII/MF Sprinkler Rebates (# of HEADS)	0
Number of CII/ MF MP Rotator Rebates (# of nozzles)	0
Number of CII/MF Master Valves	0
Number of CII/MF Sub Meters	0
Number of CII/MF Flow Meters	0
Number of CII/ MF Rain sensors	0
Number of CII/MF Pressure Compensating Screens	0
Number of CII/MF Check Valves	0
Total Landscape REBATE DOLLARS provided for Irrigation upgrades other than Smart timers	0
Number of SF Cash for Grass Rebates	4
Total SF Cash for Grass Rebate Dollars Provided in Year	1437
Number of CII/ MF Cash for Grass Rebates	0
Total CII/ MF Cash for Grass Rebate Dollars Provided in Year	0
Fall Back Watering Campaign	0
<b>Commercial</b>	
Number of CII audits completed	0
Number of Commercial Washer Rebates (Laundromat or Common Laundry Facility)	0
Number of CII HET Rebates	19
Number of CII Urinal Rebates	0
Number of CII Pre-Rinse Spray Nozzles provided	0
Number of CII Conductivity Meters	0
Number of CII Restaurant Food Steamer Retrofits	0

Number of CII Restaurant Dishwasher Retrofits	0
New Development Standards (# of new CII accounts)	0